The Early Retiree Divests the Workforce: A Quantitative Analysis of Early Retirement Among Health Professionals

by

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Abstract

Introduction: Availability of health professionals is fundamental to a population's health. Despite shortages of health professionals, we know little about voluntary and involuntary exits from the workforce among publicly-employed Canadian Registered Nurses (RNs) and allied health professionals (AHPs). Limited data on "supply" inhibits the effectiveness of Canadian health human resource workforce planning. Early retirement is common among Canadian RNs; data are lacking on AHPs. **Purpose:** To determine whether publicly-employed Canadian RNs and AHPs differ in their approach to workforce departures between the ages of 45 and 85 years. **Objectives:** To: 1) develop and validate conceptual models of retirement among RNs and AHPs; 2) identify and compare factors reported to influence retirement decisions among RNs/AHPs; 3) explore the relative importance of factors on early vs. late/"on-time" retirement among RNs/AHPs; 4) quantitatively test conceptual models of early and involuntary retirement among RNs/AHPs; 5) evaluate, comparatively, model fit and association of identified variables with either early or involuntary retirement across occupational groups, and; 6) identify and discuss implications for RN and AHP workforce policy. **Methods**: To achieve objective 1, I reviewed the retirement literature (n = 23 studies) and conducted interviews with Canadian RNs/AHPs (n = 14). My source of quantitative data, utilized to achieve objectives 2 through 6, was the Canadian Longitudinal Study on Aging (CLSA). To achieve objectives 2 and 3, I conducted exploratory data analyses (n = 794 RNs and n = 393 AHPs). To achieve objectives 4 and 5, I conducted logistic regressions for the outcome of early retirement (n = 483 RNs and n = 177 AHPs). To achieve objectives 4 and 5, I conducted a logistic regression for the outcome of involuntary retirement using a combined RN and AHP sample (n = 277). **Results**: The

conceptual model of early retirement had eight categories (38 variables): workplace characteristics; sociodemographics; attitudes/beliefs; broader context; organizational factors; family; lifestyle/health, and; work-related. The model of involuntary retirement had four categories (8 variables): broader context; sociodemographics; lifestyle/health and family. Caregiving responsibilities (variable) was added based on interview data. The average age of RN retirement (58.1 years) was significantly lower than that of AHPs (59.4 years). Financial possibility and desire to stop working were among the most frequently reported factors contributing to early and on time/"late" retirement among RNs and AHPs; 85% of RNs and 77% of AHPs retired early. The operationalized model of early retirement explained a maximum of 25% of variance in RN/AHP early retirement. Both RNs and AHPs whose retirement decision had been influenced by organizational restructuring were more likely to have retired early. RNs who felt retirement was financially possible and those with caregiving responsibilities were more likely to retire early. RNs noting a "desire to stop working" as a factor influencing retirement had lower odds of early retirement. Only 8% of variation in involuntary retirement was explained by the tested model. Only self-rated general health and occupation were associated with increased odds of involuntary retirement in a combined sample of RNs and AHPs. **Discussion**: RNs/AHPs consider many factors when contemplating retirement; some are sensitive to intervention, which generates possibilities for extending RN/AHP work-lives. The prevalence of involuntary retirement among RNs (23%) aligns with national prevalence; only 7% of AHPs reported involuntary retirement. More research is needed to i) deepen our understanding of publicly-employed RN/AHP pathways to early and involuntary retirement, and ii) understand the reasons for differences in RN and AHP pathways to retirement. **Conclusion**: There is much to learn about publicly-employed RN and AHP pathways to retirement. The models tested in this study

had much greater explanatory power for early retirement than involuntary retirement (25 vs 8% explained variance) suggesting that much is unknown regarding determinants of involuntary retirement. The conceptual models have only been partially tested – further quantitative testing is needed; such testing requires a larger sample of RNs and AHPs and the inclusion of work-related variables. Potential strategies to reduce the rate of early retirement may include: reducing the frequency of restructuring in healthcare and improving its' implementation; legislation to expand paid leave policies to those providing informal care, and; subsidization of caregiving support for would-be caregivers wishing to remain in the workforce. Work-based interventions that improve self-rated health may reduce the rate of involuntary retirement.

Preface

This dissertation is an original work by Sarah Jean Hewko. The research project received research ethics approval on Jan 15, 2016 from the University of Alberta Research Ethics Board 2 (Pro00060985) (see Appendix 1). Amendments were approved on Apr 11, 2016 and Mar 20, 2017.

For all four papers included in my dissertation, my co-authors include my dissertation committee members – Dr. Trish Reay, Dr. Carole Estabrooks and Dr. Greta Cummings (PhD supervisor) (in that order). The committee made significant contributions to the methods for the project (as a whole) throughout the process of candidacy and during/following the defense of my proposal. I was responsible for preparation of all sections of each manuscript.

One paper from this dissertation, "Development and validation of conceptual models of early and involuntary retirement among Canadian Registered Nurses and allied health professionals" (Chapter 2), has been accepted for publication in the *Canadian Journal on Aging*. It will appear in Volume 37, Number 3 of the journal in 2018. I was responsible for the literature review, qualitative validation, manuscript composition, submission and revision of the manuscript. Dr. Cummings was the manuscript's supervisory author and provided formative feedback to improve the manuscript prior to the initial submission and the submission of the revisions.

The second paper, "Why did they leave so soon? A descriptive analysis of retirement patterns among Canadian Registered Nurses and allied health professionals" (Chapter 3), will be submitted to *Human Resources for Health*. The third paper "The early retiree divests the health workforce: A quantitative analysis of early retirement among Canadian Registered Nurses and allied health professionals" (Chapter 4) will be sent to *The Journal of Human Resources* (35-page limit). The fourth paper "Can untimely late career workplace departures be prevented? A quantitative evaluation of a model of involuntary retirement among publicly-employed Registered Nurses and allied health professionals" (Chapter 5) will be sent to the *Journal of Organizational Behavior* (40-page limit).

Dedication

This dissertation is dedicated to my husband, Joel Hewko and my children Solomon and Ginny. You have been ceaselessly patient with me as I have dedicated so much of our time, money and resources to my pursuit of a doctorate. To my parents – Denis Kielly, Lois Kielly, Norma Sherret and Dave McRuvie – thank you for supporting me for the long haul. This dissertation is also dedicated, in part, to Deborah Lelievre. At a pivotal point in my life, she demonstrated to me the power of a health professional to change the course of human lives. Without her encouragement and support during that time, I would not be where I am today. Thank you.

Acknowledgements

I first wish to acknowledge the contributions of my supervisor, Dr. Greta Cummings. Through my work with her I have developed and honed many of the skills required to excel in academia. In fact, all three of my committee members – Dr. Greta Cummings, Dr. Carole Estabrooks and Dr. Trish Reay – have consistently, both through provision of formative feedback and role modeling, facilitated my transformation from knowledge consumer to scholar (both a consumer and creator of knowledge).

I would also like to acknowledge the principal investigators and administrators responsible for the institution of Canada's own longitudinal studying on aging (the CLSA) My thesis project would not have been possible had I not had free access to CLSA data. Similarly, use of the Health Research Data Repository (HRDR) via the Faculty of Nursing, again free of charge, to safely store my data during analysis has been instrumental to the successful completion of my thesis project.

I would also like to acknowledge the University of Alberta's Faculty of Graduate Studies and Research, Faculty of Nursing, and Graduate Student's Association for providing financial support, whether for tuition, general expenses or academic travel over the course of my PhD program.

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CHAPTER 1
Dissertation Overview

Introduction to the Problem

Skilled health professionals are essential in the delivery of health services, which are fundamental to a population's health. The Global Health Workforce Alliance and World Health Organization have predicted a 79% increase to the existing deficit of skilled health professionals by 2035 (Global Health Workforce Alliance & World Health Organization, 2014). We are, clearly, reaching the point of a critical shortage of health human resources – one induced by a cumulative shortage of nurses, AHPs, administrators and physicians (Dubois & Singh, 2009). Significant contributors to the existing shortage of skilled health providers include several global trends: low birth rates (Castonguay, 2006), extended life expectancy (Castonguay, 2006; FitzGerald, Keane, Reid, & O'Neill, 2013), an aging workforce (Cahill, Giandrea, & Quinn, 2015; Cook, 2015; Dubois & Singh, 2009; Dussault & Dubois, 2003; George, Springer, & Haughton, 2009; Proper, Deeg, & van der Beek, 2009), and selective early retirement (Dal Bianco, Trevisan, & Weber, 2015; Dubois & Singh, 2009; Proper et al., 2009). Prolonged, significant (i.e., steady, full-time) participation in the labour force is becoming progressively more necessary (Truxillo, Cadiz, & Hammer, 2015).

Why is it, then, that early retirement is a common occurrence among Registered Nurses and allied health professionals (AHPs)? In Canada, between 1997 and 2000, 48.9% of health care providers retired before the age of 65 years. Retirement before the standard retirement age is, notably, typical among RNs (Organisation for Economic Co-operation and Development, 2016; Ono et al., 2013): as of 2001, the average age of RN retirement in Canada was 56 (O'Brien-Pallas et al., 2003). Older Canadian workers are being increasingly pressured to delay their retirement (Bélanger, Carrière, & Sabourin, 2016); however, a trend toward later retirement has yet to be seen in the nursing workforce. A review of Canadian Institutes for Health Information (CIHI) data revealed that the supply of nurses, by age, remained roughly constant between 2005 and 2014 (Canadian Institute for Health Information, 2015). I was unable to identify the average age of retirement among AHPs from existing sources.

Retirement is only one of many factors implicated in RN workforce shortages. However, as baby boomers made up close to 39% of the RN workforce in Canada in 2014, health care leaders are invested in identifying reasons for early exit from the RN workforce (O'Brien-Pallas

et al., 2003). As detailed in Paper 1, research exists in the field of RN retirement but, at least to date, has failed to provide explicit guidance to employers and policy makers seeking to delay RN retirement. The absence of human resource data for the Canadian allied health workforce has made longer-term workforce planning challenging (Association of Canadian Community Colleges, 2012). The majority of health human resource research and policy has been focused on the nurse and physician workforces. Unfortunately, problematic shortages of multiple allied health professionals are prevalent across Canada. Such shortages often result in the escalation of health expenditures and hazardous gaps in service (Association of Canadian Community Colleges, 2012).

Below I summarize the project purpose and outline the study design and data sources. I also define key terms including early retirement, involuntary retirement, allied health professional and publicly-employed. Finally, I outline where I situate my work as a health sciences researcher. The chapter concludes with a brief description of the four papers that constitute this dissertation and the linkages among them.

Project purpose, objectives and summary

The purpose of this study was to determine whether publicly-employed Canadian RNs and AHPs who are currently between the age range of 45 to 85 years differ(ed) in their approach to workforce departures. My research provides detailed, timely information about publicly employed RNs and AHPs plans for retirement. This is the first study to explicitly explore similarities and differences in RN and AHP processes of retirement-decision making. This was the first Canadian study to systematically examine differential effects of diverse socio-demographic, lifestyle and health related factors on early and involuntary retirement outcomes across health professions (specifically Registered Nursing and the allied health professions).

My specific objectives were to:

1) develop and validate conceptual models of retirement among RNs and AHPs (Chapter 2, Paper 1)
2) identify and compare factors reported to influence retirement decisions among RNs/AHPs (Chapter 3, Paper 2)
3) explore the relative importance of factors that influence early retirement and on-time or "late" retirement among RNs/AHPs (Chapter 3, Paper 2)

4) quantitatively test conceptual models of early and involuntary retirement among RNs/AHPs (Chapters 4 and 5, Papers 3 and 4)
5) assess model fit and association of identified variables with either early or involuntary retirement across occupational groups (Chapters 4 and 5, Papers 3 and 4)
6) identify and discuss implications for RN and AHP workforce policy (meso- and macro-level) and contribution to theory (all chapters, particular focus in chapter 6)

Study design

This was a retrospective, cross-sectional study prefaced by the development and validation of conceptual models to guide quantitative analyses.

Data sources

Qualitative data.

Interviews with health professionals: I collected primary interview data with which to validate the conceptual models of early and involuntary retirement among health professionals that I developed using the literature. Relying on maximum variation sampling principles (Sandelowski, 1995), I purposively recruited a demographically diverse group (n= 14) of health professionals from 45 to 85 years of age (see Appendix 2 and Appendix 3) with a goal of evaluating the face validity of the models. Most participants were recruited from within my personal network and the networks of my professional colleagues (Légaré et al., 2011), friends and family (i.e., snowball sampling). Each participant reviewed the literature-derived conceptual models for clarity, logic and relevance. Where warranted, the literature-derived models were adjusted based on qualitative findings.

Quantitative data.

Canadian Longitudinal Study on Aging (Raina et al., 2009): The CLSA, an initiative of Canada's Institutes for Health Research, is guided by three primary objectives: first, "to examine aging as a dynamic life course process"; second, to investigate inter-relationships between extrinsic and intrinsic factors in mid- to late life, and; third, to capture trajectories, transitions and profiles of age-related developments (Kirkland et al., 2015). More than 50,000 randomly selected 45 to 85 year-old Canadians (from across all ten provinces) have participated. Near 20,000 are included in the tracking cohort with 30,000 in a comprehensive cohort. Both cohorts completed surveys - those in the tracking cohort completed their surveys over the telephone. Comprehensive cohort members completed the survey face-to-face with research staff in their

home. Included in the survey are questions related to demographics, health status, health behaviours, physical ability and status, psychological/mental health, socioeconomic status and participation in the workforce (Canadian Longitudinal Study on Aging, n.d.). Those in the comprehensive cohort have attended and will continue to attend site visits where research staff can collect biological information.

The CLSA will continue to collect follow-up data over 20 years, with waves of data collection every three years (Kirkland et al., 2015; Raina et al., 2009). The CLSA was developed to provide an infrastructure for state-of-the-art, interdisciplinary, population based research. Despite having only released data sets for the first wave of data collection, the CLSA has already begun to enhance understanding of aging processes and the factors shaping Canadians' experiences of aging (Kirkland et al., 2015; Raina, Wolfson, & Kirkland, n.d.). The last of the baseline survey data was collected in April of 2015 (Canadian Longitudinal Study on Aging, 2015). Collection of follow-up data has already begun. For our study, we accessed baseline data for all respondents in both cohorts (Tracking and Comprehensive).

Key terms

Early retirement: retirement before the age of 65.

This definition is in-line with what van den Berg, Elders and Burdorf (2010) reported as being the most commonly employed definition of early retirement following a systematic review of longitudinal studies of non-disability early retirement (van den Berg, Elders, & Burdorf, 2010).

Involuntary retirement: occurs when an individual perceives themselves as having no control over their retirement decision.

The majority of literature-derived precipitators of involuntary retirement are health related (van Rijn, Robroek, Brouwer, & Burdorf, 2014). Although not discussed in the retirement literature reviewed for these models (meta-analyses and profession-specific studies), organizational restructuring, institutional and/or federal and provincial legislation (e.g. mandatory retirement age) (Ebbinghaus, & Radl, 2015) and caregiving requirements (Humble, Keefe, & Auton, 2012) are also reported as precipitating factors for involuntary retirement.

This definition is associated with subjective measurement of involuntary retirement, such as is employed in the CLSA. We discuss issues with measurement of involuntary retirement at length in Paper 4 (Chapter 5).

Allied health professionals: health professionals with a (minimum) requirement of baccalaureate-level education - excluding dentists, psychologists, counsellors, nurses and physicians.

Allied health has no single definition (Association of Canadian Community Colleges, 2012; Elwood, 2013). The term commonly refers to occupational therapists, physiotherapists, dietitians, pharmacists, speech language pathologists and clinical social workers. Recreation therapists, respiratory therapists and medical laboratory technologists were excluded as entry-level education requirements were not consistently at the level of a bachelor's degree.
Publicly-employed: in the Canadian setting, this equates to employment with a provincial health authority.

In Canada, other potential employers of health professionals would also be considered public – these include schools (elementary, secondary, post-secondary), governments and the military. Although health professionals working in these settings may have similar salaries and benefits, their work environments will differ significantly from those employed in provincial health authorities. Our goal in limiting the sample to employees of provincial health authorities was to maximize the relevance of our findings and recommendations to those concerned with the function of the Canadian health system (as administered by provincial health authorities).

Employment within a provincial health authority can be in a hospital, public health, home care, supportive living, or long-term care setting. The availability of work for health professionals in the private sector varies widely across professions. This variation is relevant when we are seeking to understand career decisions of health professionals. Notably, alternate employers of health professionals include pharmacies (for pharmacists), social services (for social workers) and public schools (for Registered Nurses and speech language pathologists). Many health professionals also have the option to operate their own business; this is most lucrative for professions whose services are covered by extended medical plans (e.g. physiotherapists and audiologists).

Situating my work

My primary career goal is to produce and disseminate knowledge that will enhance policy makers' and healthcare administrators' understanding of the factors that contribute to the retention of health professionals. Globally, health systems are struggling to meet healthcare needs with available resources. By better leveraging investments in health professionals, organizations may be better able to retain employees, whether new graduates, mid-career

professionals or pre-retirees. Secondarily, I hope to shed light on ways in which strategies to enhance retention must be structured, implemented and evaluated in order to be effective for diverse groups of health professionals. Existing knowledge gaps prevent the development of evidence-based policy, whether organization specific, provincial, national, or global, that can be relied upon to effectively guide workforce planning and strategic human resource practice for all health professionals.

The healthcare industry is a service industry. Without people, health care institutions would be unable to function; their competitive advantage, where competition exists, is based on their human capital (Vandenabeele, 2013). Employee turnover significantly affects upon the functioning of work units, groups and organizations. Theoretically, turnover can slow organizational learning, deplete social and human capital, destabilize work routines and disrupt operations. High rates of turnover have been associated with reductions in productivity, profits and customer service. These associations are, however, not universally substantiated, implying that contextual factors may moderate the effects of turnover (Hausknecht & Holwerda, 2013). Turnover is not inherently a bad thing; movement and growth at the personal, unit and organizational level can be positive. By the same token, retention may not always be a boon; unproductive, dissatisfied employees may elect to remain in their positions simply because they have yet to find a satisfactory alternative. This type of less desirable retention is particularly prominent in the public sector where unionization is more common and generous retirements discourage mid-career turnover (Vandenabeele, 2013).

Research paradigm

Paradigmatically, I am a post-positivist (Lincoln & Lynham, 2011) – my focus is on prediction and explanation of outcomes related to efficiency, efficacy, availability and turnover within the health workforce. Claims resulting from my work can be seen as representing established probabilities or regularities about the retention of health professionals, as opposed to tenets that universally govern behavior (Letourneau & Allen, 1999). Conceptually, I see my work as fitting solidly within the field of Health Human Resources (HHR), a sub-discipline within the larger field of Human Resources (see Appendix 4 for a visualization). Human resources, in turn, is nested within the broader field of Strategic Management and Organization. Research in HHR must, inherently, be informed by or build upon theories, concepts and knowledge originating within diverse bodies of knowledge including economics (Samuelson,

1948), psychology (Mitchell & Lee, 2001), law (Domin & Marciano, 2013), sociology (Elder Jr., 1973) and health services and policy research (Ellenbecker, 2004). The Life Course Perspective (Elder Jr., 1973), originating in sociology, was adopted as the theoretical framework for my conceptual models of early and involuntary retirement.

The concept of engaged scholarship, proposed by Van de Ven (2007) (Van de Ven, 2007) has been influential in my thinking about research. Engaged scholarship research has four forms, one of which is evaluation/policy research. Questions best answered through this form of research are normative and address the design and evaluation of programs, policies, or practical solution-focused models. Research questions guiding studies led by an engaged scholar will be pragmatic – i.e., relevant to the problems experienced in the field by practitioners. (Van de Ven, 2007) Although it is not unique to engaged scholarship to encourage the practical relevance of one's research, it is a key characteristic of the approach. It is my goal to always pursue research that will provide answers to questions that are of interest to knowledge users; in the case of my dissertation project, targeted knowledge users include health administrators and federal and provincial health policy-makers.

Overview of dissertation structure

Chapters 2 through 5 of this dissertation are four sequential papers crafted to meet the over-arching purpose (as stated above). In the first paper (Chapter 2), I describe the development and validation of a conceptual model of early retirement among RNs and AHPs and a conceptual model of involuntary retirement among RNs and AHPs. My goal was to contribute to the health workforce planning literature by providing health services researchers and health workforce planners with frameworks for the formation of models forecasting the availability of health professionals over time and by identifying key factors for inclusion in future studies of retirement among RNs and AHPs.

In the second paper (Chapter 3), I characterized publicly-employed RN and AHP retirement decision-making in the interest of informing Canadian workforce planners and developers of employment policy (federal, provincial or institutional). A key gap identified in Paper 1 (Chapter 2) was the lack of relevant workforce data, particularly for AHPs, that could be incorporated into workforce planning models. In this paper, which details the results of my descriptive analysis, I provide timely average ages of retirement and planned ages of retirement for publicly-employed RNs and AHPs (broken down by profession) in Canada. My third and

fourth papers stem directly from Paper 1. In each of those papers, I operationalized and tested one of the validated models using CLSA data.

In the third paper (Chapter 4), I tested an operationalized version of the validated model of early retirement in both the RN and AHP samples. I compared model fit using RNs vs. AHP data and the relative significance of individual factors. As noted above, the model that was operationalized for analysis in this paper were drawn directly from Paper 1.

In the fourth and final paper (Chapter 5), I tested a pared-down operationalized version of the conceptual model of involuntary retirement in a sample of RNs and AHPs. Not all of the predictor variables identified in the conceptual model (described in Chapter 2) were tested. There was a limited number of RNs and AHPs who had considered their retirement to have been involuntary, which limited statistical power. I used the model of involuntary retirement among RNs and AHPs described in Paper 1 to operationalize this model.

In the last chapter of the dissertation (Chapter 6), I summarize my overall contribution to knowledge, provide recommendations for application of my findings and future directions of research to address the continued problem of health human resource shortages exacerbated by untimely (whether voluntary or involuntary) departures from the workforce.

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CHAPTER 2

Development and validation of conceptual models of early and involuntary retirement among Canadian Registered Nurses and allied health professionals

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Why do health professionals, specifically Registered Nurses (RNs) and allied health professionals (AHPs), retire early? The availability of health professionals to deliver healthcare services, when and where they are needed, is fundamental to the health of a population. A recent report from the Global Health Workforce Alliance and World Health Organization (WHO) estimated a deficit of 12.9 million skilled health professionals by 2035 – this reflects a 79% increase in the existing deficit (Global Health Workforce Alliance & World Health Organization, 2014). Multiple global societal trends have contributed to this widespread shortage of healthcare providers including an aging workforce (Cahill, Giandrea, & Quinn, 2015; Cook, 2015; Dubois & Singh, 2009; Dussault & Dubois, 2003; George, Springer, & Haughton, 2009; Proper, Deeg, & van der Beek, 2009), low birth rates (Castonguay, 2006) in developed nations, selective early retirement (Dal Bianco, Trevisan, & Weber, 2015; Dubois & Singh, 2009; Proper et al., 2009) and extended life expectancies (Castonguay, 2006; FitzGerald, Keane, Reid, & O'Neill, 2013). Consequently, more significant (i.e., full-time, steady) and prolonged labour force participation is becoming increasingly necessary (Truxillo, Cadiz, & Hammer, 2015).

In the face of rapidly aging populations, healthcare decision-makers cannot neglect to investigate and address the high incidence of early retirement among health professionals. According to Canadian data from the years 1997-2000, the prevalence of early retirement (i.e., before 65 years) among healthcare providers was 48.9%. In 2001, the average retirement age among RNs in Canada was 56 (O'Brien-Pallas et al., 2003). Although current literature suggests that professionals employed in Canada are electing to delay their retirement, the age at which a decline in nursing supply was observed by the Canadian Institute of Health Information (CIHI) was roughly similar in 2005 and 2014 (Canadian Institute for Health Information (CIHI), 2015b). Due to limited availability of Canadian AHP workforce data, we were unable to pinpoint average age of retirement among AHPs.

Retirement among RNs and AHPs, whether early or “on-time,” has received relatively little attention in the literature. There have been three literature reviews exploring retirement

among RNs (Ferreira de Macêdo, Pires de Pires, & Calvacante 2014; Moseley, Jeffers, & Paterson, 2008; Keele & Alpert, 2013) and, between 2005 and 2015, eight individual studies (see Supplemental File 2-2 for study characteristics). Research on retirement among AHPs has been minimal, with only five studies located in the literature; four of the five explore retirement within a specific allied health profession (i.e., dietetics, pharmacy, social work) (details in Supplemental File 2-2). As a result, policy-makers and hospital administrators have little evidence to support policy change or human resources practices that may prolong participation in the labour force.

Purpose

Our purpose in the first stage of this multi-stage study was to develop and validate conceptual models of retirement among RNs and AHPs – one for early retirement and one for involuntary retirement. Our work, in particular our validated models, will add to the literature by providing health workforce planners and health services researchers with an interest in the retirement of health professionals a framework for: i) the development of forecasting models, and; ii) relevant factors and considerations to be included in studies designed to explore retirement among RNs and AHPs. In future stages of this study, we will test (and refine) operationalized versions of the validated models using data from the Canadian Longitudinal Study on Aging (CLSA) (Raina et al., 2009).

Background

The societal cost of producing trained health professionals is significant – as much as $76,400 CAD for a single RN (2008) (Official Languages Community Development Bureau, 2008). This sum is in addition to fees paid directly by the student for their education. Additionally, early retirees are likely to have acquired specialized skills during their career, whether through practical experience or advanced training. Health professionals in possession of specialized skills are of particular value to the healthcare system, both as providers of direct, specialized care and as trainers and mentors for less senior professionals seeking to specialize.

Aging population

The first Canadian Baby Boomers, born between 1946 and 1964, reached 65 years in 2011 (Auerbach, Buerhaus, & Staiger, 2014). Statistics Canada estimates that the proportion of the population aged 65 years and older will increase by approximately eight percent to 24.0% between 2014 and 2063 (Statistics Canada, 2014). Estimates are similar in the US (21% by 2040 (Kromer & Howard, 2013)), Europe (20% by 2025 (Fraccaroli & Deller, 2015)) and Australia

(25% by 2050 (Hewitt, Howie, & Feldman, 2010)). Governments are actively developing policies that will stimulate continued labour force participation among older workers (FitzGerald et al., 2013; Fraccaroli & Deller, 2015; MacDermott, 2014; Proper et al., 2009; van Rijn, Robroek, Brouwer, & Burdorf, 2014; van Solinge & Henkens, 2014). These stimuli will be especially important for the healthcare workforce, which is doubly impacted by aging populations. First, because older people require more health services and have higher per capita healthcare expenditures (World Health Organization, 2011) and second, because the healthcare workforce is, collectively, also aging (Association of Canadian Community Colleges (ACCC), 2012).

Retirement

There is, across all occupations, increased heterogeneity in the permanence, timing and duration of retirement (Warner, Hayward, & Hardy, 2010). Historically, mandatory retirement age or pensionable age have contributed to the construction of cultural norms and widely shared community expectations regarding acceptable age of withdrawal from the workforce (MacDermott, 2014). We are defining *early retirement* as retirement between the ages of 55 and 65 years; this definition was the most commonly reported in van den Berg, Elder, & Burdorf's (2010) systematic review of longitudinal studies identifying factors associated with nondisability early retirement. *Involuntary retirement*, for our purposes, occurs when an individual perceives that their late career exit from the workforce was involuntary. Involuntary retirement can be either early or "on-time." This conceptualization of involuntary retirement has been adopted to align with that of the CLSA. Our definition of involuntary retirement is quite subjective in that between two individuals with similar circumstances of retirement, one may consider it to have been voluntary and another may consider it to have been involuntary. Dorn & Sousa-Poza (2010) concluded, following an international analysis of voluntary and involuntary retirement that the concepts of 'voluntary' and 'involuntary' were intrinsically subjective. In their view, use of a self-assessment (such as is used in this study) of the voluntariness of retirement is appropriate as the potential for introduction of measurement error via subjectivity is offset by the arbitrariness arising from any attempt to objectively classify retirements as 'voluntary' or 'involuntary' (Dorn & Sousa-Poza, 2010). Empirically, analytic results relating to involuntary retirement are similar whether 'involuntary' retirement is defined subjectively or objectively (Dorn & Sousa-Poza, 2010).

Findings from the literature have demonstrated that outcomes post-retirement differ depending on the voluntariness of retirement (Dorn & Sousa-Poza, 2010) (e.g., life satisfaction (Hershey & Henkens, 2014; Dingemans & Henkens, 2015), self-efficacy (Dingemans & Henkens, 2015) and adjustment to retirement (Barbosa, Monteiro, & Giardini Murta, 2016)). Additionally, involuntary retirement, by its nature, should be more amenable to intervention, as those who are retiring involuntarily are likely the most interested in remaining in the workforce should predicating factors be modified.

Registered Nurses

The largest group of healthcare professionals in Canada is nursing (Registered Nurses' Association of Ontario, n.d).; this is also true in the United States (American Association of Colleges of Nursing, 2011) and Australia (Authoritative Information and Statistics to Promote Better Health and Wellbeing, 2016). Nurses are staples of the health system – without them, other healthcare professionals struggle to deliver health services. RNs work both autonomously and collaboratively to deliver healthcare services, coordinate provision of care and support client self-care across all health statuses and life stages. In 2014, for the first time in 20 years, the supply of RNs in Canada declined and for the first time in a decade, declined in the absolute number of RNs aged 60 or more. However, proportionally, the percentage of nurses aged 60 and over increased by 4.3% between 2005 and 2014 (CIHI, 2015b). Retirement is one of multiple factors predicted to have an impact on shortages in the RN workforce; occupational turnover is also an issue, with one study reporting that 12.6% of new nurses had intentions to leave the nursing profession (Lavoie-Tremblay, O'Brien-Pallas, Gélinas, Desforges, & Machionni, 2008). As of 2014, baby boomers make up nearly 39% of the Canadian RN workforce (CIHI, 2015b). It is no surprise that healthcare leaders are particularly invested in determining when and why baby boomers exit the workforce (Auerbach et al., 2014). However, current research evidence provides little guidance to policy makers and employers seeking to use delay of RN retirement as a strategy to maximize the health workforce.

Allied health professionals

There is no single definition of allied health (ACCC, 2012; Elwood, 2013). For this study, we define AHPs as all baccalaureate degree-prepared (minimum) health professionals. Included are: speech-language pathologists (SLPs), pharmacists, dietitians (RDs), physiotherapists, occupational therapists, clinical social workers and radiation therapists. We

excluded professional groups whose preparatory education requirements are not consistently baccalaureate level – such as medical laboratory technologists, recreation therapists and respiratory therapists.

AHPs provide key services across the healthcare continuum and are essential to the sustainability of an effective and efficient healthcare system (ACCC, 2012); they play a key role in the prevention, treatment and management of many chronic conditions and assist clients and patients in dealing with problems resulting from treatment. In Canada, chronic disease rates are increasing by 14% annually (Elmslie, n.d.); rising prevalence of these diseases has led to mounting growth in demand for the specialized skills of AHPs. According to CIHI data, the Canadian pharmacist labour force grew by 9.7% between 2009 and 2012; this in contrast to overall growth in the labour force of 3.4% (CIHI, 2013b). Between 2005 and 2012, the dietetic workforce increased by 28.8% and the SLP workforce by 36.2% (CIHI, 2014). Between 2007 and 2012, the physiotherapy workforce grew by 12.5% (CIHI, 2013c), while the occupational therapy workforce grew by 17.4% between 2006 and 2012 (CIHI, 2013a). To date, health human resource policy and research have focused significantly more on the physician and nurse workforces, despite equally problematic shortages being reported in multiple allied health professions. Shortages of skilled professionals lead to the rapid escalation of healthcare costs and precarious gaps in service (ACCC, 2012).

RNs and AHPs as comparators

The RN and AHP workforces have much in common. Both require baccalaureate (minimum) level education and are female dominated. They can be employed in diverse healthcare settings and both frequently provide services to clients or patients in shared workspaces (i.e., clinics, hospitals units, residential facilities). Similar to RNs, AHPs are rarely the 'most responsible practitioner' (Canadian Medical Protective Association, 2012) involved in the care of individual patients. In general, RNs and AHPs are middle-class professions, granting practitioners comfortable lifestyles. However, important differences between RN and AHP workforces could feasibly lead to differences in the ways that each group approaches workforce departures later in life. The most tangible differences between the two groups are related to the content and scheduling of their work. RNs are more likely to work rotating, elongated shifts during evenings, nights and weekends providing continuous 24 hour, seven-day coverage in

many instances (e.g., hospitals) (Government of Alberta, n.d.). AHP's on the other hand commonly provide episodic care during more regular weekday shifts.

Evidence suggests that professions included in the AHP group have merged subcultures, at least within their organizations; they are discovering greater strength in a collective professional identity (Lunday, 2009). The term "allied health" has become effectively institutionalized. Organizational endorsement of a collective "allied health" grouping draws disciplines into behaving collectively by enabling continued opportunities for co-participation. Trade unions have generally supported collective negotiation on behalf of "allied health" professionals as it is more cost effective (Boyce, 2006). Although professions included within the allied health workforce are diverse, they share several unique features relevant to the relationship between an employee and their employing organization. AHPs commonly span work boundaries and provide ancillary services as members of multidisciplinary teams (Rodwell & Gulyas, 2015). Generally, nurses are more likely to be connected to a single work team or work unit than AHPs; in part due to higher number of hours of nursing care required per patient.

This study is exploratory in the sense that we have not definitively hypothesized that there will be a significant difference in the way that RNs and AHPs approach retirement decision-making. If there are found to be significant differences, we suspect that they will relate to disproportionate rates of occupational illness and injury among nurses, whose work tasks and work schedules are frequently, as noted above, more physically demanding than those of AHPs.

Retirement theory

Retirement, as a phenomenon, is of relevance in near all social science disciplines. To date, the majority of theories and conceptual frameworks commonly applied in studies of retirement originated in psychology; these include Super's Life-Span, Life-Space Theory (Super, 1980), Social Identity Theory (Tafjel, 1974), Beehr's Model of Retirement Behavior (Beehr, 1986; George, et al., 2009), the concept of "push" and "pull" factors (Shultz, Morton, & Weckerle, 1998), and the Theory of Planned Behavior (TPB) (Ajzen, 1991) (see Wang & Shi, 2014 for a review of psychological research on retirement). Super's Life-Span, Life-Space Theory posits that the relative importance of "roles" inhabited by individuals throughout their life span fluctuates according to life stage; role importance is operationalized through measures of time and emotion (Super, 1980). Social Identify Theory suggests that two interrelated conditions contribute to an individual's' behavior in relation to the group (as opposed to self): 1)

categorical separation of the social "world" into distinct, non-overlapping groupings, and; 2) impracticability of passage from one social "world" to another (Tafjel, 1974). Beehr's Model of Retirement Behavior acknowledges both personal and environmental factors as contributing to retirement and categorizes retirement as either voluntary, involuntary, partial complete or on-time/early (Beehr, 1986). The concept of "push" factors as distinct from "pull" factors is useful when exploring decision-making as it allows researchers to effectively evaluate whether individuals are making decisions in order to escape undesirable circumstances or as a means of accessing superior circumstances (Schultz, Morton, & Weckerle, 1998). The TPB, extending from the Theory of Reasoned Action, was designed with the goal of predicting and explaining human behavior within a specific context; TPB directly links intention (e.g., intention to retire) to behavior (e.g., retirement), while acknowledging that not all behaviors are fully within the volitional control of an individual (Azjen, 1991).

The Life Course Perspective, which originated in the sociological literature, has been adopted in our study because it incorporates several distinct themes: i) interconnection between societal changes and human lives (i.e., cohort or generational effects); ii) interdependent or linked lives; iii) timing of lives (e.g., late or early marriage, teenage pregnancy), and; iv) human agency. We selected the Life Course Perspective from the many possible theories and frameworks to guide our conceptualization of retirement for this study for several reasons. First, because time and its passage are acknowledged as having a significant impact on outcomes. Employment-related decisions intertwine significantly with many other decisions during the life course. Second, this perspective is inherently interdisciplinary, as it incorporates concepts and learnings from economics, anthropology, developmental psychology, demography and sociology (Mayer, 2009). Retirement and retirement decision-making are studied in all of the above listed disciplines; thus, in order to achieve our research objectives, we have embraced interdisciplinarity. Notably, we included a diverse selection of electronic databases in our search for relevant articles to inform model development (described in detail below). Last, this perspective encourages researchers to consider factors at the micro-, meso- and macro-levels of analyses when analyzing life course outcomes (Mayer, 2009) such as retirement. We recognize that it is necessary to acknowledge the potential contribution of factors at each level to retirement decision-making. All of these characteristics of the Life Course Perspective are incorporated into our Preliminary Conceptual Model of Retirement Decisions among RNs and AHPs (Figure 2-1).

Human agency, a key concept in the Life Course Perspective, maintains that, within existing constraints, individuals will make choices and plans from among available options that ultimately construct the course of their lives. The life course, as a key concept in the Life Course Perspective, is defined as the coalescing of age-graded trajectories, including family pathways and career paths, which are contingent on changes in conditions and the availability of future options, and short-term transitions such as exit from education and retirement. Overall, this perspective provides an inclusive framework for investigating the dynamics of diverse, interdependent paths (Elder Jr., 1994) to retirement.

Insert Figure 2-1 about here

Methods

Literature review

We performed an extensive review of peer-reviewed literature relating to early retirement decisions and voluntariness of retirement. In October of 2015, we conducted searches in multiple electronic databases including Medline (see Appendix 5), PsycInfo, CINAHL, EMBASE and Business Source Complete. Key words for all searches included: retirement (inclusive of early, voluntary and involuntary), decision-making, transition and planning. Related subject headings and MeSH terms were included where available. We considered articles as relevant if they reported on a study that yielded empirical results identifying factors predictive of general retirement, early retirement or involuntary retirement. Our decision to draw on specific sub-sets of the literature (described below) was based on the relative absence of relevant studies related to retirement among AHPs, limited scope and low quality of existing reviews on retirement among RNs and the presence of multiple meta-analyses and reviews related to retirement in the broader population.

From the general, global retirement literature, which incorporates workers from all industries, we reviewed all relevant meta-analyses and systematic reviews (McDonald & Donahue, 2011; Robroek et al., 2013; Topa, Moriano, Depolo, Alcover, & Morales, 2009; Topa, Moriano, Depolo, Alcover, & Moreno, 2011; van den Berg et al., 2010; van Rijn et al., 2014; Wang & Shultz, 2010; Weaver, 1994). The number of included articles in the individual reviews ranged from eight (van den Berg et al., 2010) to 99 (Topa et al., 2009). Four of the eight reviews

were meta-analyses (Robroek et al., 2013; Topa et al., 2009; Topa et al., 2011; van Rijn et al., 2014). Two meta-analyses had specific research questions, exploring the impact of particular factors on early and/or involuntary retirement – Robroek et al. (2013) focused on weight status and van Rijn, Robroek, Brouwer, & Burdorf (2013) on health status. The reviews scored between 1 (Wang & Shultz, 2010; Weaver, 1994) and 5 (Robroek et al., 2013; Topa et al., 2009; Topa et al., 2011) out of a possible 11 points (mean = 3.4), when assessed using the Assessing the Methodological Quality of Systematic Reviews (AMSTAR) checklist (AMSTAR, 2007; Shea et al., 2007).

From the nursing retirement literature, we reviewed the three published systematic reviews of RN retirement (Ferreira de Macêdo, Pires de Pires, & Calvalcante, 2014; Keele & Alpert, 2013; Moseley, Jeffers, & Paterson, 2008) and relevant individual studies published between 2005 and 2015 (Armstrong-Stassen, 2005; Blakely & Ribeiro, 2008; Boumans, de Jong, & Vanderlinden, 2008; Cyr, 2005; Duffield et al., 2015; Friis, Ekholm, Hundrup, Obel, & Grønbæk, 2007; Lagacé, Tougas, Laplante, & Neveu, 2010; Valencia & Raingruber, 2010). Nursing-specific reviews included a total of 91 studies. As Ferreira de Macêdo, Pires de Pires, & Calvalcante (2014) did not include a list of included studies, it was not possible to evaluate the degree of overlap in included studies across the reviews; however, as Ferreira de Macêdo et al.'s review included only studies published between 2008-2012, it is unlikely to have had any overlap with Moseley et al. (2008). Two included articles (Letvak, 2002; Spetz & Adams, 2006) from Keele and Alpert's (2013) review were cited in the text results of Moseley et al.'s (2008) review, but were not listed as included articles. As for review quality, the three reviews scored between 2 (Ferreira de Macêdo et al., 2014) and 5 (Keele & Alpert, 2013) on the AMSTAR checklist.

Last, we reviewed any relevant studies, regardless of date of publication, exploring retirement within allied health professions, individually (George et al., 2009; Juliá, Kilty, & Richardson, 1995; Schofield, Fletcher, & Johnston, 2007) or as a group (Gleeson & Gallagher, 2005). Individual professions represented in the literature included public health nutritionists (George et al., 2009), pharmacists (Schofield et al., 2007) and social workers (Juliá et al., 1995). We summarized the results of all included literature on the topics of *early retirement* and *voluntariness of retirement*; any factor reported as predictive in any of the sub-sets of the literature (general, RN, AHP) was included in the appropriate conceptual model.

We elected to take this approach, as inadequate empiric evidence was available to confirm definitive differences in the relative importance of specific factors in predicting retirement across groups. Although we specifically developed the conceptual models to aide in prediction of retirement among health professionals, it does include some factors and variables identified primarily in the broader retirement literature. Health professionals are embedded within the larger cultures of their communities and make up a significant portion of the population. Thus, we presumed that factors found to predict retirement within the broader population may significantly predict retirement among health professionals. Characteristics of the reviews and studies reviewed in development of the conceptual models can be seen in Supplementary File 2-1 and Supplementary File 2-2. Supplementary File 2-3 includes a table tying individual variables included in the models (with conceptual and operational definitions) to their source (study and/or review).

Model validation

To refine and validate the proposed conceptual models of retirement among health professionals (seen in Figures 2-2 and 2-3), we conducted in-depth individual interviews with 14 current and former health professionals between the ages of 45 and 85. Specifically, we sought to achieve face validity; Smith, Morris, Hill, Francovich and Christiano (2006) employed a similar methodology when validating their conceptual model of recurring problems in a teaching clinic (Smith, Morris, Hill, Francovich, & Christiano, 2006).

A single author (SH) conducted all interviews between February and July of 2016. We aimed to recruit between 12-20 health professionals (Guest, Bunce, & Johnson, 2006; Kuzel, 1992) between the ages of 45 and 85 years, as this matched with the population sampled in the CLSA. To pilot test the interview's structure and content, we conducted three pre-data collection interviews with individuals meeting criteria for participation. Data collected in these interviews were not included in our analysis. Prior to their interviews, participants were provided with very little background information related to the process of developing the models or the function of the models in future steps of the research. The intention was to avoid colouring participants' views; participants may have been less likely to criticize or reject the models for fear of appearing uninformed if they had been aware that all factors were drawn from peer-reviewed literature. Additionally, participants were not instructed to dedicate significant time to reviewing the models prior to the interview, as the goal was to elicit any strong reactions to missing,

misplaced or out-of-place factors. We wanted to know of any glaring omissions or inaccuracies in either or both models that would significantly impact upon their face validity as representative of significant predictors of early retirement or involuntary retirement among RNs and AHPs.

Based on the principles of maximum variation sampling (Sandelowski, 1995), we purposively recruited a demographically diverse group of participants from multiple health professions across the 40-year age range. The majority of participants were recruited from within the personal network of SH and networks of her personal and professional colleagues (Légaré et al., 2011) located across Canada (snowball sampling). All interviews were recorded and uploaded to a secure Health Research Data Repository (HRDR) located in the Faculty of Nursing at the University of Alberta (https://www.ualberta.ca/nursing/research/supports-and-services/hrdr). Thirteen of the 14 interviews took place over the telephone or over Skype™ (https://www.skype.com/en/). The last was conducted in-person at the University of Alberta. Each participant was provided with information about the study prior to providing consent to participate – either verbally or in writing on the consent form provided to them. Participants were not compensated in any way. The study was approved by the University of Alberta Research Ethics Board 2 (Pro00060985).

Prior to each interview, the participant was provided with copies of both conceptual models (Figures 2-2 and 2-3). They were asked if each model appeared clear, logical and relevant to the retirement of health professionals. Additionally, we asked each participant to identify any changes they would suggest to improve the model (Légaré et al., 2011). A single author reviewed data collected in the interviews to complete a question-by-question analysis. RN and AHP responses were analyzed separately to facilitate comparison across professional group. Analytic results were applied to refine the models: factors were added to the literature-informed models if they were identified as relevant by two or more participants.

Participants. All participants were female and half had already retired from practice. Nearly all participants were currently, or had been at time of retirement, employed in front-line clinical practice (11 of 14). Five participants were between the ages of 55-65 and 65-74 respectively, with an RN surveyed in each of the ten-year age spans; three participants were between 45-54 years and a single participant was between 75-84 years. All prominent allied health professions were represented in the sample including physiotherapy, dietetics, social

work, occupational therapy, pharmacy, radiation therapy and speech language pathology. See Table 2-1 for participant characteristics.

Insert Table 2-1 about here

Results

Model development

Overall, we drew results from 23 studies to build the models; eight of these were meta-analyses and systematic reviews of the broader retirement literature; three were systematic reviews of RN retirement literature; eight were original studies of RN retirement published between 2005 and 2015, and; four were original studies on AHP retirement. Eight categories (38 variables) were included in the conceptual model of early retirement presented to interviewees: workplace characteristics; sociodemographics; attitudes/beliefs; broader context; organizational factors; family; lifestyle/health, and; work-related. The conceptual model of involuntary retirement included four categories (8 variables): broader context, sociodemographics, family and lifestyle/health.

Early retirement. *Socio-demographic factors* linked to early retirement included degree of financial security (Cyr, 2005; Keele & Alpert, 2013), marital status (Boumans et al., 2008; Ferreira de Macêdo et al., 2014; Friis et al., 2007), household income (Friis et al., 2007), change in work situation (e.g., job elimination) (Boumans et al., 2008), sex (Boumans et al., 2008), ethnicity (Juliá et al., 1995), opportunity to change profession (Ferreira de Macêdo et al., 2014) and eligibility to retire (Blakely & Ribeiro, 2008). *Lifestyle and health* factors linked to early retirement included health status – physical (general) and/or mental (Boumans et al., 2008; Cyr, 2005; Ferreira de Macêdo et al., 2014; Friis et al., 2007; McDonald & Donahue, 2011; van den Berg et al., 2010; van Rijn et al., 2014), weight status (Friis et al., 2007), work setting (Friis et al., 2007), work schedule (shift, evening etc.) (Friis et al., 2007) and level of physical activity (Friis et al., 2007). *Family* factors linked to early retirement included retirement status of spouse (Blakely & Ribeiro, 2008; Friis et al., 2007), spouse's health status (Boumans et al., 2008; Cyr, 2005), caregiving responsibilities (Ferreira de Macêdo et al., 2014) and family's views of retirement (Boumans et al., 2008). *Attitude and belief* factors linked to early retirement included

a desire for leisure time (Blakely & Ribeiro, 2008; Boumans et al., 2008) and the feeling of being 'tired of work' (Blakely & Ribeiro, 2008).

Organizational factors linked to early retirement include heavy workload (Blakely & Ribeiro, 2008; Boumans et al., 2008; Ferreira de Macêdo et al., 2014), age-related discrimination (Boumans et al., 2008; Ferreira de Macêdo et al., 2014), absence of age-dependent human resources policies (e.g., inflexible work hours) (Blakely & Ribeiro, 2008; Cyr, 2005), lack of developmental and training opportunities (Blakely & Ribeiro, 2008; Boumans et al., 2008), presence of retirement incentives (Blakely & Ribeiro, 2008), lack of job-related recognition or appreciation (Blakely & Ribeiro, 2008), high work pressure (Friis et al., 2007), low level of influence at work (Friis et al., 2007), job design minimizing task significance (Boumans et al., 2008), high work intensity (Cyr, 2005), disempowerment at work (Blakely & Ribeiro, 2008), presence of rapid managerial, cultural or technological changes in the workplace (Ferreira de Macêdo et al., 2014) and an absence of financial incentives for remaining in the workforce (e.g., ability to make more or higher pension contributions) (Blakely & Ribeiro, 2008).

Several factors linked to retirement in general, as opposed to early retirement specifically, were included in the conceptual model of early retirement. These include age (George et al., 2009; Jones & McIntosh, 2010; Wang & Shultz, 2010), dependent child living at home (Wang & Shultz, 2010; Weaver, 1994), level of education (George et al., 2009; Wang & Shultz, 2010), perceived spousal support of retirement (McDonald & Donahue, 2011; Wang & Shultz, 2010), disability (Ferreira de Macêdo et al., 2014), occupational tenure (Jones & McIntosh, 2010), organizational tenure (Jones & McIntosh, 2010), organizational commitment (Jones & McIntosh, 2010), occupational commitment (Wang & Shultz, 2010), employment status (full vs. part-time) (George et al., 2009) and region of residence (within a country) (George, et al., 2009).

Findings from studies with a broader outcome variable, such as "retirement intentions" (i.e., earlier, but not necessarily early), were also considered when building the early retirement conceptual model, as "early retirement" and "earlier retirement" are conceptually similar and, as previously noted, research specific to health professionals' retirement decisions is limited. Three studies from the AHP literature studied broader retirement outcomes (George et al., 2009; Jones & McIntosh, 2010; Schofield et al., 2007). Several nursing studies (Armstrong-Stassen, 2005; Duffield et al., 2015; Lagacé et al., 2010; Valencia & Raingruber, 2010) and all three nursing reviews reported findings related to a broader outcome variable. As is apparent from the

summary paragraphs above, there was minimal overlap in included variables across studies; many variables were reported as predictive of retirement in a single study. See Figure 2-2 for a conceptual model of early retirement among health professionals.

Insert Figure 2-2 about here

Voluntariness of retirement. Factors associated with involuntary retirement include gender (Gleeson & Gallagher, 2005), poor health (general) (van Rijn et al., 2014), mental health (van Rijn, et al. 2014), chronic disease (van Rijn et al., 2014), musculoskeletal disorder (van Rijn et al., 2014), respiratory illness (van Rijn et al., 2014), weight status (Robroek et al., 2013) and physical inactivity (Robroek et al., 2013).

Information relating to the impact of organizational or workplace factors on involuntary retirement was absent from the literature. Only one study (Gleeson & Gallagher, 2005) looking at health professionals reported findings related to involuntary retirement. As such, there is a notable gap in our understanding of factors predictive of RN and AHP involuntary retirement. See Figure 2-3 for a conceptual model of involuntary retirement among health professionals.

In their current form our conceptual models are very primitive; they are effectively a list of factors found to be connected to the outcome – early or involuntary retirement. Results of quantitative analyses will provide an indication of the relative predictive strength of each variable and will help us to identify mediators and interacting variables. We intend to make the visual representation of the models more dynamic and more reflective of the relative strength of specific predictors (and of mediation or interactions) once we have empirically tested the models.

Insert Figure 2-3 about here

Model validation

Participants' views on the conceptual model of early retirement (Figure 2-2).

Clarity. All four RNs who participated reported that the model was clear. Three of the ten AHP participants were unsure as to how the model could or would be used; they saw the model having questionable use in practice – i.e., was it meant as a guide for discussions of

retirement with older healthcare professionals? One AHP suggested enhancing the visual clarity of the model.

Logic. Two of the four RNs inquired as to plans for testing the model. One questioned the connection between variables located adjacent to one another in the model. All AHPs agreed that the model appeared logical and three of the ten commented on how comprehensive the list of factors was. None of the participants had specific suggestions to improve on the logic of the model.

Relevance. All RNs and AHPs felt that the model included factors relevant to early retirement among health professionals. Two AHPs stated that they felt the model would also be relevant to early retirement in other professions. None of the participants had specific suggestions to enhance the relevance of the model.

Suggested improvements. Among RNs, one participant suggested that "desire for leisure" and/or "tired of work" – both included in the category of attitudes and beliefs – did not quite capture her sense of RNs retiring because they *"want to do things we've always wanted to do but couldn't because of work"* (P01*).* Among AHPs, one participant suggested that ethnicity should be expanded or clarified to include citizenship status (i.e., immigrant vs. non-immigrant). Several AHPs commented on their sense of the relative importance of the factors presented: one felt that financial security was the greatest predictor of early retirement; one felt that health and financial security were, together, the greatest predictors, and; one indicated that work setting, specifically the inherent physical demands of work in the hospital setting, were a significant predictor of early retirement in her profession.

Participants' views on the conceptual model of involuntary retirement (Figure 2-3).

***Clarity*.** The RN participants felt the model was clear; two indicated that this model was clearer than the model of early retirement because it contained fewer factors. Most AHPs also felt the model was clear; two had questions regarding the category of Broader Context and specifically Region of Residence. One participant suggested that the model could be made clearer by providing a more precise description of Region of Residence. Two AHPs noted the enhanced clarity associated with the smaller model size.

Logic. Three of the four RNs felt the model appeared logical. One had a question relating to Broader Context, similar to questions raised by AHPs in relation to clarity. All AHP

participants felt the model appeared logical. None of the participants had specific suggestions to improve on the logic of the model.

Relevance. All RNs felt the model appeared relevant to retirement among RNs. Seven of the AHP participants felt the model was relevant to retirement among AHPs. Three questioned the inclusion of weight status in the model, with one indicating that it wouldn't be a factor in their profession and another stating "*you can't make me retire because of that*" (P03). One AHP felt that model would be broadly predictive of involuntary retirement – for "*anybody really*" (P02). None of the participants had specific suggestions to enhance the relevance of the model.

Suggested improvements. Among RNs, one suggested that many RNs would likely work longer if there was "*better communication between nurses and management*" (P01). Two of the AHPs recommended that caregiving status be added as a factor predictive of early retirement. One AHP noted that performance anxiety may be a reason for retirement; an individual may no longer feel that they are performing at their best. One AHP felt that the degree to which an individual had support for periods of disability may impact upon their likelihood of retiring early – for example, if they could collect worker's compensation during the months they were physically unable to work, then they may remain in the workforce longer, whereas as those without such benefits may be forced to retire. Lastly, one AHP recommended that institutional down-sizing be reflected in the model. Two of the participants (one RN and one AHP) stated that, in their view, lifestyle and health were weighted appropriately heavily in the model. During review of this model, several participants discussed the general lack of clarity around "involuntary" retirement with the interviewer; such a classification is often subjective, as two people may retire for the same reason and yet only one will consider their retirement as being involuntary (e.g., Is it still involuntary if I hand in a resignation letter?).

Discussion

We reviewed the literature – both broad and specific – to inform the development of conceptual models of early and involuntary retirement among RNs and AHPs. RNs and AHPs consider many factors when considering early retirement. The Life Course Perspective seems particularly appropriate as a guide for framing early retirement decision-making; the validated model includes predictive factors reflective of interconnection between societal changes and human lives (i.e., age – by generational cohort) and interdependent or linked lives (i.e., caregiving responsibilities; spouse/partner's retirement status, health, support of retirement).

Several predictive factors identified in the literature review reflect human agency - for example, retirement triggered by a desire for leisure is one way that an individual may act to construct the course of their lives. Additionally, the diverse range of factors identified reflect (and can be informed by) a variety of literatures including economics (financial security, total household income, retirement (dis)incentives), epidemiology (health status (mental and physical)), social demography (region of residence), human resources (job satisfaction, organizational commitment, training/developmental opportunities, job design), industrial labour relations (shift patterns, hours of work, job design). Lastly, the factors identified in the literature review as contributing to early retirement represent the micro-level (relational – such as spouse's retirement status), meso-level (frequent pervasive change (technological/structural etc.)) and macro-level (regional differences, societal age discrimination/stigma enacted in the workplace). The role of "time" – a key component of the Life Course Perspective will be difficult to evaluate in respect to RN and AHP retirement decision-making until we have had an opportunity to compare responses over time as future waves of data are collected in the CLSA.

Fewer factors were reported as significant predictors of involuntary retirement. The factors in the model did not explicitly reflect the importance of interconnection between societal changes and human lives. Caregiving responsibilities, the factor added to the model by interviewees, adds a recognition of linked lives into the model. Human agency, again, is absent from the model in an explicit form, although several of the factors, such as physical activity level and weight status are potentially modifiable; humans as agents can choose to prioritize certain activities, such as physical activity and dietary moderation, over others. The factors included in the model of involuntary retirement are far less diverse and are within the purview of fewer academic disciplines including epidemiology (chronic disease, health status, weight status) and social demography (region of residence). Unlike in the early retirement model, meso-level factors are absent (at least explicitly). Meso-level factors that have been implicated in the incidence of micro-level health issues such as musculoskeletal disorder and weight status.

Overall, the content of both conceptual models of retirement among RNs and AHPs was considered valid (i.e., clear, logical and relevant) by a purposively selected group of Canadian RNs and AHPs, whose demographics match those of the sample in which operationalized versions of the models will be tested. As noted previously, we drew from global literature on

retirement decision-making and wanted to be sure that the resulting models were representative of the experience of Canadian RNs and AHPs before proceeding to testing of the models.

Conceptual Model of Early Retirement among RNs and AHPs

Following a question-by-question analysis of the interview data, we decided to leave the Conceptual Model of Early Retirement among RNs and AHPs as presented to participants. Participant feedback indicated that clarity could be enhanced by improving the visuals of the model; this is something we will attempt to do following model testing. Following analysis, it will be clearer which variables had non-significant impacts on incidence of early retirement among RNs and AHPs and the relative importance of those factors demonstrated to be significantly predictive of early retirement will be better understood.

Conceptual Model of Involuntary Retirement among RNs and AHPs

We added a single variable to the model of involuntary retirement to better reflect the perceptions of the Canadian RNs and AHPs interviewed. Caregiving responsibilities was added to the model under a new heading of Family. All other suggested alterations to the model were put forward by a single participant. Additionally, we altered the terminology used under the heading of Broader Context. Instead of Region of residence, it will be Province of residence. The original reasoning for calling this factor Region of residence was because the supporting evidence for inclusion of this factor was not Canadian. Despite concerns about the relevance of weight status as a predictor of involuntary retirement, we decided to leave it in the model. This variable was added based on meta-analytic evidence and a valid measure of weight status is part of the CLSA dataset.

Although only a few factors have been identified in the literature as contributing to involuntary retirement, we are fairly certain that many other factors contribute both positively and negatively to this outcome. We suspect that quantitative testing of this model will yield a relatively small explained variance (r^2), indicative of missing explanatory variables. Additionally, as noted previously, it is unclear whether there is a shared understanding of what qualifies as involuntary retirement. The content of a conceptual model of involuntary retirement will vary depending on this shared understanding of involuntary retirement as an outcome.

Comparison between RNs and AHPs

Overall, the RNs and AHPs we interviewed were largely in agreement as to the clarity, logic and relevance of the models we presented to them. RNs were more likely to comment,

without prompting, on the perceived importance of individual factors on the outcome, whether early retirement or involuntary retirement. RNs interviewed were less likely to mention potential relevance of the model outside of the health professions. A larger number of suggested changes or adjustments to the model were made by AHPs; however, the number of AHPs who participated was more than double the number of RNs – when considered in proportion, the difference is likely insignificant. Based on this validation exercise, there is no indication of significant differences between RNs and AHPs in the relative importance of individual factors on outcomes of early and involuntary retirement. However, this was a very small sample of health professionals, which was not representative of all RNs and AHPs in Canada. In the next stage of our research, we will be able to make empirical comparisons between the two groups.

Implications

It is too early to say empirically which factors are likely to have greatest impact on the likelihood of early or involuntary retirement among RNs and AHPs. However, it is encouraging to see that many factors included in the models – in particular the model of early retirement – are potentially modifiable, whether through national or provincial legislation, or through interventions in the workplace. Truxillo, Cadiz and Hammer (2015), following a review of literature related to aging at work, proposed an agenda for research on the effectiveness of workplace interventions that support older workers in the workplace. They identified several categories of potential interventions, many of which overlap with factors included in our model of early retirement, including: training/developmental opportunities; job design; work-life support (including part-time work; eldercare support), retirement dis(incentives) and; health promotion (Truxillo et al., 2015). Several categories also align with factors identified in our model of involuntary retirement, including: health promotion; ergonomic intervention, and; work-life support (including eldercare support) (Truxillo et al., 2015).

Limitations

There was very little literature exploring retirement decision-making among AHPs and scarcely more exploring the topic in relation to RNs. As a result, we had to draw on the broader retirement literature to build conceptual models that would likely capture the breadth of factors contributing to early and involuntary retirement among these health professionals. It is a good sign that interview participants found the models to be clear, logical, relevant and, for the large part, comprehensive.

Unfortunately, we were unable to recruit a male RN or AHP to participate in the validation interviews (see Table 2-1). However, a 100% female sample is not far from reflecting the gender division within these health professions – in 2015, 92.4% of Canadian Registered Nurses were female. In 2006, 94.5% were female, so it likely that among nurses 45 and older, a greater proportion were female (CIHI, 2016). Pharmacy, the most evenly distributed allied health profession, gender-wise, was 59.8% female in 2012 (CIHI, 2013b) and the least proportional profession of those included in our definition of AHPs was dietitians, who were 94.4% female in 2013 (CIHI, 2015a).

Additionally, we had a disproportionate number of participants in the middle age range of 55-74 (see Table 2-1). However, this is somewhat reflective of the make-up of the CLSA dataset, which will be used in the testing of our operationalized models. Proportionately more Canadians aged 55-64 were sampled (15,000 of a total 50,000) than Canadians aged 75-85 (10,000 of a total 50,000) (Raina, Wolfson, & Kirkland, n.d.).

In this stage of our study we sought to achieve face validity: more extensive, rigorous evaluation (both qualitative and quantitative) would be required to confidently claim other forms of validity – such as discriminant and predictive validity.

Conclusion

RNs and AHPs consider many factors when contemplating early retirement. Few studies have explored reasons for involuntary retirement; thus, fewer factors were identified as predictive of this outcome. Literature-derived conceptual models of early retirement and involuntary retirement, informed by the Life Course Perspective, were demonstrated to, in large part, have face validity among older Canadian RNs and AHPs. Some factors identified in these models may be sensitive to intercessions by policy-makers and healthcare administrators. This opens up possibilities for governments and organizations seeking to extend the work lives of older healthcare workers in order to mitigate the cumulative effects of aging populations, extended lifespans, increasing prevalence of chronic disease and existing shortages in the healthcare workforce. Future empirical testing of operationalized versions of these models of early and involuntary retirement will demonstrate the relative importance of the various factors and identify any significant differences in the retirement decision-making processes of RNs and AHPs.

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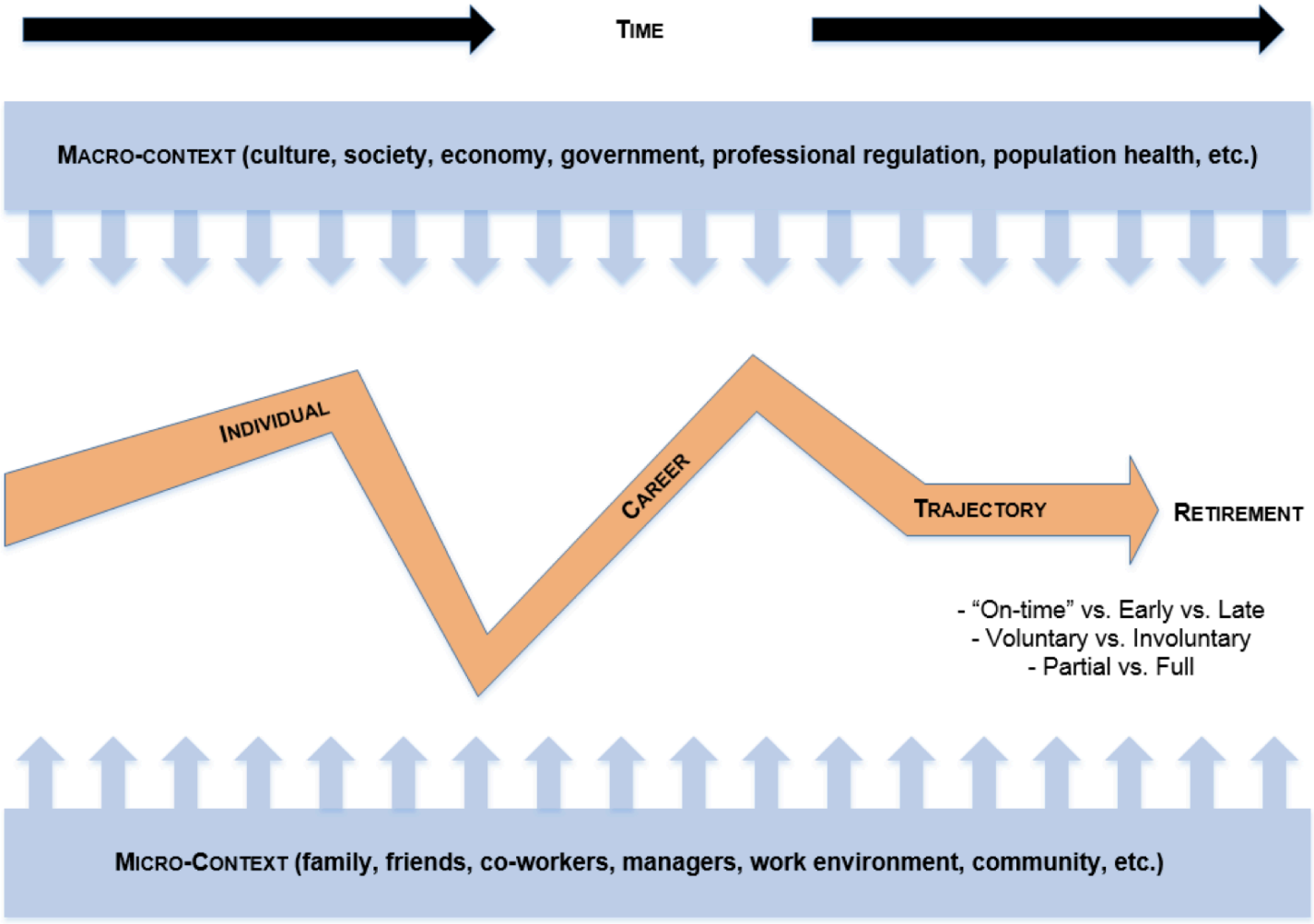
TABLE 2-1: Participant demographics (n =14)

Gender	100% female			
Retired	50%			
Age		RNs	AHPs	Total
	45-54	1	2	3
	55-64	1	4	5
	65-74	1	4	5
	75-85	1	0	1
Province				
	Alberta			3
	British Columbia			7
	Manitoba			1
	Ontario			3
Profession				
	Clinical Social Worker			1
	Occupational Therapist			1
	Pharmacist			1
	Physiotherapist			3
	Radiation Therapist			1
	Registered Dietitian			2
	Registered Nurse			4
	Speech Language Pathologist			1

FIGURE 2-1: Preliminary conceptual models of retirement decisions among RNs and AHPs



Adapted from Devine et al., 1998 and Sobal et al., 2006

FIGURE 2–2: Conceptual model of early retirement among RNs and AHPs (pre- and post-validation)

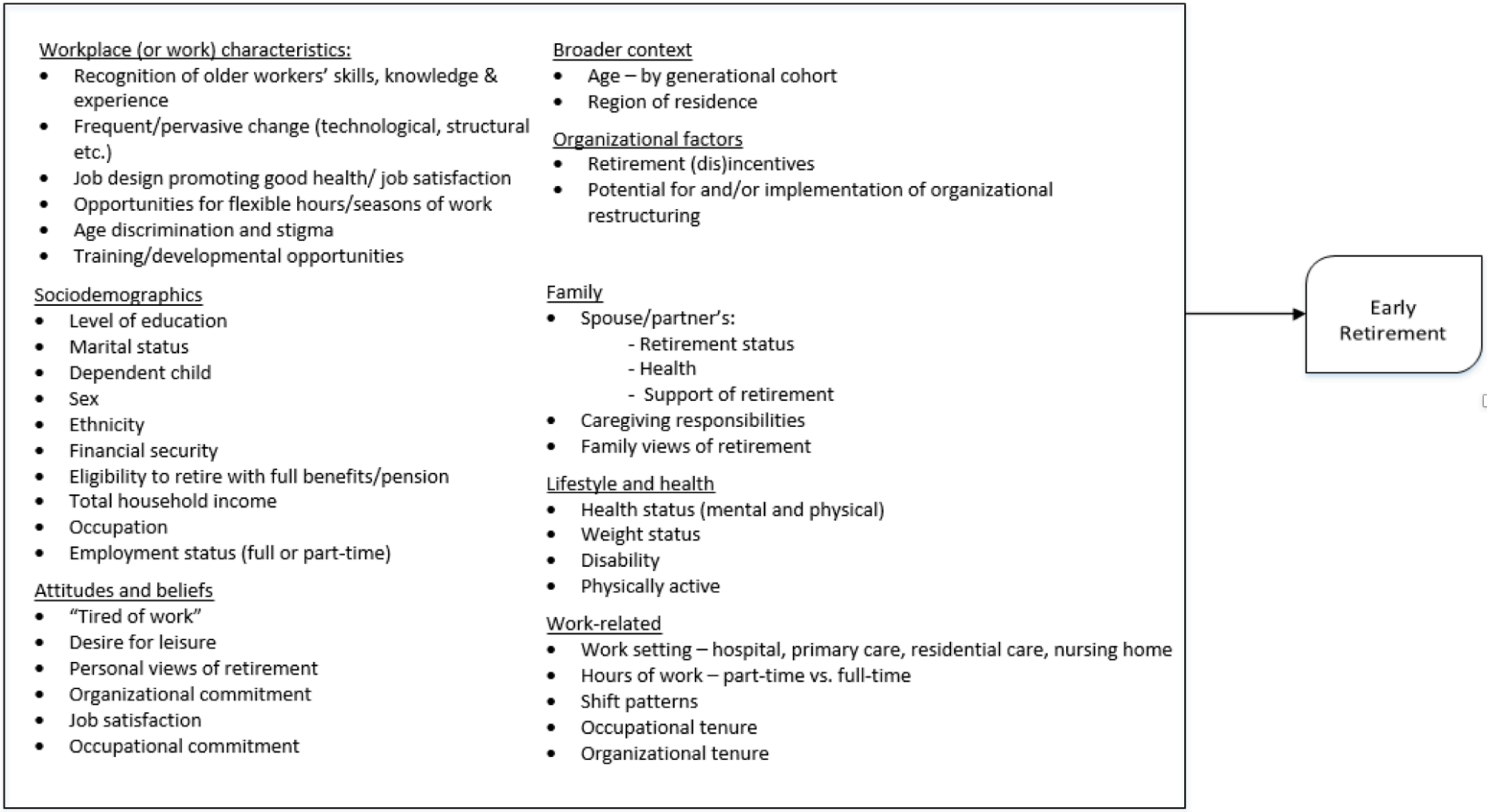
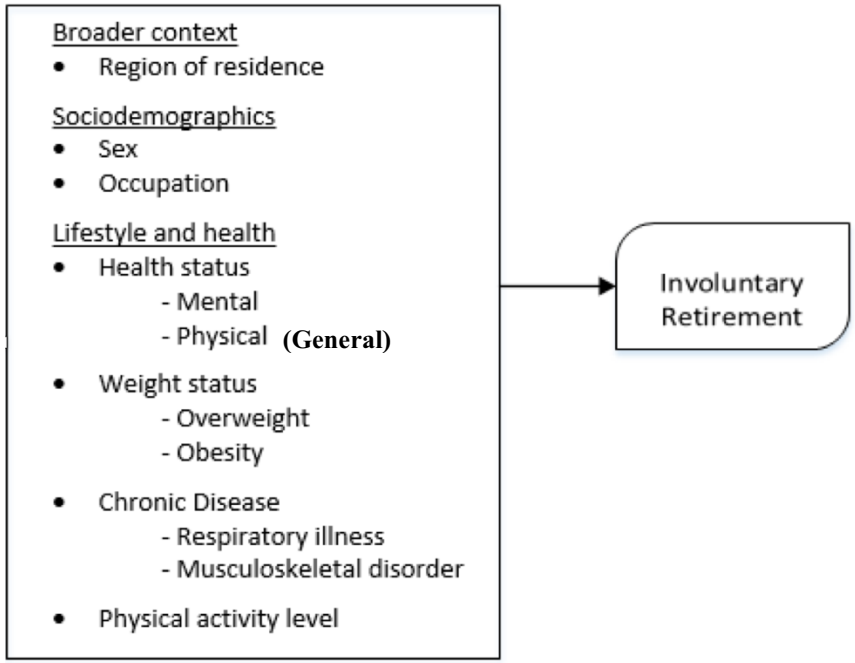


FIGURE 2-3: Conceptual model of involuntary retirement among RNs and AHPs (pre-validation)



SUPPLEMENTAL FILE 2-1: Review characteristics

Author	Year published	Years searched	Objective	Type of review	Databases	Methods	Exclusion criteria	Key words
Ferreira de Macêdo et al.	2014	2008-2012	To identify the scientific literature that deals with retirement in **nursing** available in the national and international literature.	Integrative	PubMed, CINAHL, LILACS	Data selection via "double-blind mode"	Theses, dissertations, literature reviews, letters, reviews, comments, opinion articles, case reports, abstracts in annals/dossiers/management and editorial reports, books, book chapters, government documents, newsletters	Aposentadoria, jubilación, enfe nursing, enfern enfermeira, enf enfermeiras, er nurse, nurses, e enfermero, enf enfermeros, eq enfermagem, n grupo de enfer
Keele & Alpert	2013	1995-2012	To examine the current research regarding RN retirement. To increase knowledge and understanding of existing RN retirement preparation and identify knowledge deficits for future research.		Academic Search Premier, CINAHL, PsycInfo, PubMed, Medline	Review conducted under theoretical framework of "Whittemore and Knafl with stages including problem identification, literature search, data appraisal, examination, and presentation for consideration."	Non-peer reviewed. Written in a language other than English. Addressed/explored retirement in a country other than the US.	RN retirement, nurse retiremer retention, RN v retention, RN r planning
McDonald & Donahue	2011	Not reported	Raise the question as to whether retirement is lost, as we currently know it in Canada	Selected review	Not reported	Not reported	Not reported	Not reported
Moseley et al	2008	1998-2007	To identify and explore the factors that influence older nurses to leave an organization or to retire early.	Systematic review	Medline, CINAHL, PubMed, Ovid, ProQuest, Blackwell, E-journals, Science Direct, Expanded Academic (ASAP)	3 researchers screened title/abstract	Non-English language Sample are nurses ≤40 years old Nurses employed in community and/or sector other than acute or aged care Article does not describe results of a review or research study.	Nurses, mature mature employ workers, know intergeneration retention of ma ageing nurses, retention, job s

SUPPLEMENTAL FILE 2-1: Review characteristics

Author	Year published	Years searched	Objective	Type of review	Databases	Methods	Exclusion criteria	Key words
Robroek et al.	2013	Inception of databases-Dec 2012	To analyze systematically the association between overweight, obesity and lack of physical activity and exit from paid employment through disability pension, unemployment, and early retirement.	Systematic/ meta-analysis	PubMed, Web of Science, Embase	Single author review of abstracts and manuscripts. Conducted quality evaluations and I_2 Random effects model	Non-longitudinal design, Non-quantitative measure of relationship strength and inadequate information to calculate such a measure Not English language Subjects/participants were patients	Related to: (i) a overweight/obe retirement or u or disability pe a longitudinal d
Topa et al.	2009	Inception of databases to 2007	To examine the relationships between retirement planning, retirement decisions and their antecedents and consequences.	Meta-analysis	PsycInfo, Medline, ERIC, Academic Search Premier, Dissertation Abstracts. Manual search of 5 journals and contacted researchers by e-mail to obtain unpublished papers	Retained one effect size ® per sample Homogeneity analysis via Q statistic Two-tailed z-test Fail-safe N values to detect publication bias	Published in newspapers or counseling-oriented magazines Theoretical paper Inadequate information to calculate *r* Not an empirical study Sample included younger workers	Not reported
Topa et al	2011	Inception to 2008	To determine 1) What predictive power does the objective and subjective measures of income have on retirement and its consequences? 2) Do these two types of measures differ in their predictive validity? 3) Which variables acts as moderators of these relations	Meta-analysis	PsycInfo, Medline, ERIC, Academic Search Premier, Dissertation Abstracts, manual searches of	Process of abstract/manuscript review not clearly defined No mention of quality review. Employed empirical guideline to interpret effect size magnitude. Homogeneity analysis via Q statistic. Analyzed moderator variable influence using categorical	Not an empirical research study Included participants <40 years old Did not include information required to calculate Pearson's correlations coefficient (if not provided by authors)	Retirement, ret

SUPPLEMENTAL FILE 2-1: Review characteristics

Author	Year published	Years searched	Objective	Type of review	Databases	Methods	Exclusion criteria	Key words
			between income and retirement/consequences?		journals. Contacted to request unpublished papers.	model & weight regression analysis. Fail-safe N values provided re: publication bias SEM analysis		
van den Berg et al	2010	1966 to December 2007	To gain background information regarding work- and health-related determinants of early retirement.	Systematic review	PubMed, Web of Science	Screening process not described. Analysis focused on measures of association, expressed odds ratio or regression coefficient Heterogeneity of study results tested with Epipool	Non-English language Focus on economic factors Focus on work disability Cross-sectional study design Subjects not employed at baseline Outcome measure of early retirement not clearly defined Only subjects w/ specific chronic diseases included in study No quantitative information available on associations between health status, individual, and work-related factors and early retirement Major methodological problems	Early retiremer work, physical work, psychos demands, job s autonomy, hea perceived healt work pressure, industrial, repe movement, wo
van Rijn et al.	2013	Inception of database-Jul 2013	Aim was to provide a systematic literature review of the associations between different health measures and exit from paid employment through disability pension, unemployment and early retirement, and to estimate the magnitude of these associations using meta-analyses.	Systematic/ Meta-analysis	Medline, Embase, Web of Science	Single review of abstracts, two reviewers at manuscript stage. Consensus to resolve disagreements.	Non-longitudinal study design Absence of OR, RR or HR or raw data required to calculate those Study participants/subjects were patients Non-peer reviewed article Written in language other than English	Health, work re retirement, une disability pensi design

SUPPLEMENTAL FILE 2-1: Review characteristics

Author	Year published	Years searched	Objective	Type of review	Databases	Methods	Exclusion criteria	Key words
Wang & Schultz	2010	1986-2009(?)	To provide a summary of key theoretical and empirical developments in employee retirement research since Beehr in 1986. Scope limited to focus on understanding retirement processes from an individual and behavioral perspective.	Narrative review	PsycInfo, Social Science Citation Index, EBSCO	Review organized by theoretical and empirical themes – theme illustrated with representative (not exhaustive) citations	Not specifically outlined	Not reported
Weaver	1994	"recent" – published in 1994	To review the economic literature on the work and retirement decisions of women.	Narrative(?)	Pre-databases. Method of locating studies not reported	Provide detailed reviews of all studies.	Not stated/described	Not stated/desc

SUPPLEMENTAL FILE 2-2: Study characteristics

Author	Year published	Objective	Methodology	Setting	N	Relevant details	Data analysis
Registered Nurses							
Armstrong-Stassen	2005	To investigate human resources strategies most important in retaining older RNs in the workforce To evaluate the extent to which hospitals are engaged in these practices	Cross-sectional study (questionnaire followed up by in-depth interviews with 20 randomly selected RNs who had completed the questionnaire)	Hospitals Ontario, Canada	361	Convenience sample Response rate 42% of all RNs, included only those working in a hospital setting Questionnaire developed based on an "extensive" review of the HR literature Measures included: importance of the aging workforce, perceived recruitment and retention effectiveness, human resource practices (34 in total) and demographic variables	Descriptive analyses – frequencies Nonparametric two-related sample tests Wilcoxon signed ranks test
Blakely & Ribeiro	2008	To explore factors that influence nurses to retire early and incentives that may encourage them to stay longer in employment	Two phase exploratory study Questionnaire	Newfoundland, Canada	124	Random selection Response rate 62% Questionnaire developed for the study – consisted mainly of items gathered directly from nurses during interviews and focus groups; questionnaire was reviewed by a panel of educators and nurse clinicians prior to use. Items determined: which "reasons" influence plan to retire early; to what extent would specific incentives lead you to postpone early retirement; additional ideas (open-ended).	*t*-tests with a Bonferroni correction
Boumans, de Jong & Vanderlinden	2008	To gain insight into older nurses' retirement intention To establish factors determining early retirement intentions among Belgian nurses	Cross-sectional study	General hospital Belgium	100	Convenience sample Response rate 69.6% Two validated instruments: Intended age of retirement (Timmerhuis et al. 1998) Considerations related to retirement (Timmerhuis et al. 1998)	Descriptive analyses Chi-square *t*-tests

SUPPLEMENTAL FILE 2-2: Study characteristics

Author	Year published	Objective	Methodology	Setting	N	Relevant details	Data analysis
Cyr	2005	To identify factors that may influence retirement of nurses	Descriptive survey study	Acute care hospitals Central New England, US	1,553	Convenience sample Response rate 39% Questionnaire developed by author after an extensive review of literature and interviews with leaders from states with influential labour unions; validity established through panel of experts; reliability established through test-retest Items related to sociodemograhpics; factors that may encourage early retirement; proposed changes to the work environment; recruitment/mentorship program	Descriptive statistics Frequency distributions, measures of central tendency
Duffield, Graham, Donoghue, Griffiths, Bichel-Findlay and Dimitrelis	2014	To identify factors motivating older nurses to leave the workforce	Prospective randomized quantitative survey Follow-up interviews (reported elsewhere?)	Australia	319	Random sample Overall response rate 41.7% but some excluded because no longer working as a nurse or incomplete survey Instrument developed for the study combining: Mature Age Workers Questionnaire (ABS 2003) Job Descriptive Index (JDI) Job in General Scale (JIG)	Descriptive analyses
Friis, Ekholm, Hundrup, Obel & Grønbæk	2007	To analyze the relationship between health, lifestyle, work-related and sociodemographic factors, and older nurses' exit from the labour market Post-Employment Wage	Quantitative analysis of national data set	Denmark	5,538	Data drawn from Danish Nurse Cohort Study and Danish Integrated Database for Labor Market Research All variables have previously been used and tested in former Danish national surveys Items included: self-reported health; sociodemogrphics; nurse workload/work-related factors (Karasek & Theorell); leisure time physical activity; drinking/smoking; BMI	Discrete-time survival analysis with complementary log-log link function Associations described using hazard ratios

SUPPLEMENTAL FILE 2-2: Study characteristics

Author	Year published	Objective	Methodology	Setting	N	Relevant details	Data analysis
Lagacé, Tougas, Laplante, Neveu	2010	De reproduire auprès d'infirmières âgées de 45 ans et plus le lien observé entre la communication organisationnelle âgiste et le processus de disengagement psychologique auprés d'infermiers d'expérience De proposer une extension du modèle de désengagement psychologique	Survey (questionnaire)	Hospital Francophones Québec, Canadian	321	Convenience sample Response rate 30.1% Measures – sociodemographics and "items portant sur les concepts de l'étude, validés (Lagacé & Tougas 2006; Lagacé et al., 2008). Items/measures include: communication âgiste; privation relative personnelle; devaluation; estime de soi; intentions de depart à la retraite;	Path analysis (theory-guided) Fit evaluated by chi-square, CFI, SRMR, RMSEA
Valencia & Raingruber	2010	To identify what motivates experienced nurses to continue working and to consider retirement.	Phenomenological interviews	Intensive care	16 (8 between 31 and 49; 8 between 50 and 65 years)	Convenience sample (single ICU) – all female Interview guide developed by the authors and pilot tested on a nurse researcher and staff nurse Heideggerian phenomenology (Heidegger 1962) Participants asked to share their experience and reflective understanding about what retirement meant to them during	Reviewing transcripts to identify common themes and meaning Read multiple times independently by both authors If researchers did not agree on interpretations, they returned to the data; aim was to achieve textual data consensus Common themes were identified both across groups and within groups (young vs. experienced RNs)
Allied health							
George, Springer, Haughton	2009	To examine the retirement intention of the public health nutrition workforce (age 45+)	Secondary data analysis (2006-2007 Public Health Nutrition Workforce Survey)	United States, District of Columbia, and Guam	4,460	Overall response rate 80% (entire public health nutrition workforce); analytic data set included only those age 45+ Factors were *personal* (including retirement intention, years until intend to retire, age, experience, benefit availability, education level, position classification, full-time/part-time, employed/contract etc.) or system-level (agency type, DHHS region)	Descriptive analyses $X2$ and t-tests Stepwise logistic regression ANOVA

SUPPLEMENTAL FILE 2-2: Study characteristics

Author	Year published	Objective	Methodology	Setting	N	Relevant details	Data analysis
Gleeson & Gallagher	2005	To determine incidence rates, trends and medical causes of ill-health retirement among different occupational classes	Study of occupational health files and Southern Health Board employee database	UK – National Health Service Southern Health Board		Collected: age, occupation, years of service, main medical diagnosis, occupational class; observed number of ill-health retirements was divided by the expected number multiplied by 100 to give standardized ill-health retirement ratios; calculated proportional ill-health retirement ratios for common medical causes	*X*2 Fischer's exact test *t*-test
Jones, McIntosh	2010	To test the effects of affective, continuance, and normative commitment to organizations and to occupations on older-aged pharmacists' intentions to fully retire and to puruse three types of bridge employment	Dillman design mail survey to all pharmacists 50+ employed in a single retail pharmacy chain	United States	290	Convenience sample Response rate (in analytic sample) 25% Measures included: Control – gender, age, organizational tenure, occupational tenure; Organizational and occupational commitment (Meyer et al. 1993); turnover intent (Cropanzano et al. 1993); bridge employment	Confirmatory factor analysis Chi-square Regression of specified criterion on control variables

SUPPLEMENTAL FILE 2-2: Study characteristics

Author	Year published	Objective	Methodology	Setting	N	Relevant details	Data analysis
Juliá, Kilty, Richardson	1995	To examine the extent to which social workers adequately prepare for retirement.	Secondary analysis of data (three separate surveys) collected to compare professional groups re: preparation for retirement and attitudes about retirement) Data collected via interview	Work setting information not available Columbus, Ohio San Juan, Puerto Rico	196 social workers	Samples stratified on profession, age and gender Four categories of variables: retirement intentions, retirement attitudes, expected financial resources, work attitudes (Goudy, Powers and Keith 1975).w	One-way ANOVA comparing social workers and non social workers Two-way ANOVAS testing for racial/ethnic/gender/age differences
Schofield, Fletcher, Johnston	2007	To identify ageing and retirement patterns of the pharmacy workforce (since 1986) and the implications of those changes for workforce planning	Use of Australian Bureau of Statistics data (1986-2001) – ABS Census of Population and Housing	Australia	13,395	Highest non-response rate 3.6% for age Individuals cannot be followed from one census to the next Grouping by gender, "generational cohort,", hours worked	Calculated attrition rates and projected workforce attrition to 2006 to 2026 Use of .01 level of significance

SUPPLEMENTAL FILE 2-3: Conceptual and operational variables

Variable	Theoretical definition	Operational definition	CLSA variable	Question(s)	Type of variab
Predictor variables					
Age – generational cohorts	An individual's age places them within a specific generational cohort. Each generational group is believed to have shared "experiences that mold specific preferences, expectations, beliefs and work style."(Carlson and Deloitte & Touche, n.d.)	Age, according to generational cohorts. Those between the ages of 44-46 are classified as Generation Xers, those 47-65 as Baby Boomers, and those ≥66 as Traditionalists.	AGE_NMBR_TRM	What is your age? Will be derived	Categorical (or
Caregiving	"The act of providing unpaid assistance and support to family members or acquaintances who have physical, psychological, or developmental needs"(Drentea, 2007)	For those that have already retired, self-report that "providing care to a family member or friend" contributed to their decision to retire. For those not yet retired, self-report that the "need to provide care to a family member" will influence their decision to retire.	RET_WHY_PR_TRM, RET_WHYR_PC_TRM	There are many reasons why people retire. Which of the following reasons contributed to your decision to retire? There are many reasons why people retire. Which of the following are likely to be the reasons you retire?	Binary – Y/N
Changes in work situation	Notable alteration in an individual's work situation.	For those that have already retired, self-report that "organizational restructuring or job elimination" contributed to their decision to retire. For those not yet retired, self-report that "job ending and not wanting to start offer" will likely be a reason for retirement.	RET_WHY_OR_TRM, RPL_WHYR_JE_TRM	There are many reasons why people retire. Which of the following reasons contributed to your decision to retire? There are many reasons why people retire. Which of the following are likely to be the reasons you retire?	Binary – Y/N
Chronic disease	These "diseases are not passed from person to person. They are of long duration and generally slow progression. The four main types of noncommunicable diseases are cardiovascular diseases (like heart attacks and stroke), cancers, chronic respiratory diseases (such as chronic obstructed pulmonary disease and asthma) and diabetes."(World Health Organization, 2015c)	Self-report of one, two or three or more chronic conditions in the categories of osteoarthritis, arthritis, respiratory, cardiac, cardiovascular, neurological, gastrointestinal, vision, cancer, mental health, other	CCT_F1_TRM	Derived – has at least one chronic condition. Self-report ("Has a doctor ever told you…")	Categorical (or

SUPPLEMENTAL FILE 2-3: Conceptual and operational variables

Variable	Theoretical definition	Operational definition	CLSA variable	Question(s)	Type of variab
Dependent child	One or more persons, under the age of 18, living in the home of the respondent (Canada Revenue Agency, 2015)	Self-report of one or more persons under the age of 18 living in the respondent's household.	SN_LIVH_NB_TRM	How many people, not including yourself, live in your household? a) What is the relationships of person #2 to you? b) What is the sex of person #2? c) How old is person #2? Etc.	Categorical (or - One - Two-three - One or more
Disability	"Disabilities is an umbrella term, covering impairments, activity limitations, and participation restrictions. An impairment is a problem in body function or structure; an activity limitation is a difficulty encountered by an individual in executing a task or action; while a participation restriction is a problem experienced by an individual in involvement in life situations"(World Health Organization, n.d.)	TBD – possibility of a summative disability score in the database	TBD – will likely include the respondents' OARS scale: Instrumental and Basic Activities of Daily Living Classification (ADL_DCLS_TRM)	TBD	TBD – likely b
Ethnicity	"Ethnic or cultural origins of the respondent's ancestors"(Canada, 2013)	Self-reported ethnic or cultural ancestry.	SDC_3	To which ethnic or cultural groups did your ancestors belong?	Categorical (nc Will derive by collapsing (e.g. European, Wes European, Chir Hebrew, Abori South Asian, Other/Canadian
Financially secure	Individual or family group has the "income necessary to cover basic expenses without relying on public subsidies." They have adequate finances "to cover basic expenses, plan for important life events like college or save for emergencies like unexpected health bills."	For those that have already retired, self-report that either "completing the required years of service to qualify for pension" or that "retirement was financially possible" contributed to their decision to retire. For those not yet retired, self-report that the respondent's "adequate retirement	RET_WHY_CM_TRM, RET_WHY_RE_TRM, RET_WHYR_AR_TRM I will derive – those marked as Y will have answered Yes to one (or more) of the CLSA variables listed above	There are many reasons why people retire. Which of the following reasons contributed to your decision to retire? There are many reasons why people retire. Which of the following are likely to be the reasons you retire?	Binary – Y/N

SUPPLEMENTAL FILE 2-3: Conceptual and operational variables

Variable	Theoretical definition	Operational definition	CLSA variable	Question(s)	Type of variab
Meet requirements for full pension/superannuation access	Individual has met the program-specific requirements to access their private pension (or similar resource)	income (e.g., pensions and investments)" will influence their decision to retire.			
General (**good**) health	"Good health is a state of complete physical, social and mental well-being, and not merely the absence of disease or infirmity. Health is a resource for everyday life, not the object of living, and is a positive concept emphasizing social and personal resources as well as physical capabilities."(World Health Organization, 2015b)	Self-reported health as being either excellent, very good, good, fair or poor	GEN_HLTH_TRM	In general, would you say your health is excellent, very good, good, fair, or poor	Categorical (or
Household income	Total annual income, before taxes and deductions, in the respondent's household	Self-reported, estimated total household income (range) received by all household members, from all sources, before taxes and deductions within the last 12 months.	INC_TOT_TRM	What is your best estimate of the total household income received by all household members, from all sources, before taxes and deductions, in the past 12 months?	Categorical (or
Level of education	"A construct based on the assumption that education programmes can be grouped into an ordered series of categories. These categories represent broad steps of educational progression in terms of the complexity of educational	Self-reported highest level of education with options including no post-secondary degree, certificate, or diploma; trade certificate or diploma from a vocational school or apprenticeship training; non-	ED_OTED_TRM ED_HIGH_TRM	Have you received any other education that could be counted towards a degree, certificate, or diploma from an educational institution?	Categorical (or

SUPPLEMENTAL FILE 2-3: Conceptual and operational variables

Variable	Theoretical definition	Operational definition	CLSA variable	Question(s)	Type of variab
	content. The more advanced the programme, the higher the level of education."(UNESCO Institute for Statistics, 2012)	university certificate or diploma; university certificate below a bachelor's level; bachelor's degree; university degree or certificate above bachelor's degree		What is the highest degree, certificate, or diploma you have obtained?	
Marital status	"A person's situation as regards being single, married, divorced, etc."(2005)	Respondent's self-reported relationship status	SDC_MRTL_TRM	What is your current marital/partner status	Categorical (no Will analyze as Married/living partner vs. sing widowed, divo separated
Mental health	"A state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community."(World Health Organization, 2014)	Self-reported mental health as being either excellent, very good, good, fair or poor	GEN_MNTL_TRM	In general, would you say your mental health is excellent, very good, good, fair, or poor?	Categorical (or
Musculoskeletal disorder	"Any injury, damage or disorder of the joints or other tissues in the upper/lower limbs or the back."(Health and Safety Executive, n.d.)	Self-report of a doctor having told the respondent that they have either (or more than one of) osteoarthritis of the knee/hip/hand(s), rheumatoid arthritis, other form of arthritis.	CCT_OAKNEE_TRM, CCT_OAHIP_TRM, CCT_OAHAND_TRM, CCT_RA_TRM, CCT_OTART_TRM I will have to derive this variable	Osteoarthritis: Has a doctor ever told you that you have osteoarthritis in the knee/hip/one or both hands? Arthritis: Has a doctor ever told you that you have rheumatoid arthritis/any other type of arthritis?	Binary – Will be categor Y if the respon indicated Y to more than one) questions
Occupation	"A collection of jobs, sufficiently similar in work performed to be grouped under a common label for classification purposes."(Canada, 2012)	Self-reported occupation at longest job worked over the respondent's lifetime, as coded according to the "nationally accepted taxonomy and organizational framework of occupations in the Canadian labour market (Statistics Canada 2012)	LBF_LGTYPE_SP_TRM	3131 Pharmacist 3132 Dietitians and Nutritionists 3141 Audiologists and SLPs 3142 Physiotherapists 3143 Occupational Therapists 3012 Registered nurses and registered psychiatric nurses 3233 Licensed practical nurses 4152 Social worker (can't pull out only medical)	

SUPPLEMENTAL FILE 2-3: Conceptual and operational variables

Variable	Theoretical definition	Operational definition	CLSA variable	Question(s)	Type of variab
				3413 Nurse aides, orderlies and patient service associates 3215 Medical radiation technologists (can't pull out radiation therapists) 3214 Respiratory therapists, clinical perfusionists and cardiopulmonary technologists (can't pull out perfusionists) 0311 Managers in health care (can't specify allied health)	
Perceived spousal support	"An individual's subjective, evaluative assessment of his or her social support network. Examples of subjective appraisals include satisfaction, feeling cared for, respected, or involved. These appraisals may be global, reflecting an evaluative synthesis of a person's relationship with" their spouse "or a particular type of support (e.g., emotional or instrumental)" (Chronister et al. 2006)	For those that have already retired, self-report that an agreement with their spouse or partner contributed to their decision to retire. For those not yet retired, self-report that the respondent's spouse or partner will/has pressure(d) them to continue or stop working will/has influence their decision to retire/remain working.	RET_HYE_AG_TRM RPL_INFSP_PS_TRM	There are many reasons why people retire. Which of the following reasons contributed to your decision to retire? Sometimes people's reasons for retirement are influenced by their spouse or partner. Which of the following will likely influence your retirement?	Binary – Y/N
Primary work setting	Primary setting of work at longest job held in respondent's lifetime.	Self-report of business or industry sector of the longest job the respondent had worked at.	LBF_LGIND_SP_TRM	What business or industry sector were you in? Derived variable using the Industrial Classification System (2012): 622 – Hospitals 6232 – Residential developmental handicap, mental health and substance abuse facilities 62110 - primary care 623110 – nursing care facilities	Categorical (nc
Province/territory of residence at recruitment	Region of Canada in which an individual resides at the time of the survey	Self-reported province or territory in which the respondent's health care number was issued, classified: Alberta/British	WGHTS_PROV_TRM	For which province or territory is your health care number?	Categorical (nc

SUPPLEMENTAL FILE 2-3: Conceptual and operational variables

Variable	Theoretical definition	Operational definition	CLSA variable	Question(s)	Type of variab
		Columbia, Manitoba/Saskatchewan, Ontario, Québec or the Maritimes			
Pursuit of leisure/personal interests	Pursuit of activities that are "neither work nor necessary activity"(Kelly, 1972)	For those that have already retired, self-report that a wish "to pursue hobbies or other activities of personal interest" contributed to their decision to retire. For those not yet retired, indication in "Other" that a probably reason for their retirement will be a desire to pursue hobbies or other activities of personal interest.	RET_WHY_HO_TRM, RPL_WHYR_OTSP_TRM	There are many reasons why people retire. Which of the following reasons contributed to your decision to retire? There are many reasons why people retire. Which of the following are likely to be the reasons you retire?	Binary – Y or N More sticky du of complement statement in possible/future retire
Respiratory illness	"Chronic respiratory diseases (CRDs) are diseases of the airways and other structures of the lung. Some of the most common are chronic obstructive pulmonary disease (COPD), asthma, occupational lung diseases and pulmonary hypertension."(World Health Organization, 2015a)	Self-report of a doctor having told the respondent that they have either (or more than one of) asthma, emphysema, chronic bronchitis, COPD, chronic changes in lungs due to smoking.	CCT_ASTHM_TRM, CCT_COPD_TRM I will have to derive this variable	Asthma: Has a doctor ever told you that you have asthma? Other: Has a doctor told you that you have/had any of the following: emphysema, chronic bronchitis, COPD, or chronic changes in lungs due to smoking?	Binary – Will be categor Y if the respon indicated Y to both of the que
Retirement incentives	A thing or things that encourage or motivate an individual (2005) to retire before the age of 65 years.	For those that have already retired, self-report that "employer offered special incentives to retirement" contributed to their decision to retire. For those not yet retired, self-report that the respondent's early retirement policies of their employer will influence their decision to retire.	RET_WHY_IN_TRM, RPL_WHYR_EP_TRM	There are many reasons why people retire. Which of the following reasons contributed to your decision to retire? There are many reasons why people retire. Which of the following are likely to be the reasons you retire?	Binary – Y/N
Sex	"The characteristics that differentiate males and females in most plants and animals" (Taber's Cyclopedic Medical Dictionary)	Self-reported sex – either male or female	SEX_ASK_TRM	Are you male or female?	Categorical (bi

SUPPLEMENTAL FILE 2-3: Conceptual and operational variables

Variable	Theoretical definition	Operational definition	CLSA variable	Question(s)	Type of variab
Spouse retired	Husband/wife or common-law partner has had a perceptible reduction in working hours and income (Beehr, 2014) and an increasing psychological separation from work (Beehr, 2014, Dubois and Dussault, 2002, Elwood, 2013)	Self-report of spouse/partner as retired	RET_SPSE_TRM	Is your spouse/partner retired?	Binary – Y/N
"Tired of work"	To date, "no systematic efforts to define this…precisely" (Jex & Britt 2014). The sense that one's time at work has "come to an end"(2005)	For those that have already retired, self-report that wanting to stop working contributed to their decision to retire. For those not yet retired, self-report that the respondent's desire to stop working will influence their decision to retire.	RET_WHY_ST_TRM, RPL_WHYR_WS_TRM	There are many reasons why people retire. Which of the following reasons contributed to your decision to retire? There are many reasons why people retire. Which of the following are likely to be the reasons you retire?	Binary – Y/N
Weight status	"Classification of weight, accounting for height, into the categories determining the presence and degree of obesity"(Mull, 2013)	"Body Mass Index (BMI) is a simple index of weight-for-height that is commonly used to classify underweight, overweight and obesity in adults." (WHO, 2006) Classifications are Underweight (<18.5), Normal (18.5-24.99), Overweight (≥25.00), Obese (≥30.0)	HWT_DISW_TRM	Derived variable using the questions: How tall are you without shoes on (decimal)? How much do you weigh (decimal)? And Was that in pounds or kilograms?	Categorical (or *Plan to collap Underweight/N Overweight an
Work hours	Classification of employed persons according to hours worked at their primary or only job, where >30 hours is considered full-time and <30 hours is considered part-time(Statistics Canada, 2010)	For those already retired, self-report of work hours in longest job, with options of >30 hours per week, between 20-30 hours per week and less than 20 hours per week. For those yet to retire, self-	LBF_LGSTAT_TRM, LBF_STTS_TRM	Thinking of the job you worked at the longest, what was your working status in that job? If you were self-employed, choose full-time or part-time as appropriate/	Binary – Will derive to f (>30) and part- (≤30 hours).

SUPPLEMENTAL FILE 2-3: Conceptual and operational variables

Variable	Theoretical definition	Operational definition	CLSA variable	Question(s)	Type of variab
		report of current working hours, with identical options.		What is your current working status? If self-employed, choose full-time or part-time, as appropriate.	
Work pattern	Pattern of hours of work	Self-reported work schedule, with options of daytime, evening, night, rotating, seasonal.	LBF_SCHD_TRM LBF_LGSCHD_TRM	Which of the following best describes your working schedule? Which of the following best describes your working schedule in that (longest) job? Daytime, evening, night, rotating, seasonal	Categorical (or
Workplace (or work) characteristics		Self-report that characteristics of, or experiences in, the workplace have or will influence the decision to retire	RET_WHY_OTSP_TRM RET_WHYR_OTSP_TRM	There are many reasons why people retire. Which of the following reasons contributed to your decision to retire? There are many reasons why people retire. Which of the following are likely to be the reasons you retire?	Binary – Y/N
Outcome variables					
Early retirement	Occurs when an individual exits employment below the age of 65 and receives private pension benefit(Mulders et al., 2015)	Self-reported age of retirement (either having already occurred or occurring in future) below 65 years	Will be derived from RET_AGE_NB_TRM and RPL_AGE_NB_TRM	Has already occurred: How old were you when you first retired/partly retired? Planned: At what age do you plan to retire?	Binary – early time/late
Involuntary retirement	Occurs when an individual perceives that they have no control over their retirement decision(Denton et al., 2013)	Self-reported involuntary retirement	RET_VOLUN_TRM	Would you say your retirement was voluntary, that is, you retired when you wanted to?	Binary – volun involuntary

Legend: Citations in **purple** are from the general retirement literature (broader population – reviews only); those in **blue** are from the nursing literature incorporating all available reviews those in **green** are from the allied health literature (no date restriction)

See Bibliography – All cited works for detailed references

CHAPTER 3

Why did they leave so soon? A descriptive analysis of retirement patterns among Canadian Registered Nurses and allied health professionals

The foundation of a health system is its workforce (OECD, 2016). A recent Global Health Workforce Alliance and World Health Organization (WHO) report estimated the current deficit of skilled health professionals at 7.2 million and projected an increase to a deficit of 12.9 million by the year 2035 (Global Health Workforce Alliance & World Health Organization, 2014). In 2013, WHO estimated a global shortage of 9 million nurses and midwives – making up the majority of a 17.4 million person shortage of health care workers. The aim of health workforce planning is to achieve balance between supply and demand of diverse health workers – both in the short and long-term (Ono, Lafortune, & Schoenstein, 2013).

Typically, the "supply" end of workforce planning models is based on basic demographic information; the common assumption is that health professionals will retire from their jobs at a country-specific, "standard" retirement age (Ono et al., 2013). The "standard" retirement age is increasingly a moving target as more governments attempt to stimulate continued labour force participation among their older workers (FitzGerald, Keane, Reid, & O'Neill, 2013; MacDermott, 2014; Proper, Deeg, & van der Beek, 2009). Workforce planning models developed and implemented based on assumptions of a "standard" age of retirement are at a disadvantage in that the resulting predictions are not reflective of changing rates of retention and current patterns of retirement (Ono et al., 2013).

Complicating health care workforce planning is the extended time required to correct issues with supply, particularly under-supply. Training of health care professionals is a long process (Amorim Lopes, Santos Almeida, & Almada-Lobo, 2015; Ono et al., 2013) and health policy development, adoption and enactment is often delayed (Amorim Lopes et al., 2015). The time-frame for health workforce planning must be sufficiently long, so as to anticipate and block supply issues before they arise (Amorim Lopes et al., 2015). Undesirable outcomes are most easily avoided through early, thorough consideration of policy options designed to improve inputs and outputs on both sides of the equation – supply and demand (Ono et al., 2013).

Unfortunately, one of the primary barriers to more sophisticated analysis of supply issues is a lack of information. Workforce data deficits make system-wide planning impossible

(Wranik, 2008); gaining an accurate, clear picture of the sitution is not possible without data (Ono et al., 2013). Collection of health human resource data requires a sustained investment (Tomblin Murphy et al., 2012). Despite the strategic importance of effective human resource management in the health system, the topic has received little attention in Canadian health policy research and in the academic literature (Wranik, 2008). To date, most workforce projections have focused on anticipating supply and demand for physicians and nurses (Amorim Lopes et al., 2015).

In this study, we defined RNs as regulated health professionals who work collaboratively and autonomously to facilitate achievement of optimal levels of health at individual, family-, group-, community- and population-levels. RNs support client self-management, coordinate provision of health care and directly provide health care services (Canadian Institute for Health Information (CIHI), 2017). In 2016, more than 298,700 RNs and nurse practitioners were actively licensed to practice in Canada (CIHI, 2017). It is well acknowledged that RNs typically retire before the standard age of retirement (OECD, 2016; Ono et al., 2013). However, data measuring the specific details of transitions to retirement among RNs are lacking (Ono et al., 2013). Estimations of RN retirement age are often derived from records of renewal or discontinuation of professional registration (i.e., 'exit' rates) (Ono et al., 2013; Tomblin Murphy et al., 2012). O'Brien-Pallas et al. (2003) estimated that, as of 2001, the average retirement age among Canadian nurses was 56 years. Failure to renew professional registration, regardless of the age of exit, cannot definitively be said to indicate retirement from the workforce but is viewed as a reasonable proxy.

Although there is the potential for overlap and re-allocation of activities across professional groups, most health workforce planning models are specific to a professional group (Ono et al., 2013). For this descriptive analysis, we have accessed survey data for both RNs and AHPs. We have defined AHPs as health care providers with a minimum of a required baccalaureate degree (e.g., pharmacists, physiotherapists (PTs), dietitians, occupational therapists(OTs)). In 2012, more than 80,000 AHPs were employed in diverse settings across Canada (Canadian Institute for Health Information, 2014). Broadly, data on the allied health workforce are extremely limited (Solomon, Gaves, & Catherwood, 2015). The data required to successfully make health workforce predictions for AHPs in Canada are, to date, not available.

Purpose and objectives

The purpose of this project was to characterize retirement decision-making among publicly-employed Canadian RNs and AHPs between the ages of 45 and 85 years in the interest of informing both workforce planning and development of targeted employment and social development policy.

The objectives of our analysis were to:

1. Identify and compare factors reported to influence retirement decisions among RNs and AHPs employed in the public health system;
2. Explore the relative importance of factors on early vs. on-time or "late" retirement among RNs and AHPs, and;
3. Identify and discuss implications for RN and AHP workforce policy.

Methods

The data for this descriptive analysis were drawn from the Canadian Longitudinal Study on Aging (CLSA). The CLSA sample was divided into two cohorts – those in the Tracking (Tra) assessment completed their interviews over the telephone while those in the Comprehensive (CoP) assessment attended data collection site visits and were interviewed in their homes. In total more than 50,000 Canadians between 45 and 85 years of age were recruited (Canadian Longitudinal Study on Aging (CLSA), n.d.-a; Raina et al., 2009). For details on CLSA methodology see Raina et al. (2009). We applied to the CLSA Data and Sample Access Committee for data access. The analyses reported here are part of a larger project. Ethics approval was granted by the University of Alberta Research Ethics Board 2 (Proooo60985). CLSA data were stored and accessed from within the Faculty of Nursing's Health Research Data Repository at the University of Alberta (https://www.ualberta.ca/nursing/research/supports-and-services/hrdr).

Data were provided in data sets - one for each cohort. CoP baseline (n = 30,097) data were collected between May 2012 and May 2015 and Tra baseline data (n = 21,242) were collected between September 2011 and May 2014 (CLSA, n.d.-b). Variable names differed, most often only by the last three letters (COM vs. TRM). As the objectives of the analysis were related to responses of RNs and AHPs, a single researcher (SH) reviewed text entries (English and French) to several occupation-related questions in order to identify those in the included professions. SH reviewed both data sets (CoP and Tra) to identify RNs and AHPs before merging the two samples into a single data set including only RNs and AHPs.

It was fairly common for individuals to report profession simply as "nurse." Those with a diploma or certificate level education who reported a profession of "nurse" may be (or may have been before retirement) RNs, licensed practical nurses, registered psychiatric nurses, or care assistants/aides. The minimum education level for licensing as an RN has changed over time such that all provinces apart from Québec now offer only baccalaureate level preparatory programs (Canadian Nurses Association, n.d.). In 2011, when the CLSA began collecting baseline data, 57% of Canadian Registered Nurses claimed diploma-level education (CIHI, 2017).

As it was our goal to contribute to the literature exploring retirement decision-making among health professionals with a baccalaureate-level education or higher, we elected to include only those we were reasonably certain were RNs in the analytic sample. Specifically, this meant that we included only those participants who either i) explicitly identified themselves as RNs, or 2) identified themselves as a nurse and had a baccalaureate level of education or higher. It is possible that our analytic sample includes licensed practical nurses or care aides with a baccalaureate degree in a field other than nursing.

Participants who reported self-employment, retail employment or government employment were removed from the sample as the objective was to provide information of direct relevance to health policy makers and administrators of Canada's public health care system - inclusive of hospitals, regional public health centres, many primary care centres and provincially-run long-term care facilities. In some cases, setting was unclear – "health care" was accepted as meeting inclusion criteria in the absence of further detail. In general, the majority of employed health professionals in Canada are employed within the public health care system (e.g., according to the 2016 College of Nurses of Ontario Annual Report more than 80% of RNs were employed in either hospital or community settings (College of Nurses of Ontario, 2017) and a 2016 report on the Dietetic Workforce in British Columbia reported that 73% of Registered Dietitians were employed by a provincial health authority (Dietitians of Canada, 2016)).

Measures

The CLSA questionnaire determined age of retirement by asking "How old were you when you first retired/partially retired?" Those not yet retired were asked "At what age do you plan to retire?" For our purposes, early retirement is defined as retirement at less than 65 years of age. Respondents were also asked "There are many reasons why people retire. Which of the

following reasons contributed to your decision to retire?" In this analysis, we have only shown those contributing variables that were identified in previously developed conceptual models of early and involuntary retirement among RNs and AHPs (see Hewko, Reay, Estabrooks, & Cummings, 2018). These variables included: caregiving requirements, organizational restructuring, spousal support, desire to pursue hobbies, employee incentives to retire, desire to stop working, pension qualification and financial possibility. Operationalized versions of the conceptual models will be tested in future stages of this project.

Analysis

Using STATA® SE 13.1, we conducted exploratory data analysis to gain an understanding of each variable's characteristics (i.e., distribution, observed variance). No outliers were detected. Descriptive statistics included counts and percentages for categorical variables, means and standard deviations for continuous variables and medians for variables not normally distributed. We conducted exploratory bivariate analyses using the Chi-square test for comparison of independent proportions to explore differences across professional group and differences between early retirees and those who retired on-time or "late." A participant was deemed an early retiree if they had a valid response to the age of first retirement question and their response was less than 65 years. Differences were considered significant when the two-tailed p-value was less than or equal to .05. We calculated Pearson correlations with Bonferroni-adjusted significance levels of .05 or less for all demographic variables (see Table 3-1).

Insert Table 3-1 about here

Overall, there was little missing data. For all demographic variables (see Table 3-2) apart from household income, for which 6% of responses were "missing" (or the respondent refused to answer), the percent of missing values was less than 0.5%. It is more difficult to quantify "missing" data for variables quantifying contribution to retirement; questions for these variables were part of a skip pattern. In some cases, the total number of responses was greater than the number of respondents who reported already being retired (e.g., n = 662 responded with a number to "How old were you when you first retired/partially retired?" but there were 671 responses to the question "Did qualification for pension contribute to your decision to retire?"). This indicates that some individuals who had not reported themselves as already being retired

answered questions about contributors to their decision to retire. Our approach, to exclude respondents who refused to answer or who did not know the answer to a given question from percentage calculations, aligns with existing reporting of CLSA descriptive data (Kirkland et al., 2015). Several continuous variables were positively skewed including number of children living in household, self-rated general health and self-rated mental health; we have reported medians and ranges for these variables.

Insert Table 3-2 about here

Results

In total, 1,187 RNs and AHPs employed in the public system were included in the CLSA dataset. Of those 794 were RNs (1.5% of all CLSA participants) and 393 were AHPs (< 1%). "Other" baccalaureate-prepared (minimum) AHPs include midwives, cardiac perfusionists, audiologists, radiation therapists and child life specialists. The most correlated demographic variables were age and household income (-.51, $p<.05$), age and children at home (-0.54, $p<.05$), general health and mental health (.53 $p<.05$) and household income and marital status (-.45, $p<.05$).

Demographic characteristics of RNs and AHPs differed significantly for age (at time of survey), gender, education level, household income, number of chronic conditions, weight status, number of children living in household and self-rated mental health. The RN sample had a significantly higher average age, a lower average level of education, and a lower average household income. RNs, on average, reported having more chronic conditions. In the AHP sample, there was a significantly higher proportion of males and a lower self-reported incidence of obesity. Several of the statistically significant differences – such as those in number of children living at home and self-rated mental health – are of little practical significance as rounding removes any meaningful difference between the groups.

Participating RNs had retired significantly earlier than AHPs (58.1 vs. 59.4 years, $p<.05$). Among RNs and AHPs who retired early, 11% retired under the age of 50, 9% retired between 50 and 54, 38% retired between 55 and 59 and 42% retired between 60 and 64 years of age. The difference in planned age of retirement between RNs and AHPs, for those not yet retired, was not significant (61.6 vs. 62.1 years). Across the allied health professions, average age of retirement

(among those already retired) ranged from 55.8 among speech language pathologists to 60.3 among pharmacists (see Table 3-3).

Insert Table 3-3 about here

Financial possibility and desire to stop working were the most frequently reported factors contributing to both early and on-time or "late" retirement for RNs. While AHPs also reported financial possibility and desire to stop working most frequently as contributors to early retirement they considered qualification for pension alongside desire to stop working most frequently when considering on-time or "late" retirement ($p<.05$). Financial possibility and desire to stop working were not equally reported as contributors to both early and on-time or "late" retirement: financial possibility was more often reported by those who had retired early and desire to stop working was more often reported by those who had retired on-time or "late" ($p<.05$). Agreement with spouse, caregiving requirements and organizational restructuring were also more frequently identified as contributing to early rather than on-time or "late" retirement ($p<.05$).

Sampled AHPs, regardless of retirement timing, were more likely to report that a desire to pursue hobbies contributed to their retirement decision than RNs. When we conducted t-tests with our data in response to our finding a significant difference between RNs' and AHPs' consideration of hobbies in their retirement decision-making we found a significant difference ($p<.05$) in time since retirement and likelihood of listing desire to pursue hobbies as a reason for retirement (among those already retired) (see Feldt, Hyvönent, Oja-Lipasti, Kinnumen, Salmela-Aro, 2012). Those who had indicated that a desire to pursue hobbies contributed to their retirement had an average last year of work of 2004, while those who had not identified it as a factor contributing to their retirement had an average retirement year of 2001; the difference remained statistically significant when limited to early retirees.

Insert Table 3-4 about here

Discussion

RNs and AHPs employed in Canada's public health system frequently retire well before the age of 65 years. The profession-specific ages of retirement provided from this analysis are national averages drawn from a sample of Canadian health professionals. These numbers, specifically 58.1 as the average age at retirement for RNs and 59.4 as the average age at retirement for AHPs, may be valuable to workforce planners seeking to increase accuracy of the "supply" end of their workforce planning model(s).

From a human health resources perspective, it is unfortunate that retiring early is the norm among Canadians in these health professions as many professions, including pharmacy (Government of Canada, 2017b), physiotherapy (The Conference Board of Canada, 2017), audiology and speech language pathology (Government of Canada, 2017a), struggle with shortages. Researchers in France aimed to predict the impact of delaying physician and nurse retirement and concluded that a delay of two years (even if retirement was still early) would significantly mitigate the projected decline in France's nurse-to-physician ratio (Ono et al., 2013). Also, and importantly, older health professionals embody significant human capital and exhibit explicit and tacit professional skills acquired over the length of their career (Perera, Sardeshmukh, & Kulik, 2015). It is, however, important to note that societal views of retirement have undergone recent and rapid changes; those in our sample may have considered their early retirement to have been of benefit to younger workers seeking to enter the job market. It is only recently that workers will have been exposed to the moral imperative of continued economic contribution late in life (Taylor & Early, 2016).

Demographic differences between RNs and AHPs were not unexpected (see Table 3-2). The significant difference in age is likely an artifact of CLSA sampling – however, there is some indication that nurses are, as a group, slightly older than AHPs. According to the Government of Canada Job Bank website – last updated June, 2017 (https://www.jobbank.gc.ca/explorecareers.do?selectExploreCareerBy=ec-occupation), the median age of RNs and registered psychiatric nurses is 43, while the median age of allied health professionals ranges from 41 (audiologist, SLP, OT, PT) to 42 years (pharmacist, RD).

Although nursing and many allied health professions are composed almost exclusively of females (e.g. dietetics (CIHI, 2015)), professions such as pharmacy (CIHI, 2013) are notably more gender diverse; thus, a significant difference in the proportion of males in the RN vs. the AHP sample is not surprising. Educationally, many allied health professions have mandated

masters-level preparatory degrees (e.g., PT, OT, SLP); it is, then, not unexpected that AHPs as a group would have a higher average level of education.

Despite being the most commonly reported predictor of both early and on-time or "late" retirement among both RNs and AHPs, only half (approximately) of respondents indicated that "retirement was financially possible" contributed to their decision to retire. Respondents were not limited to a single response when reporting contributors to retirement. Poor subjective financial well-being has a notable, negative impact on self-reported health (Arbor, Fenn and Meadows, 2014); as such, it is encouraging that near half of our respondents did not need to worry about their financial status when considering retirement. It is possible that some respondents were unable to wait until it was financially possible before they retired. However, we suspect that, for the majority, their relative financial privilege may have allowed them to evaluate financial possibility as of limited concern when it came to timing of retirement. In our sample, more than 40% of respondents reported a household income greater than $100,000 annually; in 2015, the median household income in Canada was $70,336 (Statistics Canada, 2017).

Desire to stop working was commonly reported as a contributor to both early and on-time retirement decisions. This response seems to be a "catch-all" response in that further qualitative probing may reveal an underlying reason for a desire to stop working (e.g. factors specific to the work environment such frequent/pervasive change; age discrimination/stigma and/or opportunities for flexible work hours). Respondents to the CLSA were provided with an opportunity to provide "other" reasons contributing to retirement, but only three of the 1,187 in our sample elected to do so. Without knowing what triggered the desire to stop working among RNs and AHPs, it is challenging to predict what type of intervention would either delay or eliminate it; we would expect, in-line with the nature of desire, that the triggers are emotional. Delaying the age at which RNs and AHPs may first "desire to stop working" may help to prolong participation in the workforce.

We have no definitive explanation for why AHPs are more likely to consider a desire to pursue hobbies when engaging in retirement decision-making. Feldt et al. (2012) conducted a study to investigate the role of job involvement and work ability in guiding life goals among retirees from managerial positions; their results indicated that the less time had passed since retiring the more likely a retiree was to report retirement goals linked to pursuit of hobbies and

leisure. Our findings are in line with those of Feldt et al. (2012), as we found that those who recently retired were significantly more likely to report "desire to pursue hobbies" as a reason for retirement.

Active participation in creative hobbies, such as knitting, woodworking and sewing, has been positively associated with health-related quality of life and superior physical health among Australian women in their eighties (Liddle, Parkinson, & Sibbritt, 2014). Thus, it is encouraging, on a societal level, that RNs and AHPs, who are largely female, are interested in dedicating time to pursuing hobbies later in life. All Canadians benefit when older generations are in good health. Further research on pursuit of hobbies among RNs and AHPs may be warranted, particularly in light of the differences in RN and AHP consideration of hobbies as part of their retirement decision-making.

It was promising to see that several of the factors identified as contributing to early retirement in our Conceptual Model of Early Retirement among RNs and AHPs (Hewko et al. 2018) were reported as contributing significantly more to early retirement decisions than to on-time or "late" retirement decisions. Both RNs and AHPs who had retired early were more likely to indicate that an agreement with their spouse, organizational restructuring and/or caregiving requirements contributed to their decision to retire than those who retired on-time or "late." It may be difficult for health administrators and policy makers to significantly alter the agreements RNs/AHPs have made with their spouses to delay retirement. It is possible that interventions designed to reduce ageism, such as those developed to target factors identified in Levy's (2016) Positive Education About Aging and Contact Experiences (PEACE) Model may indirectly lead to new views of ageing among Canadian couples – views in which early retirement may seem less desirable (Levy, 2016; Lytle & Levy, 2017).

Organizational restructuring is, frequently, implemented in response to budgetary shortfalls (actual or expected). As health care is the most significant government expenditure in most high-income countries, the demand on health care systems to cut costs is unlikely to disappear (Burke, Ng, & Wolpin, 2015). Older workers are frequently perceived to be more expensive than younger workers (Hennekam, 2015) as they are more likely to be at the top of the pay scale, by virtue of years of consecutive employment. They can also cost more to insure (whether for on-the job insurance, disability benefits and/or and extended medical benefits (e.g. see Bailey, 2014)). Burke, Ng, & Wolpin (2015) propose that the negative human resource

effects (one of which would be a surplus of early retirements) of organizational restructuring can be mitigated when efforts are made to facilitate collaboration between professional unions (such as the nursing union) and hospital management. Effective, frequent communication throughout restructuring may also lessen the uncertainty and worry experienced by employees, thus increasing the chances that fewer health professionals will opt for early retirement in the face of restructuring (Burke et al., 2015).

Existing research indicates that those who leave the workforce to act as a caregiver are more likely to have smaller pensions and a lower income; these individuals often struggle to re-enter the workforce once they are no longer needed as a caregiver (Lilly, 2011). The impact of caregiving on the retirement decisions of older RNs and AHPs could be mitigated through the adoption of caregiver-friendly policies at the institutional and provincial or federal level. Policy options may include legislation enforcing employee rights to flexible work arrangements (Mountford, 2013), institution-level introduction of flexible work arrangements (such as permission to telecommute) (Lilly, 2011), subsidization of paid caregiving to support unpaid family caregivers (Lilly, 2011) and expansion of leave policies (family leave or otherwise) to acknowledge the need to care for an ageing family member (Glenn, 2010; Lilly, 2011). At the institutional level, recognition of the efforts of employees who are caregivers may increase the employees' job and work satisfaction – for example, the introduction of an annual award recognizing an employee who admirably balances caregiving responsibilities with employment. (Lilly, 2011)

Limitations

The RN and AHP participants in the CLSA may have continued to work after retirement, whether within their profession or outside their profession. The survey did include questions regarding bridge employment and/or reversal of retirement. In this analysis, we were looking exclusively at those who perceived themselves to be retired, regardless of whether they were currently working. A desire to continue working after retirement may have systematically affected their responses to specific questions (e.g. financial possibility may have been less of a predictor of retirement among those who knew they would be supplementing their work with employment post-retirement).

As noted, participants in the CLSA ranged between 45 and 85 years of age – their responses to questions such as household income and number of children living at home

reflected their present circumstances and not necessarily their circumstances at the time of their retirement. Additionally, when reflecting on contributors to their retirement, they may have been thinking back as many as 45 years (i.e., it is theoretically possible that an 85-year-old respondent retired at age 40); it is quite possible that their responses would have been different had they been asked at time of retirement.

Selection of eligible respondents for this descriptive analysis was based on free text responses (entered by data collection staff) to questions about their employment. As a result, there was a possibility for human error, either/both at the data entry stage and at the selection stage (when SH reviewed the data). As previously noted, it is possible that the analytic sample included care aides and/or licensed practical nurses with a baccalaureate degree in a field other than nursing. Overall, our analytic sample of RNs contains disproportionately more baccalaureate-prepared RNs than diploma-prepared RNs. Statistically, Canadians who attend university have been demonstrated to differ on several key characteristics from those who do not. Those who attend university are more likely to have been raised in a two-parent home – their parents typically have a higher level of education and household income in the family of origin is higher. The distribution of diploma-prepared and baccalaureate-prepared is disproportionate with a greater proportion of rural RNs being diploma-prepared (McMullen, 2011). Additionally, as setting of employment was a free-text variable, it is possible that RNs and AHPs employed outside of the public sector were included in the analytic sample.

Last, in this descriptive analysis we only conducted bivariate comparisons, which did not correct for confounding. In future, we will be testing multivariate models; it is possible that adjusting for confounding variables will reveal that significant bivariate associations between early retirement and specific predictor variables are no longer statistically and/or practically significant.

Conclusions

Canadian RNs and AHPs retire well before the age of 65 years. Average ages of retirement, by profession (displayed in Table 3-3), may be of value to those responsible for workforce planning in Canada. More research is needed to better understand the reasons for differences between the relative importance of specific factors, both between RNs and AHPs and between early and on-time or "late" retirees.

Policy recommendations

It will be important for administrators in Canada's public health care system to consider the long-term impacts of cost-cutting measures on the labour pool of skilled health professionals. Cost-cutting and cost-containment will remain ongoing concerns; however, cost reduction strategies involving a disproportionate reduction in older, experienced, "expensive" professional staff are likely short-sighted. Clear communication surrounding organizational restructuring in the public health care system may serve to extend the work-lives of Canadian health professionals employed in the system. Lastly, policies supporting flexible work arrangements, expansion of paid leave benefits and subsidization of caregiving services for employees may reduce the incidence of workforce exits triggered by caregiving demands.

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TABLE 3-1: Correlation table (n = 1,187)

	Age	Education	Household Income	Marital Status	Weight Status	Children at Home	General Health	Mental Health
Age	1.00							
Education	-.09	1.00						
Household Income	-.51*	.14*	1.00					
Marital Status	.30*	.03	-.45*	1.00				
Weight Status	.05	-.07	-.06	.07	1.00			
Children at Home	-.54*	.07	.38*	-.21*	-.04	1.00		
General Health	.11*	-.03	-.16*	.11*	.24*	-.05	1.00	
Mental Health	.04	-.04	-.11*	.08	.07	.03	.53*	1.00

TABLE 3-2: Demographic characteristics of RNs and AHPs (n = 1,184)

	RNs n = 794	AHPs n = 393
Age (yrs - at time of survey)*		
Mean	63	60
Range	45-87	45-85
Gender (Male)*	5%	22%
University degree or certificate above a bachelor's degree*	73%	89%
Household income*[a]		
$100,00-$149,000 (average)	23%	29%
Married or living with partner	63%	69%
Province of residence—‡		
Alberta	13%	10%
British Columbia	21%	20%
Manitoba	9%	9%
New Brunswick	3%	2%
Newfoundland and Labrador	7%	6%
Nova Scotia	7%	9%
Ontario	20%	22%
Prince Edward Island	2%	3%
Québec	14%	16%
Saskatchewan	4%	3%
Chronic Disease (# of distinct chronic diseases[a])*		
Mean	1.1	0.9
Median	1	1
Range	0-6	0-6
Obese*	24%	18%
Number of children living in household*		
Mean	0.5	0.7

Median	0	0
Range	0-4	0-4
Self-rated general health (2 = Very Good and 3 = Good)		
Mean	2.2	2.1
Median	2	2
Range	1-5	1-5
Self-rated mental health (1 = Excellent and 2 = Very Good)*		
Mean	2.1	1.9
Median	2	2
Range	1-5	1-4

*p<.05 [a] 6% missing data

‡ no significance testing

[a] Chronic disease –a total of nine "possible" chronic disease classifications included heart disease, high blood pressure, stroke, cancer, chronic obstructive pulmonary disease, asthma, diabetes, anxiety and mood disorder.

TABLE 3-3: Age of retirement (actual and planned) across profession

	n	Age of retirement (average(SD)) n = 662	Planned retirement age (average) n = 497
Registered Nurse (RN)	793	485	308
Age (SD)		58.1 (6.6)	61.6 (5.0)
Pharmacist	74	39	35
Age (SD)		60.3 (8.2)	62.8 (3.8)
Social Worker (SW)	99	55	44
Age (SD)		59.7 (5.3)	62.2 (4.9)
Dietitian (RD)	37	16	21
Age (SD)		56.8 (7.0)	61.4 (2.9)
Occupational Therapist (OT)	42	19	23
Age (SD)		59.2 (7.7)	61.8 (4.5)
Physiotherapist (PT)	71	35	36
Age (SD)		60.1 (5.3)	61.8 (5.0)
Speech Language Pathologist (SLP)	27	11	16
Age (SD)		55.8 (3.9)	61.8 (5.4)
Other AHP	16	2	14
Age (SD)		60.5 (.71)	62.7 (6.8)

TABLE 3-4: Factors contributing to retirements

	Early		On-time/"late"	
	RN	AHP	RN	AHP
Financial possibility†	197	71	22	17
	48%	52%	31%	43%
Desire to stop working†	176	65	37	24
	43%	47%	51%	60%
Qualify for pension	127	51	20	18
	31%	37%	28%	45%
Desire to pursue hobbies*‡	113	53	16	17
	27%	39%	22%	43%
Spousal support†	104	34	7	6
	25%	25%	10%	15%
Caregiving†	71	20	4	3
	17%	15%	6%	8%
Organizational restructuring†	54	14	3	1
	13%	10%	4%	3%
Employee incentives to retire	22	11	3	2
	5%	8%	4%	5%

* p<.05, significant difference between **early** retiring RNs and AHPs
‡ p<.05, significant difference between **on-time/"late"** retiring RNs and AHPs
† p<.05, significant difference between early retirees and on-time/"late" retirees

CHAPTER 4

The early retiree divests the health workforce: A quantitative analysis of early retirement among Canadian Registered Nurses and allied health professional

Globally, Canada is only one of many countries confronted with the possibility of age-related labour shortages (Bélanger, Carrière, & Sabourin, 2016). It has become increasingly necessary to develop a framework to incentivize retention of older workers in the labour market (Deller, Liedtke, & Maxin, 2009). Few would disagree that delaying age of retirement, at a population level, could significantly reduce the magnitude of economic consequences resulting from population aging (Bélanger et al., 2016; Burniaux, Duval, & Jaumotte, 2004; Hicks, 2011).

Few investigators have attempted to quantify the cost to the economy of early retirement; we were able to locate a single Canadian study. Fougère, Harvey, Mercenier and Mérette (2005) employed a regional overlapping generations model to calculate the marginal effect of an increase in the average age of retirement by one year; they concluded that economic gains would be equal to 3.5% of per-capita GDP. Delaying retirement is of particular importance in health care, which is affected in two ways by the aging of the population: first, per capita health expenditures and requirement for health services increase with age (World Health Organization, 2011) and second, the health care workforce is also aging (Association of Canadian Community Colleges (ACCC), 2012).

In this study, we examined early retirement among Canadian publicly-employed Registered Nurses (RNs) and allied health professionals (AHPs). RNs and AHPs are both essential to health care systems globally. From a sheer volume perspective, there are more RNs than any other single group of health care professionals (American Association of Colleges of Nursing, 2011; Dubois, McKee, & Rechel, 2006; Registered Nurses' Association of Ontario, n.d.). The World Health Organization (WHO) estimated that, in 2015, the global population of nurses and midwives was 20.7 million (World Health Organization, 2016).

We defined AHPs as health professionals with an entry-level required education of a bachelor's degree or higher (e.g., pharmacists, physiotherapists, dietitians). As a group, AHPs provide essential services to clients and patients at all points on the healthcare continuum; they are of particular value in the prevention, management and treatment of chronic conditions (ACCC, 2012). We defined early retirement as retirement before the age of 65 years (van den

Berg, Elders, & Burdorf, 2010). Health professionals are more likely to retire earlier than those in the broader population; on average, publicly-employed Canadian RNs and AHPs retire at 58.1 years and 59.4 years, respectively (Hewko, Reay, Estabrooks, & Cummings, 2017) compared to 61.6 years among Canadian public sector employees (broadly) and 63.6 years among Canadian retirees (all sectors) (Statistics Canada, 2017).

We developed a conceptual model of early retirement among RNs and AHPs; see Hewko, Reay, Estabrooks, & Cummings (2018) for details of the model development process. Briefly, the contents of the model were derived from the retirement literature (broad and profession-specific). We established face validity of the models through a series of purposive interviews with Canadian RNs and AHPs between 45 and 85 years of age. We selected Elder's (1973) (Elder Jr., 1973) Life Course Perspective to guide the conceptualization of retirement employed in this project; notably, this perspective implicitly encourages interdisciplinarity and recognizes the value of acknowledging micro-, meso- and macro-level factors in the study of individual life courses (Elder Jr., 1973; Mayer, 2009).

In this paper, we tested our model in samples of Canadian, publicly-employed RNs and AHPs, hypothesizing that these models would explain a significant amount of variance in the outcome of early retirement. We did not hypothesize any significant differences between RNs and AHPs approach to retirement decision-making; comparative analysis of qualitative data collected during face validation provided no evidence of differences in approach to retirement decision-making between the two groups (Hewko et al., 2018).

Study aims

Our study aims were to:

1) Assess our model of early retirement using data from publicly-employed Canadian RNs and AHPs;
2) Compare model fit across professional groups and the magnitude of associations between individual predictors and early retirement, and;
3) Identify and discuss implications for RN and AHP workforce policy.

Insert Figure 4-1 about here

Methods

Data

The Canadian Longitudinal Study on Aging (CLSA) was the source of our data. Over 50,000 Canadians have participated (at baseline) in the CLSA study; the first wave of data collection began in 2011 and was completed in 2015. Future waves of data collection will continue over a period of 20 years. Respondents to the CLSA belong to one of two cohorts – those in the Tracking cohort (n = 21,242) completed telephone interviews while those in the Comprehensive cohort (n = 30,097) visited study sites for data collection and completed interviews in their homes. Details on the CLSA, its protocols, purpose and importance have been published and are available at https://clsa-elcv.ca/doc/511 (Raina et al., 2009). This study was part of a larger project approved by the University of Alberta Research Ethics Board (Pr00060985). All CLSA data were stored in a secure repository (The University of Alberta Faculty of Nursing's Health Research Data Repository - https://www.ualberta.ca/nursing/research/supports-and-services/hrdr) which was accessed remotely using secure protocols.

Sampling

We received two unique data sets – Tracking (Tra) baseline (n = 21,242) and Comprehensive (CoP) (n = 30,097). Names of variables differed across data sets - Tra variables had TRM at the end of the variable name and CoP variables ended in COM. A single researcher (SH) reviewed all text responses (French and English) to multiple occupation- and work setting-related survey questions to identify publicly-employed RNs and AHPs. All RN and AHP respondents' responses from both CoP and Tra were included in a single merged data set. Many individuals reported profession as "nurse"; this made it difficult to distinguish RNs from licensed practical nurses and health care aides. Respondents' were classified as RNs if: 1) they specifically stated an occupation of registered nurse, or; 2) stated occupation was "nurse" and level of education was baccalaureate degree or higher. Minimum education for RN licensing has not been consistent over time – as of 2011, more than 50% of Canadian RNs had less than a baccalaureate level of education (Canadian Institute for Health Information, 2017). It is possible that some of those we have classified as RNs are health care aides or licensed practical nurses with an undergraduate degree in a field of study other than nursing.

Development of analytic model

Inclusion of factors in the model of early retirement among RNs and AHPs was not limited, at the development stage, to those available in the CLSA. Therefore, we were unable to include several of the literature-derived variables in the model as they were not measured in the CLSA (see Figure 4-1). These included: recognition of older workers skills, knowledge and experience; frequent/pervasive change; job design; opportunities for flexible hours/seasons of work; age discrimination and stigma; training/developmental opportunities; personal views of retirement; organizational commitment; job satisfaction; occupational commitment; family views of retirement; work setting; occupational tenure, and; organizational tenure. Other reasons for not including measures in the model included: i) substantial correlation (between spouse's retirement status and marital status), ii) significant missing data (physical activity (87% missing) and shift patterns (33%)), iii) inconsistent reporting (work setting as a free text variable), and iv) inadequate variation (>85% of European descent for ethnicity).

Sample

The CLSA is, broadly, nationally representative. Only those participants who are already retired (i.e., responded with an age to the questions "How old were you when you first retired/partially retired?") were included in the analytic sample for this analysis. Participant data were segregated into two separate data sets to facilitate independent analysis by group (RN = 483, AHP = 177). There were several significant sociodemographic differences between participants in the RN and AHP samples: we explored these in a previous paper (Hewko et al., 2017). Briefly, the AHP sample was significantly more gender diverse (21% male vs. 3% male among RNs), more educated (33% post-baccalaureate degree among AHPs vs. 16% among RNs) and wealthier (12% of AHPs with household income over $150,000 vs. 6% among RNs). There were 483 RNs and 177 AHPs (see Tables 4-3 and 4-4) included in our samples; their average age, at time of data collection, was 68.4 and 68.9 years respectively. In both groups, early retirement was the "norm" (77% of AHPs retired early and 85% of RNs).

Measures

Our measures are outlined in Table 4-1.

Insert Table 4-1 about here

Independent variables. We used data from multiple CLSA survey questions without manipulation: Age (at time of data collection), province of residence (by health care number), sex, household income, general (global) health (Chandola & Jenkinson, 2000; Idler & Benyamini, 1997; Lundberg & Manderbacka, 1996), mental health (Ahmad, Jhajj, Stewart, Burghardt, & Bierman, 2014; Orpana et al., 2016), Older Adults Resources and Services (OARS) Disability Scale and factors contributing to retirement (binary) including financial possibility, pension eligibility, "tired of work," pursuit of hobbies, retirement incentives, organizational restructuring, agreement with spouse and caregiving responsibilities. The CLSA questionnaires are available at https://www.clsa-elcv.ca/researchers/data-collection.

We derived *education level* from responses to the question "What is the highest degree, certificate, or diploma you have obtained?" There was no indication, either in the literature reviewed to develop the model or during the process of face validation that specific categories of education (e.g. University certificate below bachelor's level vs. diploma/certificate) would differentially impact on early retirement. Instead, findings indicated that, in general, the total number of years of education was most predictive of retirement intentions (Wang & Schultz, 2010; George, Springer, & Haughton, 2009) – i.e. time spent completing education matters more than the "level" of academic program. For this reason, we collapsed to three categories of increasingly more advanced education. Our categories were: 1) diploma/certificate; 2) bachelors degree; 3) post-baccalaureate education.

For *marital status*, we also collapsed categories included in the CLSA. The original categories were single, never married or never lived with a partner, married/living with a partner in a common-law relationship, widowed, divorced and separated. Our variable is binary – with widowed and divorced individuals coded as "single." Similar to the education level, there was no indication in the literature reviewed that the particulars of a living arrangement were significant in predicting retirement, apart from differences between those who are partnered and those who are not (Wang & Schultz, 2010; Ferreira de Macêdo, Pires de Pires, & Calvacante, 2014; Friis, Ekholm, Hundrup, Obel, & Grønbæk, 2007; Boumans, de Jong, & Vanderlinden, 2008).

We derived *dependent children*, again to make it binary (0 = no children living at home, 1 = one or more children living at home), from a question regarding number of children living at home. The majority of our participants responded with zero, leaving little variation above zero.

Only 1% of RNs and 3% of AHPs had more than one dependent child. More than 80% in both groups reported no dependent children living at home.

Based on our review of the literature we included age, by generational cohort as a predictor of early retirement in our conceptual model of early retirement among RNs and AHPs. We derived *generation* based on recorded age in the earliest possible year that data could have been collected. Those between the ages of 44 and 46 were classified as Generation-X, those 47 to 65 as Baby Boomers and those older than 65 as Traditionalists (aka Veteran) (Soberg & Bennington, 2009). However, with so few Generation-X having already retired (0 RNs and a single AHP), the variable became binary (0 = Baby Boomer and 1 = Traditionalist). Variation was minimal even between Baby Boomer and Traditionalist; therefore, age (at time of data collection) was used in all models (in place of generation).

We retained the categories from the CLSA variable for *hours of work at last job* before retirement ($\geq$30 hours per week, 20 to <30 hours and <20 hours) but reversed the values so that an increasing number indicated increasing hours of work per week. All CLSA participants self-reported height and weight and the CLSA data set had a categorical variable by Body Mass Index (Centers for Disease Control and Prevention, 2016). For our purposes, we derived a variable with three levels: Underweight/Normal (0), Overweight (1) and Obese (2).

Dependent variable. As noted previously, we defined early retirement as retirement before the age of 65 years. All CLSA respondents were asked "How old were you when you first retired/partly retired?" Using these responses, we created a binary variable, with all responses of $\geq$65 years of age coded as 0 (on-time/"late") and responses of <65 codes as 1 (early retirement).

Analysis

All analyses were conducted in Stata SE 13.1®. We explored distribution and variance of each variable; no outliers were identified. For all variables except disability, skew and kurtosis indicated sufficiently "normal" distribution (within ±2 for skew and ±7 for kurtosis (Kim, 2013)). The amount of missing data was minimal for all but household income (see Table 4-1). To evaluate correlations between variables, we ran Pearson correlations with a correction for multiple comparisons (Bonferroni) (see Supplementary table 4-1 and Table 4-2 for results). The largest correlation was between marital status and spouse's retirement status (.65, $p<.05$); for this reason, spouse's retirement status was not included in any of the models. The second highest correlation was between general (global) health and mental health (.53, $p<05$). Only age at data

collection (–.32, p<.05) and household income (.18, p<.05) were significantly correlated with early retirement.

Statistical software are not pre-equipped to conduct tests for collinearity following logistic regression commands. Variance inflation factor (VIF) is a commonly used measure of collinearity in linear regression models (Norman & Streiner, 2014). The VIF is calculated to reflect relationships between predictor variables (Stata, n.d.). Because the nature of the dependent variable (continuous or binary/categorical) is not important for the VIF calculation, we were able to calculate VIF in Stata SE 13.1® only after entering the logistic regression model as a linear regression model. A VIF >10 is indicative of a problematic multicollinear relationship (Norman & Streiner, 2014; Stata, n.d.). The highest VIF value in both the RN and AHP models was associated with financial possibility (RN VIF = 1.78, AP VIF = 1.45). Thus, we concluded that multicollinearity was not an issue in these models.

Insert Table 4-2 about here

The RN sample was significantly larger than the AHP sample, reflecting the population differences. The sample size to adequately power a logistic regression is based on the number of "cases" in the data set; in this analysis, those that had retired early were considered "cases." The Wald test, used in Stata SE 13.1® to test model fit, is "based on asymptotic normality of the maximum likelihood estimation" (Lee, 2017, p. 30). Testing of the Wald statistic is via asymptotic chi-square distribution (Lee, 2017). In our analysis, we directed Stata SE 13.1™ to estimate the variance-covariance estimate via nonparametric bootstrapping (Kohler & Kreuter, 2012). Both Peduzzi, Concato, Kemper, Holford & Feinstin (1996) and Peacock and Peacock (2011) recommend a minimum ten cases per included variable. More recently Austin & Seyerberg (2017) reported that when cases per included variable are below 20, modern validation methods (e.g., bootstrapping) are recommended. Thus, although ten cases per variable is an acceptable standard (as per Peduzzi et al. (1996) and Peacock and Peacock (2011)), we have elected to be prudent and conduct bootstrapping on models powered with ten cases per variable, as recommended by Austin & Seyerberg (2017). Bootstrapping involves repeatedly drawing random samples from within the analytic sample (Norman & Streiner, 2014). The proportion of

variance explained by the model is reported by Stata SE 13.1™ as McFadden's pseudo R^2; this value is intended to be analogous to R^2 in standard linear regression (Kohler & Kreuter, 2012).

The limiting power factor for our analysis was the number of early AHP retirees (n = 137). A minimum ten cases per included variable would allow for the inclusion of 13 variables in the model. We selected 10 predictor variables for inclusion as follows: 1) the two variables found to be significantly associated with the outcome of early retirement (household income and age at data collection) were included, and; 2) the eight variables included in the conceptual model that were directly connected to the retirement decision (i.e., the CLSA interview question began "Which of the following reasons contributed to your decision to retire?"). We conducted an identical non-stepwise, unconditional, multivariable logistic regression in both occupation-specific data sets to test model fit (see Figure 4-1). We employed bootstrapping in both the RN and AHP analysis (even though power was adequate to conduct the RN analysis without bootstrapping) to maximize comparability.

Insert Tables 4-3 and 4-4 about here

Results

Our model "fit" for both RNs and AHPs (Wald χ^2 (10) = -137.91 ($p<0.001$) and Wald χ^2 (10) = -71.71 ($p<0.001$) respectively). The model explained 25% of variance in RN retirement timing and 19% for AHPs. Age (at time of data collection) was negatively associated with early retirement in both models. Specifically, for every year increase in age at time of data collection, participants were .86 to .89 times as likely to have retired early. Organizational restructuring, as a contributor to retirement, significantly increased likelihood of early retirement among RNs and AHPs; specifically, RNs and AHPs who reported organizational restructuring as a contributor to retirement were 3.94 times and 5.59 times, respectively, more likely to have retired early.

In the RN model, each incremental increase in household income (e.g., from the range of $50,000 to less than $100,000 to $100,00 to less than $150,000) was associated with a 1.61 times greater likelihood of retiring early. Among the factors reported by RNs as contributing to their retirement decision, financial possibility (odds ratio 2.49) and caregiving responsibilities (odds ratio 7.60) both significantly increased likelihood of early retirement. Alternately, those who

indicate that being "tired of work" contributed to their retirement decision were .49 times as likely to have retired early ($p<.05$).

Insert Table 4-6 about here

Discussion

Early retirement (before age 65) is the norm among RNs and AHPs employed in the Canadian public health system. Using data from a nationally representative sample of Canadians, we extracted responses provided by publicly employed RNs and AHPs, we were able to test a pared-down version of a literature-derived conceptual model of early retirement among RNs and AHPs. The tested model did not include all variables included in the proposed conceptual model of early retirement that was presented in Hewko et al., 2018 (see Figure 4-1). Overall our tested model explained between 19% and 25% of variance in RN and AHP early retirement. As a country with existing shortages in health professionals (e.g., audiology and speech language pathology (Winn, Chisholm, Hummelbrunner, Tryssenaar, & Kandler, 2015) pharmacy (Soon & Levine, 2011), occupational therapy and physiotherapy (Winn et al., 2015)) and an aging population, it is in Canada's best interest to try and extend the work lives of RNs and AHPs.

It is not surprising that much of the variation in early retirement remains unexplained by our models; we were unable to test associations of many meso-level variables (such as frequent/pervasive change in the workplace and age discrimination in the workplace) as these factors were not measured in the CLSA. The Life Course Perspective, used to guide our conceptualization of retirement, emphasizes the importance of micro-, meso- and macro-level factors as influences of life course decisions. The majority of factors significantly associated with early retirement (in both models) were micro-level (such as agreement with spouse and caregiving responsibilities).

As expected, age at time of data collection explained a significant amount of the variance in early retirement; specifically, increasing age significantly reduced the odds of retiring early (OR 0.86 for RNs and 0.89 for AHPs). Generational cohort (classified based on age) was implicated as a predictor of early retirement in our conceptual model (Hewko et al. 2018) and is, conceptually, in-line with the Life Course Perspective (Rhee, Barak, & Gallow, 2016; Fisher, Chaffee, & Sonnega, 2016). Those in cohort groupings are more likely to have been exposed to

similar technological innovations and political happenings at similar ages (Rhee et al., 2016; Fisher et al., 2016). It is not surprising, considering the age of the respondents, that there was inadequate variation in generational cohort to support inclusion of generation as a variable in the tested model. Many baby boomers who have yet to retire (and who may retire on-time or "late") were not included in the analytic sample. Evidence supporting generational differences provides only moderate support for generation membership as a predictor of work attitudes and behaviours, however, extant findings are sufficient to justify continued research in the area (Lyons & Kuron, 2014). The attention paid in the popular media to generational differences and their impact on lifestyle choice, consumption choices and work behaviours is disproportionate to the level of evidence supporting such arbitrary divisions into generational "cohorts." We look forward to empirically exploring differences in approaches to retirement decision-making across distinct generational cohorts of Canadian RNs and AHPs using future waves of CLSA data.

Unfortunately, nearly all factors reported as contributing to retirement decision-making that were significantly associated with early retirement in the models are not easily mitigated or altered by health administrators or policy-makers. Organizational restructuring was the only contributor to retirement that predicted early retirement in both RNs and AHPs at statistically significantly levels. Only 12% of RNs and 9% of AHPs reported that organizational restructuring contributed to their retirement decision. However, among those for whom it was a contributing factor, odds of early retirement increased by 294% (RNs) and 459% (AHPs). Previous research has demonstrated that the older workforce is at disproportionate risk throughout the process of organizational restructuring. There is a tendency to introduce and/or expand early retirement programs during restructuring in order to reduce the size of the workforce as the optics of this are better than those associated with sizeable layoffs (van Solinge, & Henkens, 2007; Dorn & Sousa-Poza, 2005). Additionally, as restructuring is frequently triggered by financial constraints, reducing the number of older, more "expensive" (Hennekam, 2014) workers is seen as a way of reducing organizational expenses.

Across Canada and the world, organizational restructuring is a common response to resource scarcity (whether actual or expected); as health care costs make up a significant part of government budgets in most countries, the need for cost-cutting in health system is unlikely to diminish. For nurses in particular, organizational restructuring commonly results in an increase in workload (Cummings & Estabrooks, 2003; Greenglass & Burke, 2001). Hospital

restructuring, in particular, has many impacts on nurses who remain employed – these include reduced professional efficacy, impaired ability to provide high quality care, poorer emotional and physical health, decreased job satisfaction and increased turnover (Cummings & Estabrooks, 2003). Early retirements triggered by organizational restructuring may only exacerbate resource scarcity – for this reason, health systems may wish to seek out ways to lessen the worry and uncertainty experienced by employees throughout restructuring. Burke, Ng, & Wolpin (2015) suggest that collaboration during implementation of change between hospital management and unions (such as nursing unions) may mitigate negative impacts on the employees in the organization.

Those RNs who identified "financial possibility" (i.e., their finances made it possible or at least did not deter their retirement) as a contributor to retirement decision-making were 2.49 times more likely to have retired early than those RNs who did not. CLSA respondents could select as many contributors to retirement as were relevant to their situation. In the analytic sample 45% of RNs and 50% of AHPs indicated that "financial possibility" did factor into their decision-making. Interpretation of this contributor to retirement is difficult as, on one hand, it is in no one's best interest for employees to retire before they are financially stable (as may be the case in involuntary retirement). On the other hand, it is also undesirable to have a workforce composed of employees who are unable to retire when they desire to because of financial constraints. Subjective financial well-being, when poor, negatively impacts on self-reported health (Arbor, Fenn and Meadows, 2014).

Active ageing policies designed to encourage continued workforce participation frequently include economic incentives. Midtsundstad and Bogen (2014) reviewed the impacts of active aging policies in Norway and found that policies frequently involved: i) reducing hours worked while pay remained stable, and/or; ii) provision of bonuses. Initiatives to improve working environments were less common. Economic measures, when implemented, were frequently universally distributed to all older workers, rather than targeted specifically at those employees most at risk of early retirement (Midtsundstad & Bogen, 2014). Perceived discrimination and injustice are likely to be a significant barrier to implementing bonuses and/or reduced hours with stable pay exclusively for older workers in the Canadian health care system.

As noted in a prior publication (Hewko et al., 2017), desire to stop working or being "tired of work," which in this analysis was associated with 0.49 ($p<.05$) odds of early retirement

among nurses and 0.54 (NS) among AHPs, appears to be a "catch-all" response worthy of further study. Respondents were specifically asked – was "wanted to stop working" a reason contributing to your decision to retire?" They were given an opportunity to offer "other" reasons contributing to retirement but there were only two free text responses from respondents in our analytic sample. Without a better understanding of what it is specifically that made them want to stop working it is difficult to develop strategies to alter this desire. It is possible that many of the meso-level factors not measured in the CLSA (but included in our conceptual model) such as frequent/pervasive change in the workplace, opportunities for flexible hours of work (or lack of) and experience of age discrimination and stigma in the workplace may have contributed to respondents' desire to stop working.

It is important to discuss caregiving responsibility as an influence on early retirement decisions. In our analysis, caregiving responsibilities were associated with significantly higher odds of early retirement among RNs (OR 7.60). The health professions are female-dominated and, according to US data, 60% of unpaid care providers are female; this estimate is reflective of the gender distribution among those who provide care for adults and/or dependent children (National Alliance for Caregiving & AARP Public Policy Institute, 2015). In addition, female care providers, as compared to male care providers, are more likely to provide caregiving as a reason for retirement (Bélanger et al., 2016). Glenn (2010) argues that for many women – whose roles often include mother, wife and daughter – the duty to care is an obligation inherent to their role(s). In our sample, caregiving was noted as a contributor to retirement among 17% of RNs and 15% of AHPs who retired early.

Humble, Keefe and Auton (2012) noted that, in their study, caregivers reported a willingness to remain in the paid workforce should circumstances be altered to facilitate their doing so. As a starting point to reduce the incidence of caregiving-triggered early retirement, employers may elect to subsidize caregiving support (Lilly, 2011), expand leave policies to accommodate employees' needs to provide care (Lilly, 2011) and/or facilitate work flexibility (i.e. freedom with the when and where) (Glenn, 2010; Mountford, 2013). Glenn (2010) also argues that, due to existing inequalities in the labour market that perpetuate gendered caring, affirmative-action policies and application of anti-discrimination law could serve to make engagement in caring work equally costly to women and men.

It is clear, both from the number of literature-derived variables appearing in our model that were not measured in the CLSA and from the fact that 75 to 81% of variance in the outcome of early retirement remains unexplained in the model that our understanding of retirement decision-making among publicly-employed RNs and AHPs is far from complete. Future studies with a focus on measurement of workplace characteristics (e.g., ageism, flexibility of work), attitudes and beliefs (e.g. occupational commitment, job satisfaction) and work-related factors (e.g., occupational tenure, organizational tenure) would facilitate testing of the influence of remaining factors in our conceptual model on early retirement.

In order to gain adequate numbers of respondents from smaller health professions, we would need to collect data exclusively from members of those professions. This type of study would best be conducted in collaboration with regulatory bodies and national associations as they maintain up-to-date registers of practicing professionals. The low number of AHPs in our sample likely contributed to the limited number of statistically significant relationships identified in the AHP model of early retirement. It is possible that a factor that contributed to higher odds of early retirement in one sub-group (e.g. pharmacists) contributed to lower odds of early retirement in another (e.g. social work) and thus sub-group analyses should be undertaken with a sufficient sample. Future studies in this area will require surveys of a random sample of AHPs in order to gain sufficient statistical power, particularly if comparisons of retirement decision-making across allied health professions is the goal.

Strengths

This study has several strengths. The amount of missing data is low. We applied conservative analytic methods to ensure our analysis was adequately powered. The model tested was developed following a purposive, thorough review of relevant literature. We established face validity of the model through a series of interviews with a purposive sample of RNs and AHPs meeting criteria for inclusion in the CLSA (Hewko et al. 2018).

Limitations

We were unable to test all of the factors associated with early retirement among RNs and AHPs; first because the CLSA did not measure all variables identified in the literature and second because the number of sampled AHPs was too small to facilitate adequately powered testing of the complete validated model. Our inability to confidently isolate all RNs in the sample (due to ambiguous responses to the question of occupation) also limited the RN sample size.

With a larger sample of RNs we could have tested a more complete version of the conceptual model.

Nationally representative samples are excellent for facilitating studies that can yield generalizable results. However, the CLSA sampling frame was not designed to specifically ensure representativeness according to profession or setting of employment – for this reason, the AHP and RN samples may not be representative of the broader publicly-employed AHP and RN population. Specifically, the RNs included in our analytic sample are likely to have differed systematically from those not in the analytic sample. Those who went to university, in contrast to those with diploma-level education, are more likely to have come from a two-parent family with a higher income level and a higher level of parental education (McMullen, 2011). Diploma-level RNs are also more likely to live in rural areas (McMullen, 2011). Knowing this, it is possible that our findings may not generalize as well to diploma-prepared nurses or to those nurses working in rural areas (as our sample may be disproportionately urban).

A second limitation is related to the reference point (time-wise) for many of the variables, as captured in the CLSA. For many questions, particularly those related to socio-demographics, participant responses represented their status at the time of data collection. It is probable that many respondents' marital status, province of residence, household income, mental health, general health and/or weight status (and others) had changed since the time of retirement. Interestingly, many of the variables predictive of early retirement among RNs and AHPs were measured using questions that called on participants to think back to what had contributed to their retirement. Although there was potential for recall bias (Schröder, 2011), these questions may have been more reliably connected to our outcome variable.

We relied heavily on free text variables to assign participants to both an occupational category and a setting of work; our goal was to ensure that only RNs and AHPs employed in the Canadian public health sector were included in the analytic sample. Some health professionals included in the sample may have been employed outside of the public sector, as setting of employment was frequently non-specific (e.g., "health care"). In the absence of information indicating private sector employment, we classified "health care" as public sector employment. We have justified this decision knowing that recent registry data indicates that 80% of RNs were employed in either community or hospital settings (College of Nurses of Ontario, 2017) and 73% of Registered Dietitians (as a representative group of AHPs) were employed within a provincial

health authority (Dietitians of Canada, 2016). It is possible that, due to human error, participants were misallocated (either in or out of the analytic sample). An error may have occurred at either or both the data entry stage (by CLSA research staff) or during the selection process (conducted by SH for the study).

Conclusions

The majority of publicly-employed, Canadian RNs and AHPs retire before the age of 65 years. It is too soon to say whether belonging to a particular generation (generation x, baby boomer or traditionalist) affects age of retirement as many baby boomers (and virtually all in generation x) have yet to reach the age of 65 years. Organizational restructuring, although cited by fewer than 15% of RNs and AHPs as a factor contributing to their retirement, increased odds of early retirement by more than 100% in this population. Among RNs, financial possibility and caregiving responsibilities both predicted early retirement. Those who cited a "desire to stop working" as contributing to retirement were more likely to have retired late or "on-time." The maximum explained variance in early retirement was 25% (among RNs) indicating that there is much to be learned about both RN and AHP pathways to early retirement. It is hoped that future research, ideally exploring the role of workplace characteristics, attitudes and beliefs and work-related factors (e.g. organizational tenure), may deepen our understanding of this phenomenon.

Policy implications

Health systems may want to re-consider use of early retirement as a tool to achieve cost reduction during organizational restructuring. Although this strategy can help to improve the optics of system-wide change resulting in a reduction in total available jobs, it is a blunt tool that can exacerbate existing shortages in the health professions. At the level of the institution or health authority, paid leave policies could be expanded to include leaves taken to provide care to family members. Additionally, at the provincial and federal level, legislation of flexibility in the workplace and/or provision of subsidies to employed caregivers may serve to prolong labour force participation among RNs and AHPs.

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TABLE 4-1: Overview of independent variables

	Type of Variable	Range	Reference category	% missing RN	% missing AHP
Education level	Categorical	0-2	Diploma or certificate (below Bachelor's)	None	None
Marital status	Binary	0-1	Married or living with partner	None	None
Dependent children	Binary	0-1	No dependent children	None	None
Sex	Binary	0-1	Female	None	None
Household income	Continuous	1-5	N/A	9%	7%
Age	Continuous	RNs 47-87 AHPs 45-85	N/A	None	None
Generation	Categorical	0-1	Baby Boomer	None	<1%
Hours of work	Continuous	0-2	<20 hours per week in last job before retirement	1.7%	1.6%
Province of residence	10 x Binary	0-1	All other provinces	None	None
Weight status	Categorical	0-2	Underweight/ "normal"	<1%	None
General (global) health	Continuous	1(best) -5 (worst)	N/A	<1%	None
Mental health	Continuous	1 (best) -5 (worst)	N/A	None	None
Disability (OARS scale)	Continuous	1(least impaired) – 5 (most impaired)	N/A	<1%	None
Factors contributing to retirement decision	Binary	0-1	Factor did not contribute to retirement	None	None

TABLE 4-2: Correlation table (n = 483 RNs and n = 177 AHPs)

	Early retirement	Age at data collection	Household income	Financial possibility	Pension eligibility	"Tired of work"	Pursuit of hobbies	Retirement (dis)incentives	Organizational restructuring	Agreement with spouse	Caregiving responsibilities
Early retirement	1.00	-.35*	.14	.08	-.07	-.11	-.03	.05	.11	.10	.09
Age at data collection	-.32*	1.00	-.34*	-.01	.02	.02	-.08	.11	-<.01	-.03	-.08
Household income	.18*	-.29*	1.00	.17	.04	.04	.03	-.02	-.01	.12	.06
Financial possibility	.12	-.11	.12	1.00	.31*	.33*	.31*	.02	-.06	.33*	-.22
Pension eligibility	.02	-.08	.02	.46*	1.00	.17	.14	-<.01	.01	.12	-.17
"Tired of work"	-.06	-.02	.06	.43*	.25*	1.00	.27*	-.15	.06	.13	-.19
Pursuit of hobbies	.04	-.14	.06	.47*	.24*	.41*	1.00	-<.01	.04	.34*	-.04
Retirement (dis)incentives	.02	.08	-.02	.05	.11	-.02	-.03	1.00	-<.01	<.01	-.11
Organizational restructuring	.10	.08	<.01	-<.01	-.03	-.08	-.05	.26*	1.00	.13	-.06
Agreement with spouse	.13	-.06	.14	.34*	.09	.17*	.31*	-.04	-.03	1.00	-.05
Caregiving responsibilities	.11	.07	.02	-.03	-.10	-.16*	-.08	-.05	-.08	.07	1.00

Correlations in RN sample are unshaded
Correlations in AHP sample are shaded

TABLE 4-3: Description of RN and AHP samples (n = 483 RNs and n = 177 AHPs)

	RNs (n = 483)	AHPs (n = 177)
Education level		
Less than Bachelor's degree	149 (31%)	26 (15%)
Bachelor's degree	255 (53%)	92 (52%
Post-Bachelor's education	79 (16%)	59 (33%)
Marital Status		
Single	272 (56%)	68 (38%)
Married or living with partner	211 (44%)	109 (62%)
Dependent children		
None	434 (90%)	147 (83%)
Any	49 (10%)	20 (17%)
Gender		
Male	14 (3%)	38 (21%)
Age at data collection		
Mean (SD)	68.4 (7.7)	68.9 (8.4)
Generation		
Baby Boomer	190 (39%)	64 (36%)
Traditionalists	293 (61%)	112 (64%)
Province of residence		
Alberta	66 (14%)	17 (10%)
British Columbia	108 (22%)	48 (27%)
Manitoba	41 (8%)	15 (8%)
New Brunswick	7 (1%)	2 (2%)
Newfoundland and Labrador	34 (7%)	9 (5%)
Nova Scotia	30 (6%)	14 (8%)
Ontario	95 (20%)	40 (23%)
Prince Edward Island	10 (2%)	6 (3%)

Québec	72 (15%)	19 (11%)
Saskatchewan	20 (4%)	6 (3%)
Household income		
Less than $20,000	8 (2%)	1 (1%)
$20,000 to <$50,000	128 (29%)	33 (20%)
$50,000 to <$100,000	220 (50%)	84 (51%)
$100,000 to <$150,000	57 (13%)	27 (16%)
≥$150,000	25 (6%)	19 (12%)
Hours of work in last job before retirement		
<20 hours per week	56 (12%)	23 (13%)
20 to <30 hours per week	87 (18%)	33 (19%)
≥30 hours per week	332 (70%)	117 (68%)
General health		
Poor	5 (1%)	1 (1%)
Fair	36 (7%)	8 (5%)
Good	134 (28%)	51 (29%)
Very Good	201 (42%)	81 (46%)
Excellent	106 (22%)	36 (20%)
Mental health		
Poor	2 (<1%)	0 (0%)
Fair	22 (5%)	3 (2%)
Good	117 (24%)	39 (22%)
Very Good	222 (46%)	82 (46%)
Excellent	120 (25%)	53 (30%)
Weight status		
Underweight/Normal weight	194 (41%)	71 (40%)
Overweight	162 (34%)	67 (38%)
Obese	123 (26%)	39 (22%)
Disability (OARS scale)		
No functional impairment	392 (82%)	152 (86%)
Mild impairment	81 (17%)	22 (12%)

Moderate impairment	4 (1%)	1 (1%)
Severe impairment	2 (<1%)	2 (1%)
Total impairment	1 (<1%)	0 (0%)
Early retirement	411 (85%)	137 (77%)
Factors contributing to retirement		
Financial possibility	218 (45%)	88 (50%)
Pension eligibility	147 (30%)	69 (39%)
"Tired of work"	212 (44%)	89 (50%)
Pursuit of hobbies	129 (27%)	70 (40%)
Retirement (dis)incentives	25 (5%)	13 (7%)
Organizational restructuring	57 (12%)	15 (9%)
Agreement with spouse	110 (23%)	40 (23%)
Caregiving responsibilities	73 (15%)	23 (13%)

TABLE 4-4: Distribution of representation from within the allied health professions

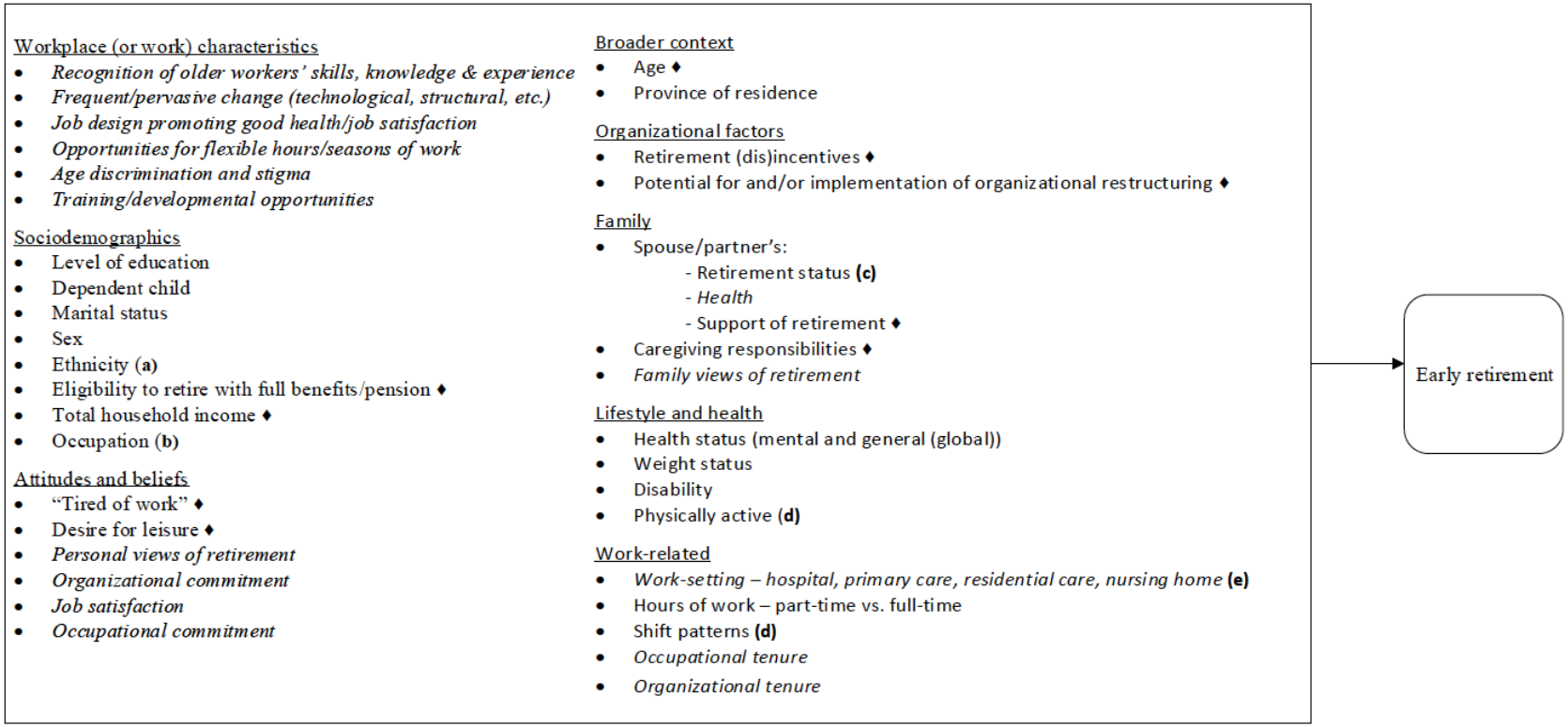
	n	%
Pharmacist	39	22
Social Worker	55	31
Dietitian	16	9
Occupational Therapist	19	11
Physiotherapist	35	20
Speech Language Therapist	11	6
Other	2	1
Total	**177**	**100**

TABLE 4-5: Logistic regression results (RN and AHP)

	RN model					AHP model				
	Odds Ratio	Bootstrap Standard Error	z	95% CI Lower	95% CI Upper	Odds Ratio	Bootstrap Standard Error	z	95% CI Lower	95% CI Upper
Constant	35,176.77	57,963.31	6.35*	1,392.08	888,884.70	10,156.86	22,202.72	4.22*	139.97	737,006.90
Age (at time of data collection)	**.86**	.02	-6.44*	.82	.90	**.89**	.02	-4.64*	.85	.94
Household income	**1.61**	.35	2.20*	1.05	2.47	1.00	.23	.01	.65	1.56
Factors contributing to retirement decision										
Financial possibility	**2.49**	.84	2.71*	1.29	4.82	2.35	1.24	1.61	.83	6.63
Pension eligibility	.68	.35	-.75	.25	1.87	.72	.32	-.073	.30	1.73
"Tired of work"	**.49**	.17	-2.04*	.25	.97	.54	.38	-.88	.14	2.12
Pursuit of hobbies	1.05	.54	.10	.38	2.85	.64	.39	-.73	.19	2.13
Retirement (dis)incentives	1.40	.88	.54	.41	4.82	1.79	1.15	.91	.51	6.29
Organizational restructuring	**3.94**	2.68	2.02*	1.04	14.96	**5.59**	3.85	2.50*	1.45	21.58
Agreement with spouse	2.15	1.18	1.40	.74	6.28	1.85	1.30	.87	.46	7.34
Caregiving responsibilities	**7.60**	6.05	2.55*	1.59	36.17	2.68	2.75	.96	.36	20.03

RN model Log likelihood:-137.91, Wald chi2 (10) = (p<.001), 43 replications, pseudo-R^2 = .25., n =438
AHP model Log likelihood:-71.71, Wald chi2 (10) = (p<.001), 26 replications, pseudo-R^2 = .19 ., n = 164
* p <.05

FIGURE 4-1: Conceptual model of early retirement among RNs and AHPs



Legend
Italicized variables were not available in the CLSA
♦ Identifies variables included in the logistic regression model

a Occupation is not tested in the model as the two occupational groups were separated for testing
b Ethnicity had too little variation to be included in the model
c Too correlated with marital status to be included in the model
d Too much missing data (part of a skip pattern) to be included
e Not explicitly asked in the CLSA, detailed information on work setting not consistently available

SUPPLEMENTARY FILE 4-1: Broader table of correlations – RNs unshaded, AHPs shaded

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1. Early retirement	1.00																					
2. Education		1.00																				
3. Dependent kids			1.00																			
4. Marital status				1.00																		
5. Financial possibility					1.00																	
6. Pension eligibility					.46*	1.00																
7. Household income			.19*	-.38*			1.00															
8. "Tired of work					.43*	.25*		1.00														
9. Pursuit of hobbies					.47*	.24*		.41*	1.00													
10. Age at data collection	-.32*			.30*			-.29*			1.00												
11. AB											1.00											
12. BC											-.21*	1.00										
13. ON											-.20*	-.27*	1.00									
14. QC		.19*										-.22*	-.21*	1.00								
15. Retirement (dis)incentives															1.00							
16. Organizational restructuring															.26*	1.00						
17. Retirement status of spouse				.65*						-.24*							1.00					
18. Agreement with spouse				-.28*	.34*				.31*									1.00				
19. General health							-.19*	-.20*	-.19*										1.00			
20. Mental health																			.53*	1.00		
21. Weight status																			.18*		1.00	
22. Disability																			.30*			1.00

Note: The following columns were removed in the absence of statistically significant correlations - sex, Manitoba, Nova Scotia, Newfoundland, New Brunswick, Saskatchewan, caregiving, hours of work

CHAPTER 5
Can untimely late career workplace departures be prevented? A quantitative evaluation of a model of involuntary retirement among publicly-employed Registered Nurses and allied health professionals

Despite recent trends toward later retirement (Bélanger, Carrière, & Sabourin, 2016; Carrière & Galarneau, 2012a), early retirement remains the norm in many health professions (Hewko, Reay, Estabrooks, & Cummings, 2017). Descriptive analysis of Canadian Longitudinal Study on Aging (CLSA) data revealed that near 85% of Registered Nurses (RNs) and 77% of allied health professionals (AHPs) retire before the age of 65 (Hewko et al., 2017). A norm of early retirement is unfortunate as Canada is already facing shortages of health professionals, particularly in rural and remote areas (e.g. pharmacy (Government of Canada, 2017b; Soon & Levine, 2011), audiology and speech language pathology (Government of Canada, 2017a; Winn, Chisholm, Hummelbrunner, Tryssenaar, & Kandler, 2015), physiotherapy (The Conference Board of Canada, 2017; Winn et al., 2015), occupational therapy (Winn et al., 2015)). Additionally, older members of the health professions are often highly skilled and typically embody considerable profession-specific expertise (both tacit and explicit) (Perera, Sardeshmukh, & Kulik, 2015).

In Canada, involuntary retirement is considerably less common than early retirement (i.e., retirement before age 65 years). Analysis of 12 years of Statistic Canada's Labour Force Survey data revealed that 23% of Canadians retire involuntarily – whether as a result of economic conditions, health/disability or family responsibilities (Carrière & Galarneau, 2012b). This rate of involuntary retirement is in-line with literature reported rates of "forced" or involuntary retirement (20-30%) (Fisher, Chaffee, & Sonnega, 2016; Shultz, Morton, & Weckerle, 1998; Szinovacz & Davey, 2005; van Solinge & Henkens, 2007). Involuntary retirement is frequently early but may also be on-time or "late" (Smith, 2006; van Solinge & Henkens, 2007). Carrière and Galarneau (2012a) were able to conclude, following analysis of Labour Force Survey results (from 2009), that involuntary retirement reduced Canadians' expected working life by approximately two years.

Although involuntary retirements make up a minority of early retirements, there are significant benefits to keeping those who have retired involuntarily in the workforce. Longer work lives contribute to a larger tax base, higher gross domestic product (GDP) and larger

workforces. Additionally, longer working lives leave workers in a better position to withstand any delay in pension benefits (Mosca & Barrett, 2016).

The study of involuntary retirement among RNs and AHPs is, therefore, of significant value, as involuntary retirement of health professionals, when prevented, can benefit all concerned. The health system benefits by keeping skilled professionals in the workforce longer and the would-be retirees (and their families) retain the benefits of remaining in the workforce. The negative impact of involuntary retirement on the mental health of involuntary retirees is well established (Dave, Rashad, & Spasojevic, 2008; Hyde, Hanson, Chungkham, Leineweber, & Westerlund, 2015; Mosca & Barrett, 2016; Negrini, Panari, Simbula, & Alcover, 2013; Park & Kang, 2016; Rhee, Barak, & Gallo, 2016). Involuntary retirement has also been demonstrated to have negative impacts on self-efficacy (Dingemans & Henkens, 2015) and life satisfaction (Dingemans & Henkens, 2015; Hershey & Henkens, 2014).

Theoretical framework

In this study, we have tested a conceptual model of involuntary retirement among RNs and AHPs. The development and validation of this model has been described thoroughly elsewhere (Hewko et al., 2018). The model was developed following a review of the literature – specifically, meta-analytic and reviews from the broader retirement literature, reviews and individual studies (2005-2015) of RN retirement and individual studies of AHP retirement (no reviews had been conducted). To evaluate the face validity of the model, we interviewed 14 purposively selected RNs and AHPs between the ages of 45 and 85 years old.

In brief, factors included in the validated model included: general health (van Rijn, Robroek, Brouwer, & Burdorf, 2014), mental health (van Rijn et al., 2014), chronic disease (van Rijn et al., 2014), musculoskeletal disorder (van Rijn et al., 2014), respiratory illness (van Rijn et al., 2014), sex (Gleeson & Gallagher, 2005), weight status (Robroek et al., 2013), province of residence and caregiving responsibilities (Hewko et al., 2018).

The Life Course Perspective (Elder Jr., 1973, 1994) has served as the grounding in several recent studies of retirement timing (Fisher et al., 2016; Rhee et al., 2016) and retirement decision-making (more generally) (Bennett & Mohring, 2015; de Wind, van der Pas, Blatter, & van der Beek, 2016). Our reasons for selecting this perspective to guide this research are similar to those of Rhee, Barak and Gallo (2016) and Fisher, Chaffee and Sonnega (2016): the Life Course Perspective incorporates several key themes including interconnection between broad,

societal changes and the lives of those living in that society (i.e., similarities within generations), timing of major events in human lives, human agency and interdependency. Also, this perspective is notably interdisciplinary in that it incorporates learnings and concepts from multiple academic disciplines (Mayer, 2009). Last, we were dedicated to consider micro-, meso- and macro-levels in our study of retirement decision-making among RNs and AHPs (Mayer, 2009).

Review of the literature

The lack of conceptual clarity surrounding "involuntary" retirement has been frequently discussed in the literature (Dorn & Sousa-Poza, 2010; Ebbinghaus & Radl, 2015; Hewko, Reay, Estabrooks, & Cummings, 2018). Conceptually, voluntariness is intrinsically subjective (Dorn & Sousa-Poza, 2010); for this reason, Dorn & Sousa-Poza (2010) encourage use of self-assessed measures of involuntary retirement. Subjective measures of the voluntariness of retirement often consist of a single item – frequently some variation on the question "Was your retirement voluntary?" Objective measures of involuntary retirement are typically derived by coding any retirements said to be the result of economic factors (e.g. being "made redundant" at work (Ebbinghaus & Radl, 2015; James, Matz-Costa, & Smyer, 2016)) and/or loss of employment due to organizational restructuring (James et al., 2016)) or changes in health status (Ebbinghaus & Radl, 2015; James et al., 2016) as involuntary. Dorn & Sousa-Poza (2010) argue that measurement error introduced through the use of a subjective measurement is equivalent to the measurement error inherent in any method of "objectively" measuring involuntary retirement. Tanner (1998) measured retirement status among UK men (overall – not specific to involuntary retirement) using both subjective and objective methods and found that, although there were ambiguities within self-reported measures of retirement (e.g. some who considered themselves retired were found to still be working), self-assessed retirement status did correspond with objective assessments of retirement status. Conversely Ebbinghaus & Radl (2015), argue that measurement of involuntary retirement must incorporate both the subjective and the objective. They conducted a comparative analysis of retirement timing (both voluntary and involuntary) across 11 European countries and concluded that there was little overlap between self-assessed involuntary retirement (subjective) and forced exit (objective). Specifically, they found that subjective self-assessments did not stratify across socio-economic characteristics, while

characteristics of forced exits matched well with the analytical tools and arguments commonly applied in sociological research (Ebbinghaus & Radl, 2015).

Registered Nurses and allied health professionals

The RN and AHP workforces are, in many ways, similar. Both require university-level education and are employed in a diverse range of healthcare settings. Most work in close collaboration with other health professionals and many share a workspace (e.g. in a hospital unit, public health clinic). Neither are commonly in the position of "most responsible practitioner" (Canadian Medical Protective Association, 2012) – a responsibility typically held by a physician. In general, RN and AHP careers afford practitioners comfortable, middle-class lifestyles.

Some differences between the two groups could lead to either i) more frequent incidence of involuntary retirement, and/or ii) a different path to involuntary retirement. Most tangibly, RNs more frequently work elongated, rotating shifts covering seven days a week, 12 months a year. These shifts can cover any portion of the day or week – evenings, nights and weekends included (Government of Alberta, n.d.). Meanwhile, AHPs are commonly tasked with providing episodic ancillary services to clients and patients served by multidisciplinary teams. Frequently, they also span boundaries between care teams, as they provide services to more than one team or unit at a time (Rodwell & Gulyas, 2015). As noted in Hewko, Reay, Estabrooks and Cummings (2018), we suspect that any differences in incidence or pathway to involuntary retirement will be directly or indirectly related to disproportionate incidence and prevalence of occupational injury and illness among RNs. In British Columbia (BC), Canada, between 2006 and 2015, injuries among RNs accounted for 18% of all injuries reported in BC workplaces. This earned them a spot in the top five occupations for injuries in BC (WorkSafeBC, 2016). Additionally, nurses are at high risk of musculoskeletal illness as result of long shifts, requirement to care for acutely ill and overweight/obese patients, heavy lifting and patient transfer requirements, workload (high nurse-to-patient ratio) and recent efforts to encourage patient mobilization as soon as possible following a medical intervention (Gomaa et al., 2015).

Study objectives

Our objectives for this study were to:

1) Quantitatively test our conceptual model of involuntary retirement among publicly-employed RNs and AHPs;
2) Evaluate, comparatively, model fit and association of identified variables with involuntary retirement across occupational groups, and;
3) Identify and discuss implications for RN and AHP workforce policy.

Methods

Data

We conducted this analysis using data from the Canadian Longitudinal Study on Aging. To access the data, we submitted an application to the CLSA Data and Sample Access Committee. A nationally representative sample (n = 51,339) of Canadians between 45 and 85 years old participated in the first wave of data collection, which took place between September 2011 and May 2015. The sample is divided into two unique cohorts: the tracking cohort completed telephone interviews (n = 21,242) and the comprehensive cohort completed face-to-face interviews in their home in addition to attending site visits (n = 30,097). Follow-up data collection will take place every three years for a total of 20 years. More detailed information on the background and protocol of the CLSA is available here: https://www.clsa-elcv.ca/doc/511 (Raina, Wolfson, & Kirkland, n.d.; Raina et al., 2009). The analysis described below has been conducted within the context of a larger project. Our ethics approval (Pr000060985) was granted by the University of Alberta Research Ethics Board 2.

Questionnaires used in the CLSA differed slightly depending on timing and method of data collection. Unfortunately, the Comprehensive questionnaire (n = 30,097 participants) did not include a question relating to voluntariness of retirement. Thus, for this analysis, we filtered the Tracking data set (n = 21,242) participants, as follows:

i. Included only those whose occupation (free text variable) was either RN or AHP (as defined above). See Hewko et al., 2018 for more detail re: RN/AHP identification.
ii. Included only those who worked in the public system (free text variable) – inclusive of public health centres, hospitals, provincially-run long-term care facilities and primary care centres.

iii. Removed those participants who did not respond to the question "Would you say your retirement was voluntary, that is, you retired when you wanted to?"

Measures

Independent variables (see Figure 5-1).

Sex. Sex was a binary variable – participants were asked "Are you male or female?"

General health. To assess general health, respondents were asked "In general, would you say your health is excellent, very good, good, fair, or poor?" Use of this single-item measure has been validated across varied ethnic groups; within all ethnic groups those who reported poorer health experienced greater morbidity (Chandola & Jenkinson, 2000). Lundberg & Manderbacka (1996) concluded, following assessment of the reliability of the single-item measure, that test-retest reliability was high. Additionally, the measure has been demonstrated to independently predict mortality (Idler & Benyamini, 1997).

Mental health. Mental health was measured in the same way, except that the question was phrased to replace "health" with "mental health." Following a 2014 scoping review of the self-rated mental health literature, Ahmad, Jhajj, Stewart, Burghardt, & Bierman (2014) concluded that scores for the single-item measure correlated moderately with scores from other mental health scales (Ahmad, Jhajj, Stewart, Burghardt, & Bierman, 2014). Self-rated mental health is not a good proxy for depression or an anxiety disorder; Orpana et al. (2016) found that one-third of Canadians reporting a diagnosis of a mood disorder and near half of Canadians reporting an anxiety disorder self-reported very good/excellent mental health. General and mental health are, notably, correlated (Levinson & Kaplan, 2014; Orpana et al., 2016). Both general and mental health were treated as continuous variables with a range of 1-5 - 1 being "Excellent" and 5 being "Poor."

Weight status. We used the CLSA Body Mass Index (BMI) classification variable to derive our weight status variable. The CLSA BMI variable was itself derived from participants' self-reported height and weight. We collapsed the six levels of the CLSA BMI classification to form a three-level variable: 0 represented BMI 18.5-24.9 (Underweight and Normal weight), 1 represented BMI 25.0-29.9 (Overweight) and 2 represented BMI $\geq$30 (Obese). This is in-line with the Centers for Disease Control and Prevention classification of adult overweight and obesity (Centers for Disease Control and Prevention, 2016).

Chronic disease. Although the CLSA data set did include a derived chronic disease variable, we decided to independently derive a less inclusive variable indicating the presence or absence of chronic disease. Using the CLSA derived variable, 89% of respondents in our analytic sample would have been classified as having one or more chronic diseases. Inclusion criteria for "chronic disease" in our derived variable was based on the Public Health Agency of Canada's definition of chronic disease (Public Health Agency of Canada, 2017). Respondents were tagged as having a chronic disease if during their interview they indicated that a doctor had ever told them they had any of the following conditions: heart disease (including congestive heart failure, or CHF); high blood pressure; stroke or CVA (cerebrovascular accident); cancer; chronic obstructive pulmonary disease (COPD), or chronic changes in lungs due to smoking; asthma; diabetes, borderline diabetes or high blood sugar; anxiety disorder such as phobia, obsessive-compulsive disorder or a panic disorder, or; mood disorder such as depression (including manic depression), bipolar disorder, mania or dysthymia. We coded chronic disease as a continuous, count variable; participants were given one "point" for every chronic condition they reported having. A total of nine variables were used to measure the incidence of the listed conditions (variable range = 0–9).

Musculoskeletal illness. Participants were coded as having musculoskeletal illness (vs. not having it – binary variable) if they had indicated in their interview that a doctor had ever told them they had one or more of: osteoarthritis of the knee, hip or hand; rheumatoid arthritis, or; some other form of arthritis. A value of 1 indicated the presence of musculoskeletal illness

Respiratory illness. Participants with either COPD or asthma (or both) were tagged as having respiratory illness. A value of 1 indicated the presence of respiratory illness.

Occupation. This was a binary variable where a value of 1 represented RNs and a value of 2 represented AHPs.

Caregiving. Participants were asked if caregiving had factored into their decision to retire – this was included as a binary variable.

Outcome variable. The voluntariness of retirement was assessed subjectively in the CLSA. Participants in the Tracking subset were asked "Would you say your retirement was voluntary, that is, you retired when you wanted to?" Participants who had retired involuntarily were coded with a 1 vs. a 0 for those who reported voluntary retirement.

Analysis

We used Stata SE 13.1® for Windows to conduct all our analyses. All analyses were conducted within a secure data repository housed at the University of Alberta (https://www.ualberta.ca/nursing/research/support-and-services/hrdr). All RNs and AHPs included in the CLSA Tracking (Tra) data set who had a valid response for the outcome (voluntariness of retirement) were included in the analytic sample. We explored the distribution of each variable included in our operational model and found no outliers. Skewness and kurtosis were within acceptable parameters (±2 for the former and ±7 for the latter (Kim, 2013)) for all continuous variables. As noted, there were no missing data for our outcome variable in our analytic sample; for all other variables, the rate of missing data was less than <.1%. We conducted Pearson correlations with a Bonferroni correction to evaluate correlation between variables (see Table 5-1). The largest correlation was between general health and mental health (.46 $p<0.05$). None of the predictor variables were significantly correlated with voluntariness of retirement.

Stata SE 13.1® is not pre-equipped to test for collinearity following logistic regression. A common measure of collinearity in linear regression models is the variance inflation factor (VIF) (Norman & Streier, 2014). A VIF>10 reflects problematic multicollinearity in the model (Norman & Streiner, 2014; Stata, n.d.) Only the predictor variables, or more specifically, the relationship between predictor variables, is considered when calculating VIF (Stata, n.d.). The VIF calculation is only possible following completion of a linear regression. We were able to run the logistic regression model (described below) as a linear regression model – with identical predictor variables to those included in the logistic regression model. The highest VIF value was 1.22 (for the chronic disease variable). Having determined that all variables had a VIF of significantly less than ten, we concluded that multicollinearity was not an issue in the model.

Insert Table 5-1 about here

We employed unconditional, non-stepwise, multivariable logistic regression to test the model fit (as seen in Figure 5-1). Our power calculation was based on the number of cases – both Peacock & Peacock (2011) and Peduzzi, Concato, Kemper, Holford, & Feinstein (1996) recommend a minimum of ten cases per variable included in the model. Austin & Steyerberg (2017), however, recommend that when cases per variable are less than 20, analytic methods

should incorporate a modern validation method such as boostrap-based optimism correction. Ten cases per included variable is an acceptable standard and would, according to Peacock & Peacock (2011) and Peduzzi et al. (1996), provide adequate power for a logistic regression. However, based on Austin & Steyerberg's findings that models with less than 20 cases per variable benefit from bootstrapping, we elected to bootstrap – the Stata SE 13.1® command we employed was vce(bootstrap).

Model testing

As noted in Hewko et al. (2018), the importance of interconnections between human lives and changes at the societal level did not manifest themselves in our literature-derived, validated model of RN and AHP involuntary retirement. Also, meso-level factors were absent from the model. For this reason, we expected that, when tested quantitatively, this model would explain only a small proportion of the variance for the outcome of involuntary retirement.

Additionally, adding to the potential for low explained variance, we were unable to test the complete model (as validated). This was not unexpected as we did not limit our inclusion of variables only to those measured in the available data set (the CLSA). Exclusion of province of residence was necessary due to power limitations. There are ten provinces, which would have added more variables to the model than could be supported by the number of cases (i.e., responses positive for the outcome of interest) in the database. Physical activity level was not included in the model as questions related to activity level were part of a skip pattern – as a result, too few of those in our sample had responses to this question (83% missing).

Our original intention had been to run the model separately using RN-only and AHP-only samples. Unfortunately, there were only five cases of involuntary retirement among AHPs. For this reason, we ran the model including both RNs and AHPs – professional group was included in the model as a predictor variable.

We experienced difficulties identifying RN respondents, as differentiated from licensed practical nurses and health care aides, in the CLSA data sets. The analytic sample size for those respondents we could confidently call RNs who had also answered the question re: voluntariness of retirement was small. As noted below, logistic regression modeling requires a minimum of 10 cases to ensure sufficient power. We had 51 "cases" of involuntary retirement – the remaining respondents had retired voluntarily, which allowed us to include occupation plus three predictor variables (in addition to the outcome variable) in our model. We elected to include self-reported

general health and to exclude self-reported mental health as the measure of general health is designed to incorporate physical and mental health. In our sample, the two measures were significantly correlated (.46, $p<.05$). We also elected to include chronic disease, which incorporated indicators of respiratory illness; this overlap resulted in a statistically significant, but not overly sizeable, correlation between chronic disease and respiratory illness (.20, $p<.05$). Respiratory illness was not included in the tested model. The last included variable was caregiving; it was included because a) Canadian RNs and AHPs felt it important enough to add to the literature derived model (Hewko et al., 2018), and b) it was the only variable in the model that reflected the respondents' status and/or mindset at the time of retirement (as opposed to at the time of data collection).

Insert Figure 5-1 about here

Results

Sample

The analytic sample contained 277 publicly-employed RNs and AHPs; their average age was 69.1 years and on average they were last employed in 2002. Eighteen percent indicated that their retirement was involuntarily. Those who had retired voluntarily had an average age of retirement of 58.3 years, which was not significantly different from the average age of involuntary retirement (57.2 years). Overall, at the time of data collection, RNs and AHPs perceived their general health as Good to Very Good and their mental health as Very Good. On average, health professionals had 1 chronic condition (see Table 5-2) – the most common chronic conditions in this population were high blood pressure (40%), cancer (21%) and mood disorder (including depression, mania, bipolar disorder or dysthymia) (18%).

Insert Table 5-2 about here

The statistical results indicate that the model, as tested, explained a statistically significant amount of variance for the outcome of involuntary retirement (Wald $X^2 = 24.51$, $p<0.05$) (see Table 5-3). The included variables explained approximately 8% of the variation in voluntariness of retirement among RNs and AHPs. Ultimately, both general health and

occupation were significantly associated with involuntary retirement ($p<.05$). The categories for self-assessed general health ranged from Excellent (scored as 1) to Poor (scored as 5): for every negative change in category for self-assessed general health (e.g. from very good to good or from fair to poor), the odds of involuntary retirement increased by 58%.

Insert Table 5-3 about here

Discussion

Involuntary retirement appears to be less common among Canadian, publicly-employed RNs than among AHPs employed in the public system. Their rate of involuntary retirement – 18% - is 5% less than the 23% reported in the larger Canadian population (Carrière & Galarneau, 2012b). However, when the rate of involuntary retirement was calculated by profession, the rate among RNs was 23%. Although model results indicate that RNs and AHPs do differ in their paths to involuntary retirement, there are too few AHP respondents to support valid comparisons across professional group.

In future, understanding of involuntary retirement among RNs and AHPs could be deepened through analysis of primary data collected with the sole purpose of exploring predictors of involuntary retirement among RNs and AHPs. Such a study could be powered to facilitate testing of the complete model of involuntary retirement among RNs and AHPs (see Figure 5-1). An inductive, qualitative study may also be of value; methods could include case-based theory building, ethnography or adoption of the interpretivist paradigm/philosophy (Eisenhardt, Graebner, & Sonenshein, 2016). Such studies are particularly useful when theory is limited and solutions to the problem at hand are unclear (Eisenhardt et al., 2016). Future studies could also incorporate both subjective and objective measures of involuntary retirement, as recommended by Ebbinghaus & Radl (2015).

The low explained variance (8%) indicates, as we had suspected, that much remains unknown about involuntary retirement among RNs and AHPs. Correlational analysis demonstrated that none of the identified predictor variables were significantly correlated with the outcome of involuntary retirement. This provides further proof that we may not understand which factors truly predict involuntary retirement. We do not find this surprising – as noted previously, theoretical gaps are apparent in the model. It is also possible that our study lacked the

power to detect statistically significant correlations between predictor variables and the outcome of involuntary retirement.

General (global) health, apart from occupation, was the only significant predictor of involuntary retirement in our model. It is notable that the measure of general health was most significantly ($p<0.05$) correlated with the most variables in the model; this indicates that improvement of general health may lead to or at minimum, be associated with, superior mental health, improved weight status, and the absence of chronic disease (including, specifically, musculoskeletal illness).

There is evidence to suggest that workplace interventions can lead to improvements in employee health. Sunderrrajan, Phan and Albarracin (2017) concluded, following a meta-analytic review of workplace health intervention programs (WHIPs) in diverse settings that WHIPs had the potential to improve health (Cohen's $d = .13$); those interventions targeting diet were most effectual ($d = .31$). WHIPs led to the most significant improvement in health (across multiple domains including diet and tobacco use) when interventions targeted employees at high health risk ($d = .41$) and when administered by a professional facilitator ($d = .27$). Interventions that targeted improvement in four domains achieved greater success than those targeting improvement in fewer domains (Sunderrajan, Phan, & Albaraccin, 2017).

Studies of interventions in specific workplaces have effectively improved employee self-rated health; for example, Sundstrup et al. (2016) reported a significant improvement in self-rated health among slaughterhouse workers with chronic pain following a 10-week strength training intervention (i.e. improvement from a self-reported health rating of 3.0 (Good) to 2.4 (closer to Very Good) (Sundstrup et al., 2016)). Anderzén & Arnetz (2005) conducted a prospective workplace intervention in 22 work units (across 5 offices) staffed by Swedish public servants. Their psychosocial intervention was customized based on unit employees' aggregated assessment of their work conditions. Each unit could select a maximum of three enhancement areas; options included participatory management, leadership, work-related exhaustion, employeeship, and work-related exhaustion. Following comparison of pre- and post- measures they concluded that there was an association between psychosocial aspects of the environment and self-rated health ($p<0.05$) (Anderzén & Arnetz, 2005).

Strengths

This study has multiple strengths. The CLSA data set includes respondents from all Canadian provinces. The proportion of missing values is insignificantly small. We employed conservative analytic to maximize the credibility of our results.

Limitations

The most significant limitations of our study relate to the timing of data collection and the limited sample size. For the majority of variables, CLSA participants were asked to answer based on their circumstances at present and not at the time of retirement. Future CLSA research, conducted using baseline and follow-up data, will benefit from this, but for our purposes it makes it impossible to determine the direction of an association. For example, we must consider that there are three possible interpretations of our findings: i) Poor self-rated general health (the only significant individual variable in our model) predicts involuntary retirement, 2) poor self-rated general health is a likely result of involuntary retirement, or 2) poor self-rated general health both predicts and is a result of involuntary retirement. As noted above, only a portion of CLSA respondents were asked about the voluntariness of their retirement; difficulties identifying RNs (as differentiated from other types of nurses) further limited sample size.

The only variable in our model which was measured with direct reference to the retirement decisions was caregiving responsibilities. The participants were asked to reflect back on their retirement and the factors that contributed to it - factors attributed as contributors to retirement several (or more) years following retirement may or may not be the same as those factors that would have been identified as contributors at the time of retirement. This is known as recall bias (Schröder, 2011).

Last, occupation and setting of employment were key variables determining inclusion or exclusion from the analytic sample. Human error may have contributed to misallocation of participants, whether at the data entry stage (CLSA staff) or during our selection of participants for the analytic sample (conducted by SH). It is possible that the RN sample included licensed practical nurses and/or care aides with baccalaureate degrees in a field outside of nursing. It is also likely that some respondents were employed outside of the public sector, as we erred on the side of inclusiveness by including those respondents identifying “health care” as the setting of their employment.

Although the CLSA, broadly, was nationally representative, it was not designed to be representative across occupations and work settings. For this reason, we cannot be confident that

our samples are representative of the Canadian publicly-employed RN and AHP populations. In fact, it is likely that our RN sample differs in some key ways from the broader RN population. We primarily filtered those respondents who identified themselves simply as a "nurse" in or out of the analytic sample based on education level. Those with less than a baccalaureate level of education were only included in the analytic sample if they explicitly identified themselves as RNs. Canadians who attend university are more likely to have been raised in a two-parent family with a higher level of parental education and a higher household income. Additionally, diploma-educated RNs are more likely to reside in rural cities and towns (McMullen, 2011). For this reason, our findings may not be generalizable to diploma-prepared RNs or to RNs working in rural cities and towns.

Conclusions

The prevalence and timing of involuntary retirement among publicly-employed RNs is in-line with prevalence and timing in the broader Canadian population. There are significant economic and social benefits (both societal and individual) associated with reducing the rate of involuntary retirements among Canadian health professionals. Only five publicly-employed AHPs in our sample reported involuntary retirement (7%); due to sample size limitations, we cannot definitively state that the rate of involuntary retirement is lower among AHPs but we feel it is worth investigating further. Our model of involuntary retirement, when tested using a sample of publicly-employed Canadian RNs and AHPs between the ages of 45 and 85 years explained very little of the variance in voluntariness of retirement. This was not unexpected considering the limited number of factors identified as contributing to involuntary retirement during development and validation of the model. A deeper understanding of involuntary retirement among these health professionals could be gained through collection and analysis of data collected explicitly for that purpose. Last, as self-assessed general health was the only individual significant factor apart from occupation associated with involuntary retirement, health care administrators seeking to lower rates of involuntary retirement may see improvement following development, testing and implementation of workplace interventions associated with improvements in self-rated health.

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TABLE 5-1: Pearson correlations with Bonferroni correction (n = 277)

	Voluntariness of retirement	Sex	General health	Mental health	Weight status	Chronic disease	Musculoskeletal illness	Respiratory illness	Caregiving
Voluntariness of retirement	1.00								
Sex	-.10	1.00							
General health	.18	-.04	1.00						
Mental health	.19	.02	.46*	1.00					
Weight status	.06	.04	.28*	.11	1.00				
Chronic disease	.10	.04	.41*	.23*	.18	1.00			
Musculoskeletal illness	.10	.24*	.25*	.11	.10	.17	1.00		
Respiratory illness	.08	-.07	.13	.09	.18	.20*	.11	1.00	
Occupation	-.18	.42*	-.07	-.07	-.01	-.08	-.17	-.03	-.05
Caregiving	-.07	.14	-.02	-.01	-.10	-.07	.03	-.11	1.00

*p<.05

TABLE 5-2: Descriptive characteristics (n = 277)

	n = 277
Age (SD)	69.1 (8.2)
Age at retirement, if voluntary (n = 225)	58.3 (6.3)
Age at retirement, if involuntary (n = 51)	57.2 (6.4)
Year of last paid job (SD)	2002 (9.2)
Involuntary retirement	51 (18%)
Region of Residence	
Alberta	39 (14%)
British Columbia	37 (13%)
Manitoba	21 (8%)
New Brunswick	10 (4%)
Newfoundland and Labrador	13 (5%)
Nova Scotia	15 (5%)
Ontario	73 (26%)
Prince Edward Island	17 (6%)
Quebec	28 (10%)
Saskatchewan	26 (9%)
Sex (male)	29 (10%)
General health (2 = Very Good) (SD)	2.2 (.93)
Mental health (2 = Very Good) (SD)	2.0 (.81)
Weight status	
Underweight/Healthy	124 (45%)
Overweight	98 (35%)
Obese	54 (20%)
Number of chronic diseases (SD)	1.2 (1.1)
Respiratory illness	38 (14%)
Musculoskeletal disease	145 (52%)
Caregiving responsibilities a factor in retirement	41 (15%)

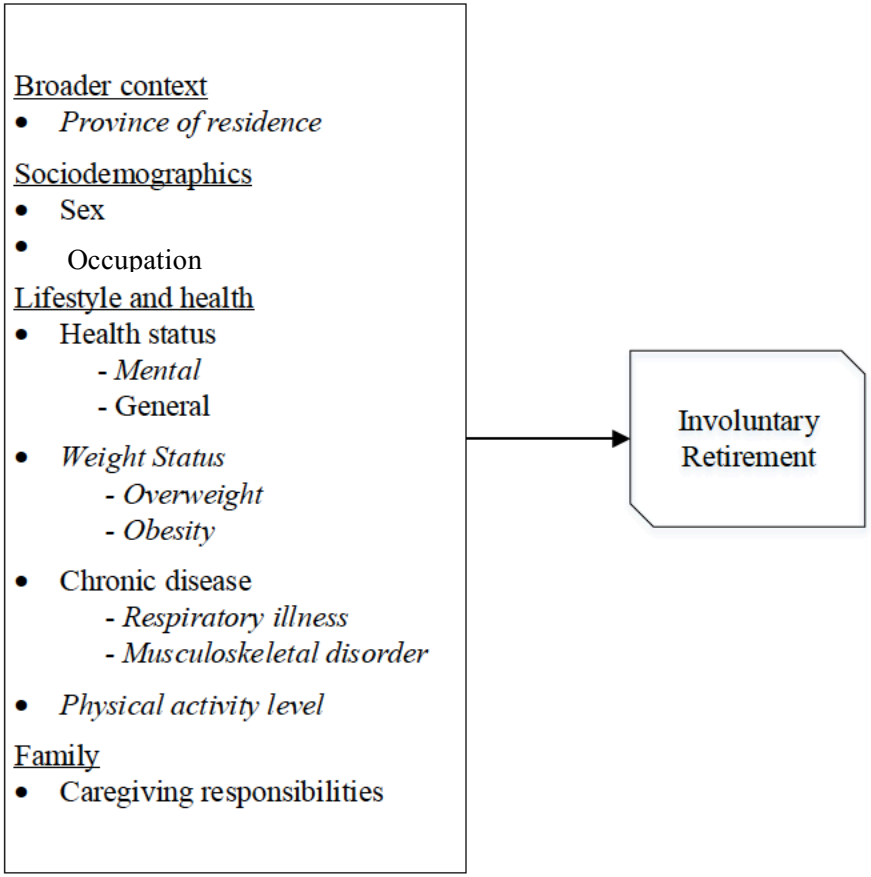
[a] One missing responses to retirement age

TABLE 5-3: Logistic regression results (n = 277)

	Z-score	Bootstrap Standard Error	Odds Ratio	95% CI Lower	95% CI Upper
General health	3.06*	.24	**1.58**	1.18	2.12
Chronic disease	.15	.16	1.02	.75	1.39
Caregiving as a factor in retirement	—.87	.37	.56	.16	2.03
Occupation	—2.48*	.14	**.24**	.08	.74
Constant	—1.10	.33	.43	.10	1.92

Log likelihood = —122.12 49 replications, Wald X^2 (4) = 24.51 ($p<.05$), pseudo R^2 = .08
* $p<.05$

FIGURE 5-1: Model of involuntary retirement among RNs and AHPs



Italicized variables were part of the validated model but were not included in the tested model due to either inadequate statistical power (province of residence, sex, occupation, mental health status, weight status, respiratory illness, musculoskeletal disorder) or proportion of missing data (physical activity level)

CHAPTER 6
Conclusions and Recommendations

Contributions to knowledge

It is clear that much remains to be known about publicly-employed RN and AHP pathways to retirement (early or involuntary). However, I am confident that my work has enhanced understanding of factors impacting upon the age and voluntariness of retirement among Canadian, publicly-employed RNs and AHPs. These findings are timely, having been based on data collected as recently as two years ago, and can be generalized across Canada. Our methods were statistically conservative in order to ensure all analyses were adequately powered.

Although limitations in AHP sample size limited our capability for comparative testing of our models among AHPs, I was able to identify some interesting, unpredicted, differences between the groups. Specifically, RNs do have a significantly lower age of retirement (58.1 years vs. 59.4 years for AHPs). Additionally, demographic differences between RNs and AHPs, not all of which have been previously discussed in the literature, are apparent. The allied health professions are more sex diverse (i.e. more identify as being of the male sex) and on average, AHPs have a higher level of education. I found that household income (at time of data collection) was significantly higher among publicly-employed AHPs than among publicly-employed RNs. Notably, AHPs were more likely to consider the desire to pursue hobbies on their pathway to retirement (both early and on-time/"late") than RNs. A larger, rigorously conducted quantitative story would help to flesh out the theoretical implications of these differences across occupational groups - or, quite possible across groups under the umbrella of allied health. Ideally, to achieve sufficient sample size, data could be collected from a random sampling of RNs and AHPs across Canada.

Contribution to theory

Our conceptual models, derived following a thorough review of related literature and validated through qualitative, purposive interviews with Canadian RNs and AHPs, have been partially tested in samples of publicly-employed RNs and AHPs between age 45 and 85 years. It is my hope that these models, once published, will be tested in future studies of retirement among RNs and AHPs. In this way, the models will be refined and improved upon over time.

The Life Course Perspective has proved to be an appropriate choice as a theory to frame model development. Looking through this lens has allowed me to see where literature was

lacking and in which disciplines (or, more specifically, from which disciplinary viewpoints) the problem of early and involuntary retirement among RNs and AHPs had been underexplored. Early retirement has been studied significantly more than involuntary retirement, however, existing data sets do not include measures of all variables identified as relevant. Developing a comprehensive data set with an adequate number of participants to power sophisticated analyses will require a significant investment of resources (time, money, expertise).

The Life Course Perspective was valuable in guiding my thinking about the way a health professional may approach retirement decision-making. The findings of this study supported the Life Course Perspective – many meso-level factors reported as contributing to retirement decision-making among RNs and AHPs were not measured in the CLSA. Thus, our finding that a significant portion of the variance in early retirement and nearly all variance in involuntary retirement remained unexplained supported the emphasis placed on all "levels" of factors in the Life Course Perspective. In future quantitative studies on this topic, I will aim to include all variables identified in the conceptual models. In this way, I hope to provide health administrators and health policy makers with a concrete understanding of the impact of meso-level factors on retirement decision-making among publicly-employed RNs and AHPs. Additionally, I was unable to explicitly account for time in the tested models. I hope to access future waves of CLSA data to gain a better understanding of RN and AHP respondents' pathways to retirement. Over the course of the CLSA (20 years) many of those respondents who have yet to retire will retire. The CLSA is structured so as to allow comparison between factors predicted to influence retirement (as reported at baseline) and factors contributing to actual retirement (collected in subsequent waves).

Model refinement

Participants interviewed to evaluate the face validity of the models, as presented to them, had requested more visually appealing versions of the models. Future testing with a larger sample, allowing for inclusion of all variables identified in the conceptual model, will facilitate development of a visual model that effectively communicates the process of retirement decision-making among RNs and/or AHPs.

Achievement of objectives

I partially or fully achieved each of my stated study objectives. As noted above, I developed and validated conceptual models (Objective 1). The two most common factors

reported as contributing to early retirement – financial possibility and desire to stop work ("tired of work") – were consistent across occupational groups. The most common factor reported as contributing to on-time/ "late" retirement among both RNs and AHPs was "desire to stop working." The second most common factor differed across groups, with financial possibility rounding out the top two among RNs and pension eligibility rounding out the top two for AHPs (Objective 2). Early retirees, both RN and AHP, were more likely to consider financial possibility, spousal agreements relating to retirement, caregiving demands and organizational restructuring than those who retired on-time or "late." Conversely, a "desire to stop working" was cited significantly more as a factor contributing to retirement by on-time or "late" retirees (both RN and AHP) than by early retirees (Objective 3). I was able to confirm model "fit" for a pared-down, operationalized version of the Conceptual Model of Early Retirement in a sample of RNs and a in a sample of AHPs. I was also able to confirm model "fit" for a pared-down, operationalized version of the Conceptual Model of Involuntary Retirement in a combined sample of RNs and AHPs The early retirement models explained, at most, 25% of variance (among RNs) and the model of involuntary retirement explained only 8% (Objective 4). Only two factors were significantly predictive of early retirement among both RNs and AHPs: increasing age (odds ratio 0.86 and 0.89 respectively) and organizational restructuring (odds ratio 3.94 and 5.59 respectively) (Objective 5). It is possible that variation in approaches to decision-making across professions in the AHP umbrella led to fewer variables being identified as significantly predictive of retirement (e.g. agreement with spouse may increase odds of early retirement among social workers and decrease odds of early retirement among pharmacists – averaging out to an equivocal finding). It may be that not all of these professions fit under a single umbrella; unfortunately, the sample size of individual professions within the allied health grouping was far too small (i.e., ranged from 27 speech language pathologists in the sample used for exploratory descriptive analyses to 99 clinical social workers) to allow for adequately powered comparisons across professions. Evidence of the achievement of Objective 6, to identify and discuss implications for RN and AHP workforce policy, is located in the Implications section of this chapter (see below).

Study limitations

As noted in each of the papers, there were limitations to the studies described in this thesis. Most notably, many questions in the Canadian Longitudinal Study on Aging (CLSA)

asked participants to report on their current state (at time of data collection). This may or may not be similar to their state at the time of retirement. Therefore, for any of those variables, the directionality of associations remained questionable – i.e., Was it poor general health that influenced involuntary retirement or involuntary retirement that triggered poorer self-rated health? Additionally, recall bias is undoubtedly present as people were asked to recall factors that contributed to their retirement – some individuals may have been attempting to recall decades-old thought processes triggering their decision to retire.

The role that sex and gender play in retirement decision-making among health professionals remains under-explored. In this study, as is true in many studies in this population, the limited number of male health professionals was a constraint to full exploration of sex and gender as a predictor of early or involuntary retirement in this population. A notable deficit in the CLSA was the failure to measure gender – only sex was included as a variable. Canadian researchers, including Dr. Karen Messing of the Université de Québec à Montréal (e.g. Messing, & Stellman, 2006) and Dr. Robert-Paul Juster, formerly of McGill University (e.g. Juster et al., 2016), have begun to explore the differential impacts of gender vs. sex on outcomes related to work and occupation. It is possible that a CLSA respondent's sex differed from their gender and that gender may have been more closely associated with retirement outcomes than sex. In future, I will be sure to incorporate a valid measure of gender, in addition to sex, in future studies of retirement decision-making among health professionals.

I had originally thought that both occupation and work setting would be coded by CLSA staff (see Supplementary File 2-3). Only after receiving the data was I made aware that a decision was made by the investigators not to code free text responses for occupation and work setting. As a result, I reviewed all free text responses in order to identify those participants who could be classified as publicly-employed RNs and AHPs. There is a possibility that this added to any human error introduced in data entry. Although I am confident that only including respondents in the RN sample who had either specifically identified themselves as a Registered Nurse or who had identified themselves as a "nurse" and had a baccalaureate level of education yielded a suitably "pure" sample of RNs, I definitely removed many respondents from the analytic sample who were RNs practicing in the public sector. The excluded diploma-prepared RNs almost certainly differed systematically from the included RNs; Statistics Canada has reported sociodemographic differences between those who attend university and those who do

not. Specifically, those who attend university are more likely to have had two-parents in the home (in childhood), a greater household income in their family of origin and are more likely to have parents with higher levels of education. Diploma-prepared nurses are also disproportionately represented in rural settings (McMullen, 2011). Thus, the results of this study may not be generalizable to RNs working in rural settings or to diploma-prepared RN retirement decision-making (more broadly).

Additionally, setting of work was ambiguous for many respondents. Any respondents who explicitly reported working outside of the public sector were removed from the sample, however, I accepted the ambiguous response of "health care" for work setting as meeting the criteria of public sector employment. Undoubtedly, this led to some impurity in the sample as it relates to setting of work.

Implications

For the individual health professional

There are few direct implications for individual RNs from this study and none for AHPs (primarily due to limited sample size). For those retiring for reasons largely related to caregiving responsibilities, it may be possible to negotiate accommodations that would facilitate continued employment while caregiving. Additionally, RNs and AHPs may be able to reduce their risk of involuntary retirement by engaging in health promoting and disease reducing activities.

For human resources staff employed in the public health care system

The results of our analyses provide some direction to human resource staff and executives employed in the publicly-funded health system in Canada. First, the calculated average ages of retirement (by profession) (see Chapter 3: Paper 2) may be of use to human resources staff during negotiation of collective agreements. It can be argued (using our study's results) that current benefits and incentives have contributed to an undesirable, and likely unsustainable, "normal" age of retirement among health professionals. The appropriate response to such a finding is not to aim for the elimination of early retirement as it is not inherently negative: rather, we can target a general increase in the average age of retirement among health professionals, even it is only an increase of one or two years (e.g. from 58.1 to 60 years).

Second, multiple significant differences were found between RNs and AHPs, both in demographics and in factors contributing to retirement (both early and on-time/"late"); human resources departments may see value in conducting "in-house" surveys to guide implementation

of institutional/organizational late career retention strategies. Specifically, they may want to evaluate the appropriateness of a single strategy targeting all staff vs. diverse strategies targeting specific professions or professional groups. Third, there is the potential that the introduction of supports for RNs with unpaid caregiving responsibilities could lead to prolonged working lives among RNs.

Fourth, use of incentivized early retirement strategies during organizational restructuring may have negative effects – such strategies often provide short-term relief at a significant long-term cost. Specifically, encouraging early retirement among health professionals may exacerbate existing shortages in the health professions. Last, as was noted in Chapter 5: Paper 4, the implementation of interventions in the workplace that have been demonstrated to improve health may reduce the rate of involuntary retirement among RNs employed in that institution or organization.

For provincial policy-makers

Optimizing the health workforce is only one of multiple potential reasons to introduce provincial policy targeted at reducing societal age discrimination and stigma. Ageism has consequences across sectors; undoubtedly, the only policy-level interventions that will have discernable effects on societal views of the aged will required cross-portfolio collaboration, with action items required in all regions of the province and in most (if not all) sectors.

Broadly, upstream policies promoting the health of a province's population may lead to improvements in the health of RNs and AHPs. Improvements in the health of the population would also reduce the demands on the health care system, potentially mitigating the negative impacts of shortages of skilled professionals.

Additionally, any decision to implement widespread health system restructuring should be made only after having reviewed best available evidence on human resources effects – both short- and long-term (and effective mitigation strategies). Any negative human resources effects should be weighed against the potential benefits of restructuring.

For federal policy-makers

The most efficient way to reduce retirements triggered by unresolvable issues related to unpaid caregiving responsibilities is likely to introduce federal level policy to address the need for some form of support and/or accommodation for staff struggling to meet caregiving demands. (see Chapter 4: Paper 3). This support could involve paid leave for caregivers, flexible work

hours and/or location (as feasible) and/or allotting funds in the federal budget accessible only to those for whom subsidization of caregiving would facilitate continued employment.

In 2017, the Canadian federal budget included a caregiving benefit allowing employees up to 15 weeks of paid leave (Employment Insurance) to care for an ill or injured adult in their family. Additionally, the budget merged three existing tax credits to form a single, simplified caregiver credit (the Canada Caregiver Credit) (Government of Canada, 2017). Provincially, Manitoba has established Caregiver Recognition Day as part of the Caregiver Recognition Act. The act was passed in 2011 and mandates consultations with caregivers in addition to bi-annual reports on progress. Québec's home care policy most broadly defines "caregiver" and recognizes, formally, the needs of caregivers as separate from those of the recipients of care (The Change Foundation, 2016). Recent legislative steps, in particular the introduction of Employment Insurance support by Canadian federal government, have improved the selection of "choices" available to informal caregivers in the health professions. However, for those in the health professions, maximum employment insurance remittances are likely to be significantly less than average income while working. This may create some difficulties for individuals who have bills and expenses in proportion to their average earnings. Additionally, fifteen weeks of income support may be useful for those with a defined time period during which informal caregiving will be required. However, the need for informal care is frequently ongoing over an undefined period of time.

Workforce planning could be significantly more effective if data on the supply and demand of health professionals (such as RNs and AHPs) were more systematically collected. Considerable information is already being collected in the form of workload statistics. Ideally, such data could be more efficiently collected and stored so as to facilitate effective health human resource workforce planning across varied professions.

Last, any and all policy supporting upstream, preventive health care and disease reducing work practices in the workplace have the potential to reduce the odds of involuntary retirement among RNs and AHPs employed in the public system by way of improvements in self-rated health.

Directions for future research

There is no question that further research is needed, including quantitative and qualitative research, to:

1) Deepen our understanding of publicly-employed RN/AHP pathways to early and involuntary retirement, and;
2) Understand the reasons for differences in RN and AHP pathways to retirement.

Additionally, several categories of factors implicated as influencers of RN/AHP retirement decision-making have been underexplored including workplace characteristics, attitudes and beliefs and work related factors. Involuntary retirement remains conceptually problematic, in the broader field of retirement research (across industries) it would be of value to study the process of classification of retirement as involuntary or voluntary. For example, I would be interested in conducting a qualitative study to investigate, in depth, the experiences of RNs and AHPs that consider their exit from the workforce to have been involuntary.

The models require further validation. Further quantitative testing of these models is necessary to better understand the differences and similarities in RN and AHP retirement decision-making. It would also be interesting to see how valid these models were when tested using CLSA data from other publicly-employed professional respondents (such as teachers). This may aide in establishing discriminant validity. Engaging experts in the areas of retirement and health human workforce planning to review the models would aide in establishing the models' content validity.

When future waves of CLSA data are available, I plan to re-test these models. The addition of time passed as a variable will add significantly to knowledge of how retirement decisions are made among AHPs and RNs. In my view, there is inadequate evidence at this time to support investment of research dollars in the development and implementation of interventions to reduce either early or involuntary retirement.

Knowledge translation

As noted in Chapter 1, all four papers in this dissertation will be submitted to a peer-reviewed journal for publication. I have presented Paper 1 (Chapter 2) at the *Academy of Management Annual Meeting* in Atlanta, GA (2017). It is my intention to present each of the remaining three papers at scholarly conferences (*Centre for Health Services and Policy Research Health Policy Conference 2018* and *Academy of Management Annual Meeting 2018*). Additionally, I will prepare targeted policy briefs describing key study findings; these will be distributed by e-mail to leaders and administrators of provincial regulatory bodies and national professional associations. I will also approach my contacts at Employment and Social

Development Canada, Northern Health, Eastern Health and Alberta Health Services to determine if a Lunch & Learn style session and/or a webinar would be of interest to their human resources staff and/or mid-level managers of RNs and AHPs. The CLSA offers webinars highlighting the research conducted using the data; I will notify the CLSA's principal investigators of my interest in offering a webinar in this series.

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APPENDICES

APPENDIX 1: Ethics approval letter

Notification of Approval

Date:	January 4, 2016
Study ID:	Pro00060985
Principal Investigator:	Sarah Hewko
Study Supervisor:	Greta Cummings
Study Title:	The early retiree divests the workforce: A quantitative analysis of early retirement among health professionals
Approval Expiry Date:	Tuesday, January 3, 2017

Approved Consent Form:	Approval Date 1/4/2016 1/4/2016	Approved Document Consent Form Revised Information Letter

Thank you for submitting the above study to the Research Ethics Board 2. Your application has been reviewed and approved on behalf of the committee.

A renewal report must be submitted next year prior to the expiry of this approval if your study still requires ethics approval. If you do not renew on or before the renewal expiry date, you will have to re-submit an ethics application.

Approval by the Research Ethics Board does not encompass authorization to access the staff, students, facilities or resources of local institutions for the purposes of the research.

Sincerely,

Stanley Varnhagen, PhD
Chair, Research Ethics Board 2

Note: This correspondence includes an electronic signature (validation and approval via an online system).

11405 87 Ave NW
Edmonton, AB T6G 1C9
skielly@ualberta.ca

The early retiree divests the workforce: A quantitative analysis of early retirement among health professionals

Principal Investigator:
Sarah Hewko, RD MHA, Doctoral Candidate, Faculty of Nursing, University of Alberta

Doctoral Supervisor:
Greta Cummings, RN, PhD, FCAHS, FAAN, Faculty of Nursing, The University of Alberta

FOCUS GROUP LETTER OF INFORMATION FOR HEALTHCARE PROFESSIONALS

Invitation to Participate
You are invited to participate in a research study that explores why and when healthcare professionals choose to retire

Purpose of the Letter
The purpose of this letter is to provide you with information so that you can make an informed decision about participating in this research.

Purpose of the Study
The purpose of this study is to determine whether Canadian Registered Nurses and Allied Health Professionals between the ages of 45 and 85 years have similar or different outlooks on retirement. This study is being conducted as partial fulfillment of my doctoral dissertation.

Inclusion Criteria
In order to participate in this research you must be an English-speaking current or former Registered Nurse or Allied Health Professional (including occupational therapists, physiotherapists, dietitians, speech language pathologists, audiologists, radiation therapists, clinical social workers, pharmacists) between the age of 45 and 85 years. You must have practiced as a healthcare professional in Canada.

Study Procedures
If you agree to participate, you will be asked to take part in an interview with me. The interview may take place in-person in a convenient public location or via telecommunication (Skype or telephone call). Those unable to provide signed (electronic or otherwise) consent forms may provide explicit verbal consent. You will be asked to review a visual model of retirement among

health professionals and provide comments on its clarity, relevance and testability. You will be invited to suggest changes that may improve the model. We anticipate that the interview will take 30 minutes of your time.

Possible Risks and Harms
There are no known or anticipated risks associated with participating in this study. You can decline to answer any question(s).

Possible Benefits
We cannot guarantee you any direct benefits because of your participation in this study. However, this study could lead to the validation of a testable model of retirement among healthcare professionals. In further stages of the study, we will perform statistical analysis on a large, population-level data set to further validate the model. Study findings could have immediate and direct implications for health policy development and short- and long-term workforce planning. For example, governments and healthcare organizations may use our findings to guide healthcare workforce planning.

Compensation
No compensation will be provided for participation in the study.

Voluntary Participation
Participation in this study is voluntary. You may refuse to participate, refuse to answer any questions or withdraw from the study with no effect on your current or future employment. If you elect to withdraw from the study, the digital audio file of your interview will be deleted as soon as possible. Once analysis is completed it will not be possible to remove your data from synthesis; however, you may request that we not publish any anonymized quotes from your interview in the resulting article(s) and reports.

Confidentiality and Privacy
All interviews will be audio recorded for analysis. All digital audio files will be destroyed after being uploaded to a secure data repository and will not contain any identifying information. As per requirements, digital audio files will remain in the data repository for five years; all data collected will remain confidential and accessible only to the investigators of this study. If the results are published, your name will not be used or reported in a publication. Any direct quotes from interviews reported in publications will not be attributable to an individual. The deadline for elective withdrawal of consent is March 31st, 2016.

Contacts for Study Questions or Problems
If you require any further information regarding this research project or your participation in the study you may contact Sarah Hewko at skielly@ualberta.ca or Dr. Greta Cummings 780-492-8703, email: gretac@ualberta.ca. The plan for this study has been reviewed for its adherence to ethical guidelines by a Research Ethics Board at the University of Alberta. For questions regarding participant rights and ethical conduct of research, contact the Research Ethics Office at (780) 492-2615.

Sincerely,

Sarah Hewko, RD MHA
Doctoral Candidate and Graduate Research Assistant
Faculty of Nursing, University of Alberta
skielly@ualberta.ca

APPENDIX 3: Consent form

UNIVERSITY OF ALBERTA
FACULTY OF NURSING

11405 87 Ave NW
Edmonton, AB T6G 1C9
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CONSENT FORM

Title of Project: The early retiree divests the workforce: A quantitative analysis of early retirement among health professionals

Principle Investigator(s): Sarah Hewko, RD, MHA skielly@ualberta.ca
Doctoral Supervisor: Dr. Greta Cummings Phone Number(s): 780-492-8703

To be completed by the study participant:	Yes	No
Do you understand that you have been asked to be in a research project?	☐	☐
Have you read and received a copy of the attached Information Sheet?	☐	☐
Do you understand the benefits and risks involved in taking part in this research project?	☐	☐
Have you had an opportunity to ask questions and discuss this project?	☐	☐
Do you understand that you are free to withdraw from the project at any time, without having to give a reason and without affecting your current or future employment?	☐	☐
Has the issue of confidentiality been explained to you?	☐	☐
Do you understand who will have access to the information from this project?	☐	☐

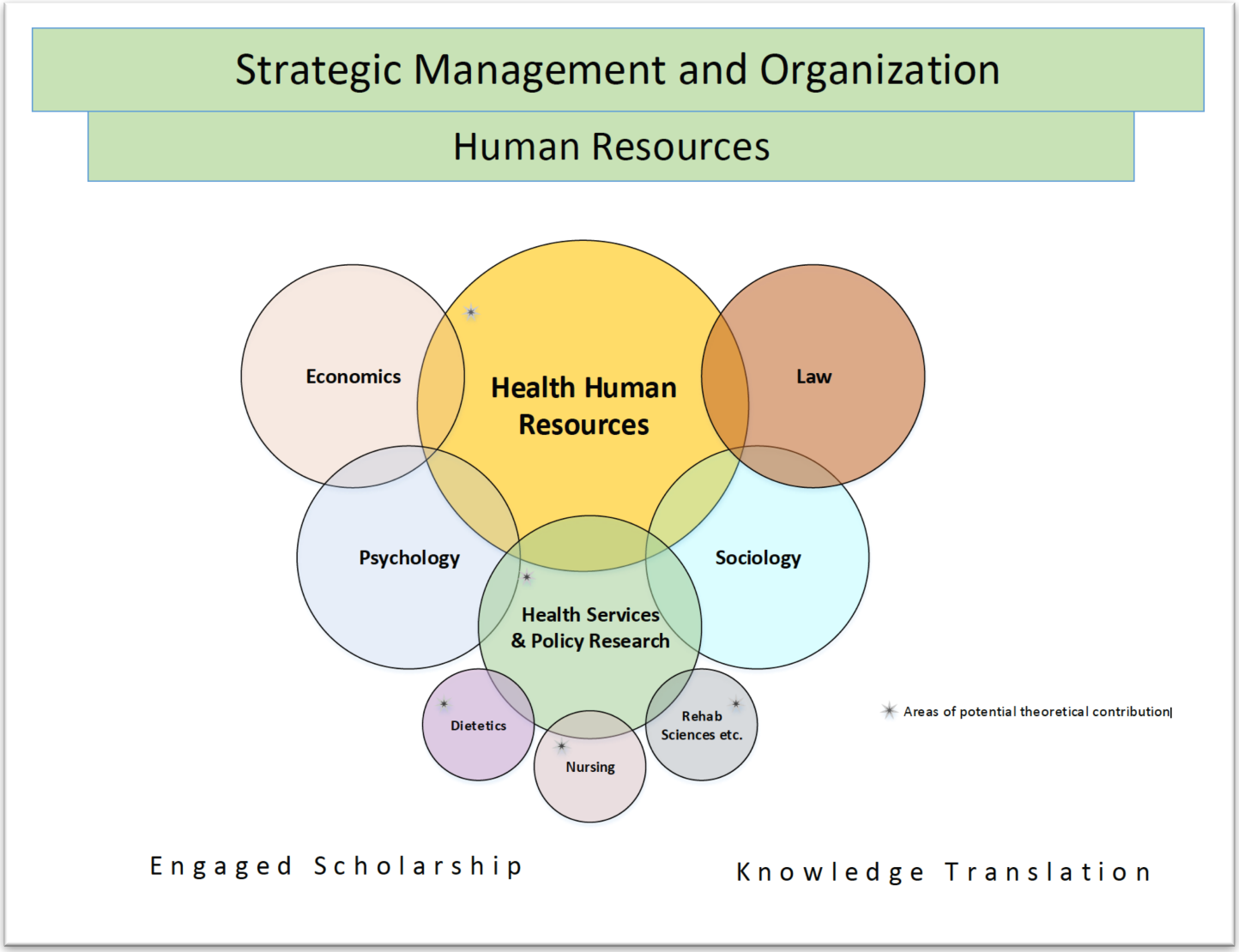
I agree to take part in this project: YES ☐ NO ☐

Signature of Project Participant _____

(Printed Name) _____

Date: _____

APPENDIX 4: Situating my work



APPENDIX 5: Medline search output