IMMIGRATION STATUS AND WORK DISABILITY DURATION IN BRITISH COLUMBIA

by

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Abstract

Introduction

Immigrant workers, particularly recent immigrants, who may have lower English proficiency and a lack of familiarity with Canadian social programs, face particular challenges after a work injury. They may not know their employment rights and may have trouble accessing, understanding, and navigating the compensation system. Although work disability can have negative impacts on the physical and mental health of immigrants, no Canadian research has examined immigrant workers' experiences after a work injury. The purpose of this study was to investigate differences in disability duration by immigration status for injured workers in British Columbia with an accepted workers' compensation claim between 1995 and 2012.

Methods

Workers in British Columbia with an accepted workers' compensation claim between 1995 and 2012 were linked to Citizenship and Immigration Canada Permanent Residents data. Injured workers were identified as recent immigrants (less than 10 years in Canada), established immigrants (10 years or more in Canada), and Canadian-born workers, at the time of their injury. Disability duration was defined as the number of disability days paid in the first year after injury. Differences in disability duration by immigration status were examined at the 25th, 50th and 75th percentiles of the distribution using quantile regression. Models were adjusted for age, sex, occupation, injury year, injury type, and previous claims and were stratified by age and sex to investigate interaction effects.

Results

Results showed that both recent and established immigrants had longer work disability durations than Canadian-born workers, at all points of the distribution, and after adjusting for demographic and occupation characteristics. The relationship between immigration status and disability duration was greater for younger immigrant workers than for older immigrant workers and for immigrant men than for immigrant women.

Conclusion

Consistent with the first hypothesis, immigrants had longer disability durations than Canadianborn workers, at all points of the distribution. Contrary to the second hypothesis, established immigrants had longer disability durations than recent immigrants, at all points of the distribution. Overall, results indicate that immigrants may face barriers to returning to work following a work-related injury and that these barriers persist over time and are greatest for younger immigrant workers and immigrant men.

Preface

This study involved the use of administrative data that contained personally identifying information for linkage purposes only. Personally identifiable fields were removed and replaced with anonymous study identifiers in the linked database provided to the researchers. The research was approved by the Behavioural Ethics Research Board at the University of British Columbia (Ethics Certificate number H15-00384). The research also involved research agreements covering the conditions for the use of administrative data with WorkSafeBC and the Citizenship and Immigration Canada.

This thesis is the original intellectual product of the author, N. Saffari, who was responsible for thesis project development, data analysis, as well as thesis composition. Dr. C. McLeod was the supervisor on this project and was involved throughout project conception and data analysis, and provided edits and suggestions during thesis composition. Dr. K. McGrail and Dr. M. Koehoorn made contributions as supervisory committee members. The results from this thesis are in preparation for peer-reviewed publication.

All inferences, opinions, and conclusions drawn in this thesis are those of the authors, and do not reflect the opinions or policies of the Data Steward(s).

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Х

Dedication

I dedicate this thesis to my husband, Afshin, and my daughter, Tina, whose sacrifices of our precious time together in the past two years have made this thesis possible for me.

Chapter 1. Introduction

Work and its associated income and social status are important social determinants of health. Work determines the health and wellbeing of an individual through influencing income, providing health insurance, as well as exposing individuals to various work-related health and safety hazards (Collard et al., 2012). Since the majority of immigrants come to Canada for employment (Kosny et al., 2012), an occupational injury and its associated absences can have a significant adverse impact on their financial and health status. Notwithstanding the magnitude of global immigration, relatively little is known about the relationship between work and health among immigrant groups (Hansen et al., 2014).

Immigrants come to Canada for several reasons, including improving their socioeconomic status and quality of life. Leaving behind loved ones and crossing borders, they start their journey in search of opportunities in Canada. Moving to a country with a different language and culture is quite challenging. In 2011, 20.6% of Canadians reported a language other than English or French as their mother tongue (Statistics Canada, 2015a). Normal day-to-day activities, such as shopping or visiting a doctor, can be a huge challenge due to a lack of English proficiency and familiarity with the new environment. Research showed that those who lack proficiency in the majority language face barriers in accessing workers' compensation and health care services (Premji, 2015; Asanin & Wilson, 2008).

Working in poor quality, low wage, and dangerous jobs is a common outcome for many immigrants due to the lack of recognition of foreign credentials. This has translated to increased injury rates among immigrants compared to their Canadian-born counterparts (Smith & Mustard, 2010; Premji et al., 2010).

When new immigrants are injured in the course of employment, they face particular challenges in reporting, filing, and receiving benefits from the workers' compensation system. There are a number of factors that may affect immigrant workers' experiences after a work injury or illness. New immigrants with financial problems may refrain from reporting a work injury for fear of reprisals and losing their job (Pransky et al., 2002). They may not know their rights and responsibilities, and they may have trouble accessing, understanding and navigating the workers' compensation system (Kosny et al., 2012; Premji, et al., 2008; Premji & Krause, 2010).

I am an immigrant. Fifteen years ago, I moved to Canada with my husband and five year-old daughter, determined to build a new life. I soon realized that without a degree, employment opportunities were limited. I was fortunate enough to be supported by my husband to go back to school and gain education and training experience within the Canadian system. My husband, however, needed to enter the labour market quickly to support the family. After a few months in a new job, for which he was over qualified, he experienced an injury that was never reported. Therefore, I am the wife of an injured immigrant worker as well. From that double position, I often wonder about experiences of immigrants after a work injury or illness. Do all injured immigrant workers respond the same way as my husband did? What do their experiences and his have in common?

My interest in studying this topic is based on the assumption that what we learn about immigrants' experiences after a work injury could inform disability management policies and practices, which could, in turn, improve the health and wellbeing of this vulnerable group. As Radford (2007) explained, "increasing the research that focuses on the experiences of immigrants and visible minorities, would enable us to better understand the challenges and hurdles faced by immigrants and minorities across Canada, which could in turn contribute to improve policies and practices that benefit the health and wellbeing of new immigrants" (p. 47).

1.1 Plan of Thesis

This thesis explores whether there are differences in disability duration after a work injury between immigrant and Canadian-born workers.

Chapter 2 develops the conceptual framework and study hypotheses based on a review of the empirical research on the labour market experiences of immigrants of prime working age in Canada. It begins by providing an overview of immigrants' work and health, and continues by investigating the incidence of, and risk factors for, work injuries among immigrant workers. The relationship between immigration status and disability duration is explored in the last section.

Chapters 3 describes the development of the data and key decisions in creating the study cohort and the principal study variables from WorkSafeBC claim files and the Citizenship and Immigration Canada Permanent Residents file.

Chapter 4 presents the descriptive and analytical results of the main study, investigating the relationship between immigration status and disability duration for injured workers with a workers' compensation claim.

Chapter 5 concludes with a synthesis and discussion of the findings. The strengths and limitations of studies are presented. The relevance of the findings to policy makers and future research in the areas of immigration status and disability duration is discussed.

Chapter 2. Background and Literature Review

Chapter 2 provides the literature review, conceptual framework and study hypotheses. The literature review explored the demographic characteristics of immigrants to Canada and some of the issues they face in Canada, particularly around labour force participation, work, health, and risk of work injury. The purpose of conducting a comprehensive literature review on differences in the risk of work injury between immigrant and Canadian-born workers was to explore and identify individual and broader labour market and social context factors that have a negative effect on immigrant workers' injuries. The identification of these factors helped us create a set of hypotheses that looked specifically at their impact on immigrant workers' disability duration. The literature review also informed the study's conceptual framework, and a table that summarizes the various factors at both individual and broader labour market and social context levels that may impact the experiences of immigrant workers after a work injury.

2.1 Immigration to Canada

"Immigrants" are "persons residing in Canada who were born outside of Canada, excluding temporary foreign workers, Canadian citizens born outside Canada and those with student or working visas" (Statistics Canada, 2010). Canada's immigration policy recognizes three broad immigrant categories: Economic, Family, and Refugee (Statistics Canada, 2014). The economic class includes skilled workers, business immigrants, those with Canadian work experience, live-in caregivers, and spouses or dependents that accompany the principal applicant (Citizenship and Immigration Canada, 2014). Economic immigrants are selected based on their professional expertise and expected contribution to the Canadian economy,

using a points-based system that assesses language abilities, skills, education, age, work experience, or their ability to invest within the country (Newbold, 2006).

The family class consists of individuals sponsored by family members who are landed immigrants or Canadian citizens, and the refugee class includes government assisted and privately sponsored refugees, refugees landed in Canada, and their dependents (Citizenship and Immigration Canada, 2014). Family class immigrants and refugees are not required to have the same skills and abilities as those in the economic class (Kosny et al., 2011).

The proportion of each category of immigrants coming to Canada has changed over time. While the family class comprised the majority of immigrants to Canada in the 1980s, economic immigrants are the majority in the 1990s and 2000s (National Household Survey, 2001). Although the number of economic immigrants to British Columbia has declined by 57% and the number of family class immigrants has increased by 30% from 2010 to 2013, economic immigrants still comprise the majority of all immigrants entering the this province (Welcome BC, 2013).

The cultural and ethnic composition of immigrants, as well as their educational background, has also changed markedly over time. Before 1986, the majority of immigrants to Canada came from Europe, with Italy and the United Kingdom providing the largest number of immigrants; however, in the 1990s and 2000s most immigrants came from Asia, primarily from China and India (Kosny et al., 2011). Slightly over half of the immigrants who arrived between 2006 and 2011 came from Asia (including the Middle East) (Statistics Canada, 2011). British Columbia's largest ethnic/cultural group is Chinese, followed by South Asians and Filipinos (Welcome BC, 2013).

Results from the 2001 Census showed that immigrants who arrived in Canada since 1991 had a higher level of education than those arrived earlier and were twice as likely as Canadianborn individuals to have a university degree (Statistics Canada, 2008). As well, new immigrants to Canada are relatively young. In 2011, new immigrants had a median age of 31.7 years, compared with 47.4 for the total immigrant population and 37.3 for the Canadianborn population (Statistics Canada, 2015b).

Canada's immigration policy has led to an influx of immigrants into the country. Since 2004, Canada has accepted, on average, about 255,000 immigrants per year (Welcome BC, 2013). The immigrant population grew at a rate of 3.3% between 2007 and 2012, more than double the growth rate of the general population (Environment and Social Development Canada, 2013). The vast majority of this rapidly growing population is geographically concentrated in major urban centers of the provinces of Ontario, British Columbia, Quebec and Alberta and (Statistics Canada, 2015b). In 2011, Canada had a foreign-born population of 6,775,800 people and British Columbia was home to 1,191,900 immigrants, representing 26% of the total BC population (Statistics Canada, 2011).

A recent United Nations report ranked Canada third on projected net immigration between 2005 and 2050 behind the United States and Germany (United Nations Department of Economic and Social Affairs, 2004). Immigrants are an important part of Canada's history and they will continue to define its future.

2.2 Immigrants and Work

Immigrants comprise a considerable proportion of the Canadian workforce, and their numbers are growing. Immigrants accounted for 21% of the Canadian labour force in 2011

(Kustec, 2012), and 28% of British Columbia's labour force in 2012 (Environment and Social Development Canada, 2013). The number of immigrants coming to Canada specifically for the purpose of work (economic class immigrants) has increased by 11% between 2004 and 2013 (Welcome BC, 2013). In 2011, within the immigrant population, the majority of labour force participants were established immigrants (those who have been landed immigrants to Canada for more than 10 years), with very recent (landed five years or less) and recent immigrants (landed between 5 and 10 years) making up smaller proportions (Citizenship and Immigration Canada, 2012).

Newcomers to Canada face barriers to integrating into the Canadian labour force in part due to a lack of Canadian work experience, but also due to a lack of knowledge about Canadian employment opportunities and lower English proficiency (Schellenberg & Maheux, 2008). Immigrants may have difficulty finding jobs that match their education and training because their foreign credentials are not recognized (Chen, Smith, & Mustard, 2010). As such, while 80% of new immigrants find jobs within their first two years in Canada, only 42% find work within their area of expertise (Ngo, 2008).

This has led to lower labour force participation rates and higher unemployment rates among immigrants, compared to Canadian-born counterparts (Kustec, 2012). According to Statistics Canada (2013), while the employment rate among the Canadian born population was 82.2% in 2009, the corresponding figure for immigrants was 74.9%. Time of immigration appears to have a significant effect on immigrant employment rates. In 2011, recent immigrants experienced higher unemployment rates than established immigrants and both groups of immigrants had higher unemployment rates than the Canadian-born working age population (Statistics Canada, 2013).

2.3 Immigrants and Health

Healthy Immigrant Effect

Immigrants are typically healthier than the native-born population upon arrival in their new country. This foreign-born health advantage, known as the "healthy immigrant effect," has been demonstrated among immigrants in Canada (Perez, 2002; Newbold & Danforth, 2003), the United States (Jasso et al., 2004), Spain (Sole et al., 2010) and Australia (Brekke & Schone, 2014). The health of immigrants was found to be either better than or similar to that of the Canadian-born population, particularly with respect to chronic diseases (McDonald & Kennedy, 2004), mental health (Aglipay, Coleman, & Chen, 2013), and risk behaviours (Salant & Lauderdale, 2003; Frisbie, Cho, & Hummer, 2011).

One reason for the observed healthy immigrant effect is government screening programs that favour newcomers who are young, healthy, and well educated and that disqualify those with pre-existing medical conditions (Thurston & Verhoef, 2003). Other reasons include the relatively healthier behaviours of new immigrants, such as lower consumption of high-fat, processed food, prior to immigration and immigrant self-selection whereby the healthiest individuals in a country are the people most likely to apply to immigrate and are able to immigrate (Hochhausen, Perry, & Le, 2010; Biddle, Kennedy, & McDonald, 2007).

Despite immigrants' initial better health relative to the native-born, several studies have found that the health of immigrants deteriorates and converges with that of the native population over time (Newbold, 2006; Perez, 2002). In 2006, Newbold found that among those who had resided in Canada for 30 years or more, the prevalence of chronic conditions was equivalent to that of the Canadian-born population. Three years later, Newbold analyzed Statistics Canada's Longitudinal Survey of Immigrants to Canada and reported that the proportion of new arrivals with fair or poor health tripled over the four year period following arrival to Canada, while the proportion reporting excellent health declined from 37% to 19% (Newbold, 2009).

Some of the observed decline in the health of immigrants could be attributed to the diagnosis of pre-existing conditions due to increased access to health care in Canada (McDonald & Kennedy, 2004). The health of immigrants may deteriorate over time due partly to stress and discrimination (Stuber et al., 2008; Williams & Mohammad, 2009), as well as to acculturation and the adoption of adverse health-related behaviours common in Canada, including those related to diet, exercise, smoking and alcohol (Salant & Lauderdale, 2003; Frisbie, Cho, & Hummer, 2011).

2.4 Differences in Rates of Work Injury and Fatality by Immigration Status

Some evidence suggests that immigrants are more likely to experience work-related injuries (Friedman & Forst, 2008), illnesses (Wang et al., 2007), and death (Loh & Richardson, 2004), compared to their native-born counterparts. A review of 31 studies on immigrant workers' occupational injuries around the world concluded that immigrant workers, on average, experience occupational injuries almost twice as often as native-born workers (Salminen et al., 2011). The observed differences in injury rates between immigrant and native-born workers, however, may have reflected a higher proportion of immigrants within high-risk occupations. Three European studies in the review found that within the same occupational group, immigrant workers experienced occupational injuries less often than their native-born counterparts. Therefore, Salminen and colleagues concluded that, "under

the same working conditions, it is possible for immigrants to work as safely as native workers" (p. 126).

In Alberta, immigrant workers, in 2003, experienced occupational injuries over one and a half times more often than the general employed population (Thurston & Verhoef, 2003). In the United States, Orrenius and Zavodny (2009) reported that the average industry injury rate for immigrant workers was about eight injuries more per 10,000 workers than among native workers, and the average occupation injury rate was 31 injuries more per 10,000 workers. As well, the average industry fatality rate among immigrant workers was about 1.8 deaths more per 100,000 workers higher than among natives, and the average occupation fatality rate was almost 1.6 deaths more per 100,000 workers.

In contrast, similar or lower rates of work-related injuries and illnesses have also been reported among immigrant workers, compared to their native counterparts. In South Carolina, for example, male immigrant farm workers had similar rates of work-related injuries as other farm workers (McDermott & Lee, 1990). Using the National Health Interview Survey for the period 2000-2003, Sinclair et al. (2006) found that immigrant workers had a lower probability of experiencing a non-fatal workplace injury, relative to their native-born counterparts. Using the same data, Zhang et al. (2009) presented further evidence to support this conclusion by showing that the occupational injury rate of immigrant workers was half that of American-born workers between 1997 and 2005.

In Canada, Premji et al. (2010) found that despite working in jobs with more risks, injury rates, particularly for manual labour, was lower for immigrants than for the Canadian-born population. The researchers attributed the observed results to a higher likelihood of under-

reporting of injuries among immigrant workers. Morassei et al. (2013) observed that immigrant workers, regardless of the number of years since their immigration to Canada, had a significantly lower risk of work injury than Canadian-born counterparts. The authors of the study attributed the apparent lower risk of work injury among immigrant workers to the wording of the interview question that asked about injuries that "limited normal activities." As Smith and Mustard (2009) suggested, new immigrants may be reluctant to acknowledge that their injuries limited their normal activities (e.g. work) for fear of losing their jobs.

2.4.1 Why Immigrants Might Have Higher Rates of Work Injury or Fatality

Research suggests that several individual, labour market and social context factors are associated with an increased risk of work-related injuries and illnesses among immigrants. Individual factors are attributes of individuals, such as lower English proficiency and job tenure. Labour market and social context factors are contextual factors that shape individuals' labour market experiences and influence their working lifecourse over time to create a labour market and health trajectory (Amick, McLeod, & Bultmann, 2016). Examples of these factors include culture, discrimination, and job security.

Individual Factors

The following individual factors have been shown to increase the risk of injury among immigrant workers:

Shorter Job Tenure

Length of service at a particular job has an inverse relationship with work injury rates. That is, shorter job tenure is associated with an increase risk in occupational injury. Examining job tenure and lost-time claims rates in Ontario, over a 10-year period, Morassaei et al. (2012) found that wage-loss claim rates were significantly higher for workers with shorter job tenure, compared to workers at a job for more than one year.

Greater work injury rates among immigrant workers may be due in part to their newness to the job, as their injury rate converges with those of native workers after the first five years on the job. Evidence for the decline in immigrant workers' injury rates after the first five years on the job has been found in Australia (Corvalan et al., 1994), Sweden (Doos et al., 1994), Canada (Smith & Mustard, 2009), and the United States (Orrenius & Zavodny, 2009). A decline in the risk of injury after the first year on the job has been observed for all new workers' and not only for immigrant workers. For example, Breslin and Smith (2006), in Ontario, found that new workers were four to six times more likely to be injured during the first month on the job, compared to workers with more than 12 months of employment. Further, this increased risk persisted after adjustment for sex, age, occupation and industry group differences.

One reason for this decline is new workers' increased familiarity with workplace procedures and knowledge required to safely perform the job, helping them to work in a safer manner (Salminen et al., 2009). New workers may be at greater risk for occupational injuries due to lack of job experience and knowledge, inadequate safety training, and exposure to more hazardous conditions (Smith & Mustard, 2007).

Newness to the workplace may be particularly problematic for immigrants as they have other vulnerabilities, such as lower English proficiency, lack of knowledge about Canadian occupational health and safety, and newness in the host county, that are not experienced by

the Canadian-born population. Their newness in Canada often means that they lack knowledge about Canadian health and safety rights and resources (Agudelo-Suarez et al., 2009).

English Language Proficiency

Greater work injury rates among immigrant workers may be due in part to English proficiency issues. In Australia, immigrant workers from non-English-speaking countries were found to have higher work-related mortality rates than immigrants from Englishspeaking countries and natives in the same occupation (Corvalan et al., 1994).

Lower English proficiency may prevent new immigrants from communicating hazards and understanding health and safety training information provided by the employer (Premji et al., 2008). As well, workers with lower English proficiency may receive less occupational health and safety training than their English-proficient counterparts (O'Connor et al., 2005; Smith, 2004). This has been demonstrated in a community-based study in the United States, where the researchers found that immigrant workers proficient in English were 1.7 times more likely to have received work training, and twice as likely to receive health and safety training than those not proficient in English (Panikkar et al., 2012). English proficiency was also found to be a strong predictor of knowledge about workers' compensation (Panikkar et al., 2012).

Labour Market and Social Context Factors

The following labour market and social context factors have been shown to increase the risk of injury among immigrant workers:

Lack of Occupational Health and Safety Training

A lack of adequate occupational health and safety training for immigrant workers, compared to native-born counterparts, might be responsible for the observed higher work-related injury rates among immigrants. In Canada, Smith and Mustard (2007) found that only one in five new Canadian employees received any occupational health safety training in their first year of a new job. Park (2011) also reported that between 2007 and 2008, immigrant workers were significantly less likely to receive occupational health safety training than their Canadian-born counterparts after controlling for demographic and labour market factors. Compared to 17.3% of Canadian- born men and 11.3% of Canadian-born women, only 15.4% of immigrant men, and 9.6% of immigrant women received occupational health safety training.

In the United States, a survey of 427 Latino workers in Virginia showed that only 31% received any job safety training, 25% of whom were offered training only in English (Pransky et al., 2002). The workers in this study experienced more injuries than would have been expected in the working population as a whole.

Research showed that workplace health and safety training reduces the incidence of occupational incidents (Jacobsson et al., 2011; Jensen et al., 2014). This type of training is particularly important for immigrants who are unfamiliar with Canadian occupational health and safety procedures. However, training that is only provided in English would present a significant challenge for immigrants who are not proficient in English and thus may not be effective.

Dangerous Jobs and Poor Working Conditions

Elevated rates of injury and fatality among immigrant workers, compared to their Canadianborn counterparts, have been attributed in part to their disproportionate exposure to hazardous working conditions and employment characteristics (Smith & Mustard, 2010; Quinn et al., 2007; Premji, 2014). Several studies provided evidence that immigrants in Canada are more likely to be employed in occupations and industries with high injury and fatality rates (Thurston & Verhoef, 2003; Orrenius & Zavodny, 2009) and that within the same jobs, they are assigned to the most hazardous tasks (Premji et al., 2010; Smith, Kosny, & Mustard, 2009). In Montreal, Canada, for example, the proportion of immigrants in jobs was found to be positively and significantly associated with the level of risk of occupational injuries, illnesses and deaths associated with these jobs (Premji et al., 2010).

Immigrant workers are also more likely to be in work situations with greater health and safety risks, including temporary employment, shift work, overtime work, non-membership in a union; and employment in small workplaces, physically demanding occupations, or poor quality, low wage jobs (Breslin & Smith, 2006; Salminen, 2011; Smith & Mustard, 2004; Smith & Mustard, 2009; Smith & Mustard, 2010; Teelucksingh & Galabuzi, 2005; Premji, 2014).

Long working hours (Dembe et al., 2005), shift work (Folkard & Lombardi, 2006), and temporary employment (Benavides et al., 2006; Hintikka, 2011; Laberge et al., 2014) have been associated with an increased risk of work-related injuries. A Canadian study showed that overtime work (more than 40 hours per week) increases the risk of absence caused by an occupational injury or illness by 300 percent (Breslin et al., 2008). As well, previous research

has documented a greater risk of injury in physically demanding occupations, compared to non-physically demanding occupations (Breslin & Smith, 2006; Smith & Mustard, 2004). These working conditions impact health through pathways that include greater exposure to risks, inadequate protection, lack of benefits coverage by insured public or private health services, disorganized occupational health and safety practices, and lack of compliance withand enforcement of legislation (Premji, 2014; Smith & Mustard, 2010).

Why Immigrants Work in Riskier Jobs

Individual factors, such as language barriers and financial strains, and social factors, such as lack of linguistically appropriate information, discrimination, and job insecurity, may lead to immigrants' greater likelihood of being employed in jobs with poor and hazardous working conditions or perform the most hazardous tasks within those jobs (Premji, 2014; Premji & Smith, 2013; Premji et al., 2008).

According to Orrenius and Zavodny (2009), "Workers' ability to speak English is inversely related to their industry injury and fatality rates, indicating that immigrants who speak English fluently, work in safer jobs" (p. 548). Researchers in the United States found that Hispanic male immigrants with lower English proficiency were more likely to work in occupations with higher fatality and injury rates than their English-proficient counterparts (Davila et al., 2011). Other language-related dimensions, such as accent, may also facilitate access to better employment and working conditions (Premji & Lewchuk, 2013).

Corvalan et al. (1994) identified proficiency in the host country's language as one of the most fundamental factors that directly affect safety at work among immigrants and concluded the following:

"Immigration status alone is not a factor, which should cause differential occupational health and safety outcomes. Adverse outcomes are more likely to be related to variables associated with immigration status, such as lack of English language proficiency and poor socioeconomic status, [which] are modified by other factors such as duration of residence." (p. 364)

The initial vulnerability of workers is made worse by the lack of adequate culturally and linguistically appropriate information at both federal and provincial levels for recent immigrants about employment standards, occupational health and safety, and workers' compensation systems (Breslin & Smith, 2006; Kosny & Lifshen, 2012; Premji et al., 2008). For example, material safety data sheets (MSDS) and workplace hazardous materials information system (WHMIS) labels are provided only in English and upon request, in French (WorkSafeBC, 2016), and are associated with complex language and low comprehensibility in general, regardless of English proficiency (Nicol et al., 2008). Immigrants may also be unaware of hazards associated with a workplace, as employers tend to understate workplace risks to immigrant workers, either intentionally or as a result of communication difficulties (Orrenius & Zavodny, 2009).

Immigrants, particularly recent immigrants, also tend to have more financial problems due to the costs associated with resettlement in their new country and their lower incomes than native workers; therefore, they may be more likely to trade off higher wages for poorer working conditions (Orrenius & Zavodny, 2009). Davilla et al. (2011) questioned the assumption of immigrant workers seeking dangerous positions in exchange for higher wages, rather attributing it to the lack of other employment opportunities.

Discrimination may also explain immigrants' disproportionate exposure to work hazards. The risk of experiencing discrimination in the labour market and at work was found to be more than 50% higher among Chinese men and women as compared to whites, in Toronto, Canada (Premji & Lewchuk, 2013). Preston et al. (2011) found that perceived racism on the job was twice as high among visible minority immigrants as it was among immigrants from European backgrounds. This observation persisted even when education, language fluency and gender were held constant. Those who perceive the highest rates of discrimination worked in low wage employment and reported lower rates of job satisfaction than other workers.

Restrictive Licensing Policies

Policies at the federal level such as restrictive licensing policies among professions prevent immigrants from obtaining work that matches their education and training (Thurston & Verhoef, 2003). The elevated risk of work injury among immigrant workers may be due to their employment in occupations for which they are overqualified (Belin et al., 2011; Chen, Smith, & Mustard, 2010). Premji and Smith (2013) provided evidence for higher work injury rates among immigrant workers, especially those of recent arrival, whose education exceeds that of their job requirements, compared with other immigrant workers.

In 2008, 28% of Canadians in non-management occupations were overqualified, with higher rates among immigrant- and younger- workers (Smith, et al., 2012). Over-education rates were found to be higher among recent immigrants who had lived in Canada for less than 10 years (48%) than both established immigrants (35%) and non-immigrants (31%) (Wald & Fang, 2008). As Chen et al. (2010) explained, "It generally takes new immigrants at least 10

years to achieve similar labour market outcomes as Canadian-born workers, and realize their economic potential" (p. 615).

The physical demands of the job were found to mediate the impact of over qualification on work injuries (Premji & Smith, 2013). A mismatch between a worker's physical capacity and the physical demands required on the job has also been associated with poor general mental and physical health (Chen et al., 2010). Chen and colleagues suggested that the workers' experiences of unmet occupational expectations and loss of occupational status negatively affected their self-esteem, which in turn, resulted in poor health status. In a qualitative study of immigrants in Ontario, Canada, Dean and Wilson (2009) interviewed highly skilled immigrants who were either unemployed or underemployed. All participants reported experiencing stress, anxiety, depression, irritation, and frustration. Approximately half also described physical health problems, such as hypertension and musculoskeletal disorders.

Psychological disorders were found to be positively associated with occupational injury (Zwerling et al., 1996). Wang and Delp (2014) found that the combination of good health status and low job stress was associated with a large reduction in the incidence work injuries. As well, according to Blonk et al. (2006), work stress is an important cause of absence and work disability in Western countries.

Culture

Some immigrants' deference towards authority could increase their likelihood of accepting hazardous tasks at the workplace. As Premji et al. (2010) noted, "Hierarchical relationships and harmony in Chinese traditional culture and attitudes of fatalism and resignation, may result in obedience of employers and acceptance of hazards" (p. 4). Immigrants who are less

acculturated may have characteristics that are associated with more work injury, including limited knowledge of preventive services, more stress, and fewer social support resources (Thurston & Verhoef, 2003). Menzel and Gutierrez (2010) have also suggested that *machismo* (hypermasculinity) and *respeto* (respect to authority) among Latino male workers plays an important role in higher injury rates because they discourage the use of safety equipment and refrain from communicating with a person in authority.

2.4.2 Why Might Immigrants Have Lower Rates of Work Injury and Fatality

Underreporting

The apparent lower injury rates among immigrant workers may be due to their greater reluctance to report work-related injuries or illnesses, compared to their native-born counterparts. A number of studies have pointed to the under-reporting of work-related injuries among immigrant workers (Gravel et al., 2010). A study conducted in the sawmill industry in British Columbia, for example, reported that visible minorities were less likely to report injury claims (Alamgir et al., 2006). In the United States, a study of immigrant hotel workers found that while 75% of workers experienced work-related pain, only 31% reported it to management and only 20% filed claims for workers' compensation (Scherzer, Rugulies, & Krause, 2005).

Underreporting may be higher for immigrants than native workers due in part to fear of job loss owing to their financial precariousness, and unfamiliarity with workers' rights to compensation after work injuries (Smith, 2012). However, there is evidence of underreporting of both work injuries and workplace hazards even when workers are aware of their rights (Scherzer et al., 2005). In addition, workers might not report injuries because they

believe that the costs associated with a compensation claim (e.g. income loss) outweigh the benefits (Galizzi et al., 2010). Language barriers could also deter immigrant workers from reporting injuries to their employers, as research has demonstrated that immigrant employees who speak English fluently are more likely to report injuries to their managers, compared to those with lower English language proficiency (Madera & Chang, 2011).

However, the evidence on whether immigrants underreport work-related injuries and illnesses to their employers is mixed. A qualitative study of new immigrants in Canada concluded that most, but not all, injured workers reported their injury to their employer or a health-care provider (Kosny et al., 2011). But, this study did not include a comparison group of Canadian-born workers. As such, it is not clear whether immigrants are less likely to report work-related injuries and illnesses than Canadian-born workers (Park, 2011).

2.5 Immigrants' Challenges After Reporting a Work Injury

After reporting a work injury to their employers, immigrant workers may encounter additional difficulties with respect to filing a claim (Kosny et al., 2012), receiving compensation benefits, and seeking healthcare (Quandt et al., 2006), compared to Canadianborn counterparts. These difficulties may have an adverse effect on the injured immigrant workers' compensation process. Employers may take advantage of workers' limited knowledge about their rights and entitlements by offering paid time off work to prevent them from filing a claim, or they may threaten to terminate workers if they file a claim (Park, 2011).

Previous studies have reported lower rates of workers' compensation for new immigrant workers (Pransky et al., 2002). An analysis of the U.S. Medical Expenditure Panel Survey showed that Hispanic workers were 53% more likely to have medical conditions resulting from work-related injuries but were 48% less likely to receive payment for medical costs from workers' compensation (Dong et al., 2007). Results of a Canadian study showed that women, immigrants in their first 10 years in Canada, younger workers, respondents who were in their first year of a job, those who were not members of a union or collective bargaining agreement, and part-time workers were less likely to receive any type of compensation from workers' compensation or other sources during their absences (Smith et al., 2009).

Immigrant workers may also experience racism, such as having applications for social benefits rejected on the basis of race or ethnicity (Zuberi & Ptashnick, 2012). Finally, injured immigrant workers may also face barriers to getting the health care they need, including the perception that the care will not be adequate, not knowing where to access the care they need, and having communication problems due to a lack of proficiency in the majority language (Xiang et al., 2012; Asanin & Wilson, 2008).

2.6 A Summary Statement

I have explored in detail reasons why immigrant workers may have different injury rates compared to Canadian-born counterparts. The interactions between individual factors and the broader labour market and social context factors were found to contribute to the observed higher rates of work injuries among immigrant workers. I have also briefly examined evidence on the challenges injured immigrant workers may face after reporting an injury. It is possible that the same factors that have caused higher injury rates among immigrant workers, compared to Canadian-born counterparts, might have also negatively affected their

experiences after a work injury.

There remains, however, a need to better understand the role played by these factors in the experiences of individuals who combine immigration status and a work disability condition. The next section will address the significance of work disability for immigrants and a gap in the literature on the experiences of immigrant workers with work disability. I will then review the evidence on work disability among immigrants that could inform the development of a conceptual framework, illustrating the role individual and broader labour market and social context factors play in immigrants' experience of work disability.

2.7 Study Rationale

Given the unique challenges immigrants may encounter in their host country, work disability may have more devastating effects on injured immigrant workers compared to Canadianborn counterparts. However, while there is research on work injuries and their causation among immigrant workers, research on their experiences after a work injury is sparse. No research, for example, has investigated whether there are differences in disability duration between immigrant and Canadian-born workers after a work injury. This study is the first to investigate these differences within a Canadian context.

Findings from this study could improve the health and wellbeing of injured workers by improving disability management policies and return-to-work programs, and reducing inequities where they might exist. Effective disability management policies and return-towork programs can minimize employee turnover and lost time and the associated financial and emotional costs to the worker, the employer and society. Understanding these differences will also inform future research that investigates why differences may exist in disability

outcomes in more detail between workers of different ethnic/cultural backgrounds.

2.7.1 Why Immigration Status Matters: A Social Determinants of Health Perspective

Even though immigrants often leave their homeland to escape political persecution, poverty, or economic hardship, their immigration status exposes them to new social, economic, and political difficulties in their destination countries. As Castaneda et al. (2015) explained, "Although immigration is a consequence of social determinants of health, such as poverty, occupational and educational opportunities, and political prosecution, immigration must also be positioned as a social determinant in its own right" (p. 375). Additional social, economic, and political barriers encountered by immigrants in their new country can exacerbate work disability, a challenge for any worker.

2.7.2 Evidence for Immigrant-Native Differences in Disability Duration

Existing evidence suggests that there may be differences in disability duration between immigrant and Canadian-born workers following an occupational injury or illness. In the United States, African American and Hispanic workers reported missing more workdays as a result of their occupational injury and illness than their non-Hispanic White counterparts (Johnson & Ondrich, 1990; Strong & Zimmermen, 2005). Zhang et al. (2009) reported that immigrant workers were more likely to be hospitalized and miss more than six workdays after a work injury, compared to US-born workers. In Sweden and Norway, immigrants had higher rates of disability pension (Claussen et al., 2012; Osterberg & Gustafsson, 2006), and in Singapore, foreign-born workers were absent from work longer than native workers following a work injury (Carangan et al., 2004). Psychosocial stressors related to immigration and resettlement, such as lack of social support, language barriers, financial difficulties, and discrimination (Callister, Beckstrand, & Corbett, 2011) could create work-related problems, such as increased absenteeism due to not-workrelated sickness, presenteeism (impaired job performance and productivity while at work), and long-term work disabilities (Birnbaum, Kessler, & Kelley, 2010).

2.7.3 Determinants of Duration of Work Disability

Previous research has demonstrated that, in general, older age, lower socioeconomic status, more severe injuries, poor relations with coworkers, low job satisfaction, autonomy and control, and larger compensation benefits for lost wages are likely to prolong work disability after a work injury (Strong & Zimmermen, 2005).

A review of empirical studies by Krause et al. (2001) identified 100 factors predicting duration of disability after an occupational injury or illness, and categorized them under seven broad categories as follows:

1) *Individual level worker characteristics*: Sociodemographic factors (e.g. age, gender); psychological factors (e.g. mental health); attitudes and beliefs (e.g. prediction of ability to change job); health behaviours (e.g. smoking); clinical measures (comorbidity).

2) *Injury or illness characteristics*, such as injury or illness severity, body part injured, compensability.

3) *Medical and vocational rehabilitation interventions*: Acute disability phase (e.g. back education); sub-acute disability phase (e.g. physician-patient communication about job); chronic disability phase (e.g. multimodal functional restoration).

4) Individual task level physical and psychological job characteristics: Physical job
characteristics (e.g. heavy physical work); psychosocial job characteristics (e.g. job control); social support (e.g. supervisor support).

5) *Organizational level employer factors*, such as unionization and proactive in-house returnto-work program.

6) *Employer- or insurer-based disability prevention and disability management interventions*, such as active monitoring of claimants by insurer, and early contact of worker by workplace.

7) *Societal level social policy, legislative, and macro-economic factors*, such as complexity of compensation system, and dismissal during sick leave.

Krause and colleagues' model of the determinants of work disability duration can help identify specific factors associated with immigrants that might contribute to differential work disability duration. These factors inform the study conceptual framework, the table of individual and labour market and social context, as well as the study hypotheses. In addition, the conceptual model builds on and integrates the research evidence discussed above on increased injury rates for immigrant workers, compared to Canadian-born counterparts, and extends these factors to identifying whether and how there might be differences in work disability duration between immigrants and Canadian-born workers.

2.8 Conceptual Framework

The conceptual framework illustrates how individual and workplace/organizational factors interact with each other and are shaped by a broader labour market and social context to affect immigrants' work disability durations (see Figure 1). The framework is composed of two inter-related categories: individual and workplace/organizational factors. Each of the two

categories is composed of a number of sub-categories, linked through expected relationships. Individual and workplace/organizational factors are embedded within a broader labour market and social context, which influences the relationships among the categories and subcategories and also the way they interact with each other. A thorough assessment of the relationship between immigration status and work disability duration cannot be accomplished without considering all categories and sub-categories as well as the contextual elements included in this framework.

Immigration status represents injured worker's length of time in Canada. Age and sex are compositional characteristics of the injured immigrant workers that interact with immigration status to affect the attributes of the individuals, under the heading of "individual factors." Individual factors then interact with workplace/organizational factors to affect work disability duration. Compositional characteristics of workers may be confounders or effect modifiers and may determine whether or not individual factors matter. Individual factors may also include education, ethnicity, and family characteristics, such as whether or not the worker has children, which we have not examined. Social aspects influencing the relationship between immigration status and disability duration are embedded in a circle and include job insecurity and discrimination.

This framework leads to and supports the underlining hypotheses of this thesis regarding why there may be differences in work disability duration between immigrant and Canadianborn workers. No pre-existing conceptual framework exists that addresses this question directly. The framework was constructed based on a critical examination of the scientific and "grey" literature on the experiences of immigrants after having a work injury or illness. As

such, it does not attempt to be exhaustive but rather tries to establish groundwork for the generation of the thesis hypotheses.

Figure 1. Conceptual model of impacts of individual factors, and labour market and social context on immigrants' disability durations.



2.8.1 Longer Disability Durations Among Immigrant Injured Workers

Issues related to the workers' compensation and healthcare systems, workers' interpersonal problems, and the nature of their injury can lead to delayed and complicated compensation claims after work injuries or illnesses (MacEachen, et al., 2010). Krause et al. (2001) reported that duration of work disability is influenced by characteristics of the injured worker, characteristics of the injury or illness, the medical and vocational rehabilitation

intervention programs, physical and psychosocial job characteristics, the employer, the disability insurance system and contextual factors such as discrimination, the legal framework, and labour market characteristics. Some of these factors may be particularly relevant to immigrant workers, either increasing or decreasing their disability duration after a work injury.

Individual Factors

Shorter Job Tenure

Immigrant workers' shorter job tenure may prolong their disability duration, compared to Canadian-born counterparts. Research has demonstrated that the length of work disability decreases with increasing job tenure (MacKenzie et al., 2006). The inverse relationship between job tenure and the duration of disability might be due to greater organization attachment, greater work-related experience, positive supervisor interactions, and improved ability in navigating the return-to-work system or accessing resources to assist with return to work at an organization, all of which can make the return-to-work process easier (Besen, 2016).

On the contrary, it is also possible that compared to workers with shorter job tenure, those with longer job tenure have longer work disability durations because they might feel increased job security and thus they do not feel the need to rush back to work to keep their jobs (Besen, 2016). Accordingly, Canadian-born workers with higher job tenure might have longer disability durations than immigrants with lower tenure. As well, established immigrant with higher job tenure might have longer disability durations than recent immigrants with lower tenure.

Lower English Proficiency

Immigrants' lower English proficiency may prolong their disability duration after a work injury for several reasons. They may have challenges communicating their needs, accessing care, and getting the appropriate follow up, all of which could extend their recovery time. Injured workers need to complete compensation forms that require a good understanding of the English or native language (Gravel et al., 2010). Immigrants with lower native language proficiency may not understand forms, decisions or requirements, which could complicate and delay the compensation process and increase the duration of their disability.

During the recovery process, injured workers are also required to communicate with one or more healthcare providers. Misunderstandings can occur as a result of language barriers. Lower proficiency in the native language might also prevent immigrants from effectively explaining their symptoms to health care professionals (Lee et al., 2001). Premji (2015) reported that injured immigrant workers with lower English proficiency experienced difficulties communicating with healthcare providers, resulting in wrong diagnoses, incomplete or subjective assessments, and assumptions about their motivations and willingness to return to work, which affected their eligibility to compensation benefits and services. Gravel et al. (2010) also examined the compensation process for work-related musculoskeletal injuries among immigrant and non-immigrant injured workers in Montreal and reported that immigrants are less likely to obtain a precise or accurate diagnosis due to language barriers.

Lower English proficiency has also been reported as an important accessibility barrier to health care. A study of 100 monolingual Chinese immigrant women working in the garment

industry in California found language to be the most frequently reported barrier to accessing care for a work-related injury or illness (Burgel et al., 2004). Poor access to health care and a lack of timely and appropriate treatment may result in longer disability durations among injured immigrant workers, compared to their Canadian-born counterparts.

Nature of Injury: Chronic Episodic Versus Acute Injuries

Disability durations may vary depending on the type of injury. While for a chronic episodic condition, such as a back injury, the injured worker may need to negotiate constantly for treatment, for acute injuries, such as a fracture, they would not, because those injuries have a much more prescribed diagnostic and treatment trajectory. As Kosny et al. (2011) explained, workers who have a visible and acute injury tend to have better experiences with the Canadian workers' compensation system, compared to those who have invisible injuries, because invisible injuries cannot be objectively measured.

Since immigrants with lower English proficiency might have greater difficulties negotiating with the workers' compensation system, there might be larger differences in disability outcomes between immigrant and Canadian-born workers with chronic episodic conditions than with acute injuries. As well, issues of perceived legitimacy, associated with invisible chronic medical conditions, can delay or complicate compensation claims (Mansfield et al., 2014).

Higher Rates of Serious Injuries Among Immigrants

Immigrant workers may have longer disability durations because they experience higher rates of more severe work-related injuries and illnesses than their native-born counterparts

(Pransky et al., 2002; Strong & Zimmerman, 2005). In the United States, Zhang et al. (2009) reported that immigrant workers experienced more severe injuries than US-born workers between 1997 and 2005. In Canada, Smith and Mustard (2009) analyzed information from more than 97,000 workers in the Canadian Community Health Survey in 2003 and 2005 and found that recent immigrant men were twice as likely to sustain workplace injuries that required medical care compared with Canadian-born men.

Immigrant workers may experience more severe injuries because they are more likely to be employed in riskier jobs or perform more hazardous tasks than their native-born counterparts within those sectors (Orrenius & Zavodny, 2009). Immigrant workers may also conceal a work injury or illness for fear of losing their jobs and repercussions, which could exacerbate the injury or illness. Recovery is quite different for workers with severe injuries from those with mild injuries. Workers with serious and complex injuries may have longer work disability durations than workers who have minor injuries because they tend to spend much longer in rehabilitation. In a multivariate analysis of early disability risk factors for low-back pain, Shaw et al. (2005) found that earlier injury reporting to the employer and longer job tenure, predicted earlier return to work. Due to greater difficulties in navigating the compensation and health care systems, immigrant workers may return to work too quickly, before they are fully healed, resulting in aggravation of existing injuries or re-injury that subsequently results in longer disability durations

Labour Market and Social Context Factors

Complex Workers' Compensation and Culturally Challenged Healthcare Systems

The workers' compensation is a complex system that many workers may find difficult to

navigate (Kosny et al., 2012). The system's lack of face-to-face contact and communication through letters that are in English or French make it more difficult for new immigrants with lower English proficiency to understand certain requirements. Partial or incomplete forms could be detrimental to the worker's claim and result in a complicated, delayed compensation process.

Lack of culturally competent care may limit the use of the health care system and compromise the quality of health care, which, in turn, could increase the length of disability duration after a work injury among immigrants (Lawrence & Kearns, 2005). A culturally competent healthcare setting should include a culturally diverse staff that reflects the community they serve, formal translators and interpreters, training for providers about the culture and language of the people they serve, and signage in the clients' language(s) (Anderson et al., 2003).

Occupations With Higher Serious Injury Rates

Occupations with higher serious injury rates have been associated with longer work disability duration. The occupations with the highest serious injury rates were found to be manufacturing and utilities, and trades, transport and construction, and the lowest rates were observed in management, and administration and professional occupations (Fan et al., 2012). Immigrants are much more likely to work in processing and manufacturing jobs and much less likely to be in public sector jobs and in managerial positions than Canadian born workers (Kosny et al., 2011).

Discrimination in the workplace may influence job assignments such that immigrants are assigned to more hazardous job tasks. Increased exposure to occupational hazards as a result

of racial discrimination may translate to higher rates of work-related injury and illness and consequently longer disability durations (Castro et al., 2008).

2.8.2 Shorter Disability Duration Among Immigrant Injured Workers

Individual Factors

Financial Difficulties

Financial strains associated with resettlement and lower wage jobs might force new immigrants to return to work faster than their Canadian-born counterparts following a work injury or illness. New immigrants to Canada face challenges such as difficulty finding good jobs and higher levels of low income and poverty (Chun & Cheong 2011). Immigrating to a new country is costly, and after only a few months in Canada, some immigrants begin to send financial aid to family in their country of origin (Kosny et al., 2011). As well, immigrants, especially recent immigrants, have lower average earnings than their Canadian-born counterparts (Teelucksingh & Galabuzi, 2005; Wang & Lo, 2004). Therefore, even though WorkSafeBC covers 90% of a worker's average net earnings until they return to work, higher rates of low income, poverty, and lower access to other financial resources, may create greater financial difficulties for recent immigrant workers, compared to Canadian-born counterparts that necessitates earlier return to work following an injury.

Labour Market and Social Context Factors

Job Insecurity

Job insecurity might lead injured immigrant workers to return to work quicker. New immigrants to Canada have been shown to report higher levels of job insecurity, unemployment, and underemployment (Chun & Cheong 2011). Lack of recognition of newcomers' foreign credential and work experience and lower English proficiency force them to work in low-skilled and temporary jobs, characterized by low levels of job security (Subedi & Rosenberg, 2016). Immigrants who landed recently (less than 10 years) are more likely than established immigrants to work in temporary positions (Statistics Canada, 2015d). In addition, an injury can further threaten job security and future employability, both of which have implications for financial wellbeing (Castro et al., 2008). As such, the high rates of job insecurity and challenges immigrant workers might face in finding a new job may motivate them to return to work faster to keep their jobs.

Pressure from Employers to Return Back to Work

Employers may urge injured immigrant workers to go back to work, often while still in a fragile and vulnerable physical and emotional state, to avoid costly lost-time claims (Kosny et al., 2011). New immigrant workers could be misled by employers about their rights and responsibilities related to workers' compensation and persuaded to return to work due to their lack of knowledge about the Canadian workers' compensation system and their entitlements (Kosny et al., 2012).

As well, immigrant workers may be reluctant to jeopardize their employment and compromise their income by declining their employers' return to work request. While all workers may worry that a work disability will jeopardize their job and compromise their income, immigrants have added pressures, such as greater financial problems and limited job prospects, compared with Canadian-born counterparts (Weiner, 2008). As such, new immigrants place a higher value on their first low-paid, poor quality jobs because they view these jobs as a way of gaining Canadian work experience and as a stepping stone to better quality work in the future (Kosny et al., 2011).

2.8.3 Importance of Age and Sex Differences in Disability Duration

There are age and gender/sex differences in the duration of work disability. Although older workers have a lower injury rate than younger workers in general, it takes longer for injured older workers to return to work after a work injury or illness, compared to their younger counterparts (Breslin, Smith, & Moore, 2011). Previous studies have consistently found a relationship between increasing age and the increased likelihood of prolonged disability following compensable occupational injuries or diseases (Rogers & Wiatrowski, 2005). A study that analyzed workers' compensation claims between 2001 and 2004, in Victoria, Australia, found that the number of compensated days per claim increased with age to reach a maximum for those in their late 50s (Berecki-Gisolf et al., 2012).

A number of possible explanations for longer disability duration among older workers have been suggested. Injury recovery may be negatively affected by the biological effects of aging, such as slower tissue repair and reduced muscle elasticity, as well as by a greater prevalence of comorbid health conditions, such as chronic disease, which may complicate

and lengthen recovery from work-related injury and disease (Berecki-Gisolf et al., 2012). As well, it has been reported that compared to younger workers, older workers might sustain more serious injuries and illnesses, which could delay recovery after work injury or illness (Besen et al., 2016).

Existing evidence suggests that there might be gender differences in disability duration as well. Some studies have indicated that compared with men, women are slower to recover from an injury, have slightly longer work disability durations, and are less likely to return to work after an injury (Lederer & Rivard, 2012; Kempen et al., 2003; Kendrisk et al., 2012). 36). Using data from Statistics Canada's Workplace and Employee Surveys (WES), Zhang (2007) also found that compared with men, women took more paid sick days and those with young children (under 5 years old) tended to take more unpaid days off. In contrast, Harrold et al. (2008) found that women were more likely to have a shorter duration of absence after a work injury but were also more likely to have a re-injury.

2.8.4 Why Age and Sex Are Important With Respect to Immigration Status

Age and sex are related to immigration status. Although new immigrants to Canada are relatively young, generally, immigrants are older than the Canadian-born population. In 2011, the median age for the total immigrant population was 47.4 years and for the Canadian-born population was 37.3 years (Statistics Canada, 2011). The total female immigrant population was, on average, nine years older than the Canadian-born female population. Similar patterns were observed for the male population. As well, there are strong correlations between time, age and immigration status. In order to become an established immigrant, an individual has to be in Canada for more than 10 years by definition.

Gender has a different effect for immigrants than the Canadian-born population. Morissette and Sultan (2013) followed a cohort of young immigrants and native-born Canadians from 1991 to 2010 and found that the wage gap between immigrant and Canadian-born men was larger than that between immigrant and Canadian-born women. As well, for immigrant men, a higher education was associated with higher earning. In 2010, for example, less-educated male immigrants' earnings were 78% of those of their native-born counterparts, compared with 93% for more- educated immigrant workers. Immigrant women, however, earned 95% of what their native-born counterparts did, regardless of education level. Using 2006 Census data, Preston et al. (2011) found that while immigrant men experience similar unemployment rates as Canadian-born men, immigrant women experience higher unemployment rates and lower labour market participation rates than Canadian-born women. Immigrant women had less job security than both immigrant men and Canadian-born men and women. As well, immigrant women are more likely to be married and live with family members, compared with Canadian-born counterparts (Chiu, 2011).

Gender may also have a different effect for immigrant men and women. Immigrant women take longer than immigrant men to integrate into the labour force and are more likely to experience a mismatch between the skill requirements of their occupation and their education level (Statistics Canada, 2016). They often earn much less than men, even when they have similar educational backgrounds and occupational experience (Creese & Beagan, as cited in Nanjia, 2013). In 2011, immigrant women between the ages of 15 and 24 years earned, on average, 81% of the median employment income earned by immigrant men of the same age (Statistics Canada, 2016).

Based on the preceding two sections, age and gender/sex are conceptualized as both confounders and effect modifiers. As such, stratifying by age and sex as well as continuing to control for them is important when examining the relationship between immigration status and work disability duration.

2.9 Summary of Key Points

The proposed framework points to a number of individual and broader labour market and social context factors that may negatively affect the compensation process of injured immigrant workers, either increasing or decreasing their disability durations. Some of these factors were also responsible for increased injury rates among injured immigrant workers (see Table 1). For example, lower English proficiency and shorter job tenure could lead to both an increase in injury rates as well as to longer disability durations. Among these factors, individual factors, such as lower English proficiency and shorter job tenure, and social context factors, such as job insecurity, seemed to have a significant adverse effect on the compensation process. Length of time in Canada can be used as a proxy for these factors. As such, it is predicted that immigrants who have been in Canada longer, have better English skills, longer job tenure, and higher job security, and consequently shorter work disability durations, compared to recent immigrants and that both groups of immigrants have longer disability duration than Canadian-born workers.

| Factors | Impact on Injury Rates | Impact on Disability Duration |
|--|---|---|
| Factors Individual Factors Labour Market and Social Context Factors | Impact on Injury Rates Increase Shorter job tenure Lower English proficiency Decrease Under-reporting Increase Lack of occupational health and safety training Dangerous jobs and poor working conditions | Impact on Disability DurationLongerShorter job tenureLower English proficiencyNature of injuryChronic episodic vs. acuteHigher rates of serious injuriesamong immigrantsShorterFinancial difficultiesLongerComplex workers' compensationand culturally incompetenthealthcare systemsOccupations with higher serious |
| | Restrictive licensing policies over-qualification | injury rates Discrimination |
| | Culture | <i>Shorter</i> Pressure from employer to return back to work Job insecurity |

Table 1. Impact of individual and labour market and social context factors on both injury rates and disability duration among injured immigrant workers

2.10 Objective and Research Hypotheses

The purpose of this study was to investigate differences in disability duration by immigration status for injured workers in British Columbia with an accepted workers' compensation claim between 1995 and 2012.

Access to historical workers' compensation claims data in British Columbia, linked to the Citizenship and Immigration Canada (CIC) Permanent Residents data provides this unique opportunity to describe differences in workers' compensation experiences for those who access the system with an accepted workers' compensation claim that can inform differences by immigration status for this aspect of our social safety net.

Study hypotheses:

- 1- Overall, immigrant workers would experience longer disability durations compared to their Canadian-born counterparts with the same type of work injury, over the study period.
- 2- Compared to established immigrants, recent immigrants would experience longer disability durations for the same type of work injury, over the study period.

Chapter 3. Methodology

3.1 Study Cohort

Workers with an accepted workers' compensation injury claim record for short-term disability, resulting in at-least one day away from work, over the period January 1, 1995 to December 31, 2012, in British Columbia, defined the study population-based cohort.

The cohort was restricted to workers between 15 and 64 years of age at the time of injury (3% excluded). Health-care only, fatal, and long-term disability claims without associated short-term disability claims were excluded from the current analysis. Additionally, records for which sex or age was missing or unknown across all of the available data sources were eliminated (19%). The claims were also limited to those for injury, excluding claims for illness and disease (e.g. cancer, hearing loss) (14%) (see Table 3).

During the 18-year study period, the workers' compensation system provided benefits coverage for approximately 93-94% of British Columbia's provincial workforce. Compensation claim records provide detailed socio-demographic, occupation and industry of employment, and medical information for workers with work-related injuries and illnesses (Fan, McLeod, & Koehoorn, 2012).

The final cohort included 516,354 (883,830 claims) injured workers between the ages of 15-64 years with a short-term disability injury claim. The cohort comprised of 461,195 Canadian-born workers (805,221 claims), 20,540 established immigrants (31,727 claims), and 34,619 recent immigrants (46,882 claims).

3.2 Data Sources

An administrative claims database maintained by WorkSafeBC, containing claim records from January 1, 1985 to December 31, 2013, was used in order to define the study cohort for the analysis of disability durations (WorkSafeBC, 2015). However, in order to identify established immigrants (10 years or more in Canada), claim records from January 1, 1995 to December 31, 2012, were used for the data analyses. The dataset included three, linkable data files: 1) claims file, 2) injured workers file, and 3) claim-cost-summary file. Collectively, these three linked data files provided individual-level data on worker demographics (e.g. age, sex), work characteristics (e.g. occupation and industry of employment at time of injury), nature and type of injury, injury date, number of short-term disability days paid, compensation amount, and payment dates.

Funded by employers through insurance premiums, the compensation system provides medical treatment, disability payments, and occupational rehabilitation to all workers who have been injured while at work (Fan et al., 2012). In British Columbia, "wage-loss benefits are payable where an injury or disease resulting from a person's employment causes a period of temporary disability from work" (WorkSafeBC, 2002). Wage replacement is provided from the first full day of work absence, excluding the day of the injury (Smith et al., 2014).

The Citizenship and Immigration Canada Permanent Residents data was also used to identify recent- and established- immigrant workers as well as to distinguish between immigrant- and Canadian-born- workers (CIC, 2015). CIC Permanent Residents data included the following socio-demographic and immigration variables: age, sex, immigration class, country of birth, mother tongue, landing date, highest level of education, and family status at landing for

individuals who have been granted permanent residence in Canada from January 1, 1985 to December 31, 2013.

Compensation records and Citizenship and Immigration Canada Permanent Residents records were linked at the individual worker level, via Population Data BC. Population Data BC is a data and education resource, providing data linkage, development, and access to individual-level, de-identified longitudinal data on British Columbia's residents, facilitating research on the determinants of human health, wellbeing and development (Population Data BC, 2012).

3.3 Data Linkage

Population Data BC (PopData) has over 15 years of experience and established protocols for linking individuals across unique databases using deterministic and probabilistic methods (PopData, 2016). PopData uses personal identifiers and exact and probabilistic linkage techniques to link information on individuals across data sources and over time (PopData, 2016). This is done via a linkage-coordinating file that is created and maintained by Population Data BC. PopData generally achieve linkage rates above 95%, which limits potential bias in population-based analyses (Jutte, Roos, & Brownell, 2011).

PopData makes linked research databases available to researchers in a privacy protected, confidential manner (Hertzman, Meagher, & McGrail, 2013). Their approach to data linkage allows for security and consistency in the linking of data across multiple data sets, disciplinary areas, time periods and projects, resulting in a high quality research product. The data linkage for this study, however, had one limitation. All records were not found in the underlying files, suggesting that not every record was linked to its matching record (linked N=1,472,944). This has led to the exclusion of a number of records from all data files (unlinked N = 52,964, including both immigrant and Canadian-born workers).

3.4 Study Design

A retrospective cohort study was used to examine the differences in disability durations by immigration status for workers in British Columbia with a compensable short-term work-related injury between 1995 and 2012.

3.5 Study Variables

Explanatory Variable: Immigration Status

The primary explanatory variable of interest was "immigration status", defined as length of time between the date the person officially landed as an immigrant and injury date. The variable was calculated by subtracting the "landing date" coded in the CIC Permanent Residents data from "injury date" coded in the WorkSafeBC claims file. Injured workers were identified as recent immigrants (less than10 years in Canada), established immigrants (10 years or more in Canada), and Canadian-born workers (no record in the CIC data).

Outcome Variable: Disability Duration

The outcome variable for this study was "disability duration," defined as the number of short-term disability days paid (wage-loss days) that had occurred as of the extract date (September, 2015) for claim data. For consistent follow-up among all participants, claims were followed for one year starting from the date at which the first short-term disability payment began. Wage-loss days were censored at 260 days within the first calendar year after injury reflecting a standard five-day working week.

Confounding Variables

Covariates and confounders were derived from both databases as described below:

Sex

The 'sex' field recorded in the injured workers file was used. Sex was coded "1" for male and "2" for female.

Age at the Time of Injury

Age at the time of injury was computed by subtracting injured worker's "date of birth," provided in the injured workers file, from "injury date," coded in WorkSafeBC's claims file. Age was used in the models as a continuous variable. Due to the non-linear relationship between age and disability duration, age-squared (age²) was added to the models, except in the age-stratified models, where the relationship between age and disability duration was approximately linear and thus the age-squared term was not included.

Occupation

WorkSafeBC data contains occupation codes grouped according to Statistics Canada's Standard Occupational Classification, a standard for the classification of over 30,000 jobs into categories (Statistics Canada, 1991). This nationally accepted reference on occupations in Canada included 10 broad occupational categories, 47 major groups, 139 minor groups, and over 500 unit groups. For this research, the 10 broad occupational categories were used. In the data, before 1997, as well as between 1999 and 2000, there were a number of claims that had an unspecified occupation due to changes in the coding system. These unspecified categories were retained in the data analysis, as outlined in the list of occupational categories provided in Table 2.

| Table | 2. | WorkSafeBC | 10 | broad | occupati | ional | categories | (SOC | 1991) |
|-------|------------|------------|----|-------|----------|-------|------------|-------|-------|
| abic | <i>4</i> • | WURDard | 10 | Divau | occupan | onar | categories | (DUC) | 1))1) |

Nature of Injury (NOI)

Claims were categorized as an acute or strain injury, which were identified using the nature of injury (NOIs) codes in the workers' compensation claims file. The list of NOIs used to define acute and strain injuries for the purposes of this study are provided in Table 3.²

¹ Source: <u>http://www.statcan.gc.ca/concepts/occupation-profession-eng.htm</u>

1-digit occupation, 10-groups from Standard Occupational Classification (SOC) 1991
 ² Sarkany (2011). *Certification in hazardous industries: An evaluation of the British Columbia faller training standard* (Unpublished doctoral thesis). University of British Columbia, Canada.

| Acute Injuries | Strain Injuries |
|-----------------------|---------------------------|
| Abrasion | Back strain ³ |
| Amputation | Bursitis and related |
| Concussion | Carpal tunnel syndrome |
| Contusion | Other strains |
| Dislocation | Tendinitis, tenosynovitis |
| Exposure to cold/heat | |
| Fractures | |
| Heat burns | |
| Hernia | |
| Laceration | |
| Multiple injuries | |
| Other injuries | |

Table 3. Nature of Injury (NOI) claim criteria for acute and strain injury types

Time Variable: Injury Year

The 18 years of study data provided the opportunity for investigating changes in the outcome over time. Injury dates were grouped into six three-year categories: 1995-1997, 1998-2000, 2001-2003, 2004-2006, 2007-2009, and 2010-2012.

Previous Claims

A previous claim indicator was derived using all accepted short-term disability claims from 1995-2012. A rolling 2-year window was used to ascertain previous claims prior to the analysis claim of interest (e.g., dating back to 1993 for claims in 1995). The previous claim indicator was coded as either 'yes' (one or more claims in the past 2 years) or 'no' (none). Multiple injury claims per worker were used in the analyses. Therefore, a primary claims in 1997, for example, would provide an indicator of a previous claim for another injury in 1999. Claims were limited to those for injuries excluding all disease/illness claims from the outcome and from the previous claim variable.

Moderating Variables

Age (<35 years and 35-64 years) and sex (male versus female) were defined as both confounding and moderating variables, in order to examine effect modification between age and sex and immigration status.

Variables Used in Post-hoc Analysis

For the post hoc analysis, the following additional variables- measured at the time of arrival in Canada- from the CIC Permanent Residents file were used:

Educational Qualification

Nine educational qualifications were categorized into four analytic groups: secondary or less, some university-no degree, trade/certificate/diploma, and bachelor's degree or greater.

Country of Birth

Two hundred and sixty seven countries of birth were grouped into nine categories for the analysis: Europe, Africa, East Asia, West/Central Asia, South East/South Asia, Eurasia/Oceania North America/Australia/New Zealand, Caribbean, Central, South America/Mexico, and Unknown/Stateless.

Mother Tongue

Two hundred and forty four mother tongues were grouped into seven analytic categories: English/French, Chinese, Punjabi, Tagalog, Spanish, Persian, and Other.

Immigration Category

Thirty immigration categories were grouped into four categories for the analysis: family class, refugee class, economic class, and others.

Family Class

Family class included two groups: principal applicants and spouse/dependents.

3.6 Data Analysis

3.6.1 Descriptive Analyses

Descriptive statistics (proportions) were performed for the characteristics of the study sample by immigration status. Confidence intervals at the 95% level are provided for all estimates. Chi-square tests were used to determine if there were differences in proportions between immigration status and confounding/moderating variables with respect to disability duration. In Stata, the "chi2" option was used with the "tabulate" command to obtain the test statistic and its associated p-value (UCLA, 2016).

3.6.2 Analytical Analyses

Work disability duration was defined as the total number of disability days paid in the first calendar year after injury, censored at 260 days. Differences in disability duration by immigration status were examined at the 25th, 50th and 75th percentiles of the distribution using quantile regression. All data analyses were conducted using the statistics software Stata 14 SE (StataCorp. 2015).

Quantile regression coefficients estimate the effect of an independent variable on a specific quantile of a dependent variable. Quantile regression is appropriate for examining skewed distributions that are best described using medians instead of means (Stoltzfus, Nishijima, & Melnikow, 2012). It allows for the investigation of different effects for those who may have the longest disability durations as unique sub-groups within the study population (Hogg-Johnson & Cole, 2003). As Cook and Manning (2013) described:

The main advantage of quantile regression methodology is that the method allows for

understanding relationships between variables outside of the mean of the data, making it useful in understanding outcomes that are non-normally distributed and that have non- linear relationships with predictor variables (p. 58)

A series of quantile regression models examined the relationship between immigration status and disability duration, with the first model (the unadjusted model) including the outcome and the explanatory variable only. The second model adjusted for sex and age, and subsequent models (models 3 to 6) were progressively adjusted for occupation, injury type, injury year, and previous claims. Models were also stratified by age (<35 years and 35-64 years) and sex (male versus female) to investigate interaction effects.

3.6.3 Sensitivity Analyses

Three sensitivity analyses were conducted to examine how the relationship between immigration status and disability duration may change if the data were restricted to injuries that resulted in fractures, first claims, or injuries that had occurred between 2004 and 2012.

Fractures Only Model

In order to investigate if differences in the type of injury account for differences in disability duration, the data were restricted to injuries that resulted in fractures. While strains and sprains have much more variability in their treatment and recovery windows, fractures are more consistent. Therefore, eliminating the variability in the injury may clarify the underlying relationship between immigration status and work disability duration. Fractures were defined as injuries resulting in "fractures," "fractures and burns," and "fractures and other injuries," using nature of injury codes (NOI) in the workers' compensation claims file.

First Claims Only Model

Canadian-born workers are more likely to have previous claims because they have been in the Canadian labour market for a longer period of time, compared to immigrant workers. Research showed that having a previous claim increases disability durations (Ruseckaite & Collie, 2011). Therefore, a higher proportion of previous claims among Canadian-born workers might have lengthened their disability durations, and, subsequently, biased my results towards the null. In order to eliminate this bias, those with a claim in the previous two years were excluded.

Injury Year 2004-2012

Preliminary analyses of the data showed that the compositions of immigrants changed across time. Specifically, a higher proportion of claims in earlier years (before 2004) were from recent immigrants and the converse was true for established immigrants. This trend, however, changed after 2004, when the distribution of claims stabilized across recent and established immigrants.

In order to rule out the influence of time trends on the relationship between immigration status and short-term disability days paid, a model was run for the data restricted to claims for the period 2004 to 2012.

3.6.4 Post-hoc Analysis

Given the heterogeneity among immigrants to Canada, it is important to explore a variety of socio-demographic and claim characteristics when evaluating differences between immigrant and Canadian-born workers. Describing the characteristics of recent and established immigrants could also provide insight into whether these characteristics predict differences

in disability durations between recent and established immigrants, as well as between immigrants as a group and Canadian-born workers.

Socio-demographic and claim characteristics, such as occupation, injury type, education and family status, were investigated by age and sex as well as by recent and established immigration status.

Chapter 4. Results

4.1 Descriptive Results

There were differences in the distribution of injury claims by immigration status across all covariates, including sex, age, occupation, nature of injury, injury year, and previous claims. Table 4 describes baseline socio-demographic, occupation and injury characteristics of claims for injured workers who had an accepted claim between 1995 and 2012, by their immigration status.

Overall, 29.6% of the entire cohort was female, with a higher proportion of women among established immigrants (35.9%) and a lower proportion among recent immigrants (26.6%). The majority of the cohort was older than 35 years of age (61.6%), with a slightly higher proportion of older workers among recent immigrants (62.5%) and a much higher proportion among established immigrants (94.2%).

Overall, 34.5% of injured workers' claims came from sales and service occupations, 21.3% from trades and transport, 11.3% from process and manufacturing, and 7.3% came from health occupations. The proportion of established immigrants in health occupations (13.5%) was almost twice as large as recent immigrants (6.3%) and Canadian-born workers (7.2%). Compared to recent immigrants (24%) and Canadian-born workers (21%), a higher proportion of established immigrants came from sales and service occupations (26.8%). Compared to established immigrants (16.5%) and Canadian-born workers (10.6%), a higher proportion of recent immigrants came from processing and manufacturing occupations (18.5%). Compared to recent (27.2%) and established immigrants (30%), a higher proportion of Canadian-born workers came from trades and transport occupations (35.2%).

In recent years, a higher proportion of claims were from established immigrants (e.g. 2010-2012: 26.5%) compared to recent immigrants (e.g. 2010-2012: 13.35).

Overall, 58.4% of the cohort had strains injury claims. The proportion of strain injury claims was similar for Canadian-born workers (58.7%) and established immigrants (59.4%) and lower among recent immigrants (50.9%). Canadian-born and established immigrants had similar portions of previous claims at 23.4% and 21.5% respectively, while recent immigrants had a lower proportion of previous claims at 18.4%.

| | Immigrants | | | | | Canadian-born | | chi2 ^g |
|-----------------------------------|---------------------|--------------------|--------------------------|-----------|------|---------------|------------|-------------------|
| | | | | n=805,221 | | 005,050 | p - | |
| | Recent ^b | | Established ^c | | | | | |
| | n=46,882 | | n=3 | 1,727 | | | | |
| Variables | % ^d | 95%CI ^e | % | 95%CI | % | 95%CI | % | |
| Sex | | | | | | | | *** |
| Men | 73.4 | 72.9-73.7 | 64.4 | 63.5-64.6 | 70.5 | 70.3-70.5 | 70.4 | |
| Women | 26.6 | 26.2-27.0 | 35.9 | 35.4-36.5 | 29.5 | 29.4-29.6 | 29.6 | |
| Age | | | | | | | | *** |
| Younger (<35) | 37.5 | 37.1-37.9 | 5.8 | 5.5-6.1 | 39.7 | 39.6-39.8 | 38.3 | |
| Older (35-64) | 62.5 | 62.0-62.9 | 94.2 | 93.8-94.4 | 60.3 | 60.2-60.4 | 61.6 | |
| Occupation | | | | | | | | *** |
| Management | 1.3 | 1.2-1.4 | 1.7 | 1.6-1.9 | 1.5 | 1.5-1.6 | 1.5 | |
| Business | 3.7 | 3.5-3.9 | 4.1 | 3.9-4.3 | 4.0 | 3.8-4.1 | 3.9 | |
| Natural/App. Sc. | 1.2 | 1.1-1.3 | 1.1 | 1.0-1.2 | 1.2 | 1.1-1.2 | 1.2 | |
| Health | 6.3 | 6.1-6.5 | 13.5 | 13.2-13.9 | 7.2 | 7.1-7.2 | 7.3 | |
| Social Science | 1.3 | 1.2-1.4 | 2.2 | 2.1-2.4 | 2.3 | 2.2-2.3 | 2.2 | |
| Art/Culture | 0.6 | 0.5-0.7 | 0.5 | 0.4-0.6 | 1.1 | 1.0-1.1 | 1.0 | |
| Sales/Service | 24.0 | 23.5-24.3 | 26.8 | 26.3-27.2 | 21.0 | 20.8-21.0 | 21.3 | |
| Trades/Transp. | 27.0 | 26.7-27.6 | 30.0 | 29.5-30.5 | 35.0 | 35.0-35.2 | 34.53 | |
| Primary | 3.0 | 2.7-3.0 | 2.3 | 2.1-2.5 | 4.6 | 4.5-4.6 | 4.4 | |
| Process/Manuf. | 18.5 | 18.1-18.8 | 16.5 | 16.1-16.9 | 10.6 | 10.5-1.7 | 11.3 | |
| Unspecified pre-1997 | 13.0 | 12.7-13.3 | 1.2 | 1.0-1.3 | 11.5 | 11.4-11.6 | 11.2 | |
| or between 1999-2000 ^t | | | | | | | | |
| Nature of Injury | | | | | | | | *** |
| Strain | 50.9 | 50.4-51.3 | 59.4 | 58.8-59.9 | 58.7 | 58.6-58.8 | 58.4 | |
| Acute | 49.1 | 48.6-49.5 | 40.6 | 40.0-41.1 | 41.3 | 41.1-41.4 | 41.6 | |
| Injury Year | | | | | | | | *** |
| 1995-1997 | 19.6 | 19.3-2.0 | 2.5 | 2.3-2.7 | 18.1 | 18.0-18.1 | 17.6 | |
| 1998-2000 | 18.3 | 17.9-18.7 | 7.4 | 7.1-7.6 | 17.8 | 17.7-17.9 | 17.5 | |
| 2001-2003 | 16.7 | 16.4-17.1 | 15.6 | 15.2-16.0 | 17.2 | 17.1-17.3 | 17.1 | |
| 2004-2006 | 16.0 | 15.7-16.3 | 21.9 | 21.4-22.3 | 17.2 | 17.1-17.3 | 17.3 | |
| 2007-2009 | 16.0 | 15.7-16.3 | 26.2 | 25.7-26.7 | 16.3 | 16.2-16.4 | 16.6 | |
| 2010-2012 | 13.3 | 13.0-13.6 | 26.5 | 26.0-26.9 | 13.3 | 13.3-13.4 | 14.0 | |
| Previous Claims ^h | | | | | | | | *** |
| Yes | 18.4 | 18.0-18.7 | 21.5 | 21.0-21.9 | 23.4 | 23.3-23.5 | 23.1 | |
| No | 81.6 | 81.2-81.9 | 78.5 | 78.1-79.0 | 76.6 | 76.5-76.7 | 77.0 | |

Table 4. Socio-demographic characteristics of claims for all injured workers, who had an accepted claim between 1995 and 2012, by immigration status

^a * p<0.05, ** p<0.01, *** p<0.001 ^b Recent = Less than 10 years in Canada

^c Established = 10 years or more in Canada

^d Column percentages

^e 95% CI = 95% confidence interval

^f Prior to 1997 and between 1999 and 2000, there were a large proportion of claims that had unspecified occupation due to system/classification scheme change in 1997, so occupation was not present in the first 2 years of our data)

^g This is a chi-square statistics that test the assumption of independence of proportions across columns

^h Previous claims in the past 2 years

4.2 Analytical results

Quantile Regression Results

In the unadjusted models examining the relationship between immigration status and work disability duration, the results show, at each of the 25th, 50th, and 75th percentiles, that established immigrant workers had longer disability durations than recent immigrants and that both groups of immigrants had longer disability durations than Canadian-born workers. For example, at the 50th percentile, established immigrants had disability durations five days longer (CI: 4.9-5.0) and recent immigrants two days longer (CI: 1.9-2.0), compared to Canadian-born workers. The fact that confidence intervals do not overlap and are narrow indicates a precise estimation of the model estimates.

The inclusion of sex and age attenuated the relationship between immigration status and short-term disability duration. With the inclusion of occupation, the strength of the relationship increased for recent immigrants, but not for established immigrants. Once nature of injury was added, the strength of the relationship for both recent and established immigrants increased. No additional changes were observed after controlling for injury year and previous claims. Based on the above findings, and a priori conceptualization of variables associated with immigration status and disability duration, the final models included all of the potential confounders/covariates.

Table 5 depicts differences in disability durations between immigrants and Canadian-born injured workers at the 50th percentile of the distribution for one unadjusted and five adjusted models.

| | Unadjusted Model [95% CI] | Model 1 [95% CI] | Model 2 [95% CI] | Model 3 [95% CI] | Model 4 [95% CI] | Final Model Model 5 [95% CI] |
|---|--|---|--|---|--|--|
| Immigration Status | | | | | | |
| <10 years in Canada >=10 years in Canada Canadian-born | 2.0 [1.9-2.0] 5.0 [4.9-5.0] Ref. | 1.4 [1.2-1.6] 2.9 [2.7-3.2] Ref. | 1.8 [1.6-2.0] 3.0 [2.8-3.3] Ref. | 2.2 [1.9-2.4] 3.3 [3.0-3.6] Ref. | 2.2 [1.9-2.4] 3.2 [2.9-3.4] Ref. | 2.2 [1.9-2.4] 3.2 [2.9-3.4] Ref. |
| Women Men | | 0.5 [0.4-0.6] Ref. | 0.7 [0.6-0.9] Ref. | 0.6 [0.5-0.7] Ref. | 0.5 [0.4-0.7] Ref. | 0.5 [0.4-0.7] Ref. |
| Age at Injury | | | | | | |
| Age Age-squared | | 0.2 [0.2-0.2] 0.0005 [0.0002-0.001] | 0.1 [0.1-0.2] 0.001 [0.001-0.002] | -0.02 [-0.1-0.0] 0.00 [0.002-0.003] | -0.01 [-0.0-0.0] 0.002 [0.002-0.003] | -0.01 [-0.0-0.0] 0.002 [0.002-0.003] |
| Occupation | | | | | | |
| Management Business, Finance, Admin Natural, Applied science Health Social science, Educ. Art, Culture, Rec., Sport Trades, Transport, Equip. Primary Processing, Manuf., Util. Unspecified pre-1997 or between 1999-2000 Sales, Service Injury Type | | | 2.0 [1.6-2.4] -0.7 [-1.00.4] -0.1 [-0.5-0.4] 5.3 [5.0-5.5] -3.0 [-3.42.7] 1.8 [1.3-2.3] 1.8 [1.7-2.0] 6.5 [6.2-6.7] -0.6 [-0.8 -0.4] 0.3 [0.2 -0.5] Ref. | 1.6 [1.2-2.0] -1.4 [-1.71.1] -0.4 [-0.9-0.1] 3.9 [3.7-4.1] -3.3 [-3.73.0] 1.2 [0.7-1.7] 1.5 [1.3-1.6] 6.1 [5.9-6.4] -0.3 [-0.50.1] 0.3 [0.1-0.4] Ref. | 1.6 [1.2-2.0] -1.4 [-1.61.1] -0.5 [-1.00.1] 3.9 [3.6-4.1] -3.3 [-3.73.0] 1.2 [0.7-1.7] 1.4 [1.3-1.6] 6.1 [5.9-6.4] -0.3 [-0.40.1] 0.6 [0.3-0.9] Ref. | 1.6 [1.2-2.0] -1.4 [-1.71.1] -0.5 [-1.00.0] 3.9 [3.7-4.1] -3.3 [-3.62.9] 1.2 [0.7-1.7] 1.4 [1.3-1.6] 6.2 [5.9-6.4] -0.2 [-0.40.1] 0.6 [0.4-0.9] Ref. |
| Strains Injuries Acute Injuries | | | | 4.8 [4.7-4.9] Ref. | 4.8 [4.7-4.9] Ref. | 4.8 [4.7-4.9] Ref. |

| Table 5. Differences in disability durations between immigrants and Canadian-born injured workers at the 50 th |
|---|
| percentile of the distribution for adjusted and unadjusted models |

| | Unadjusted | | | | | Final Model |
|-------------------------------|---------------|---------------|---------------|---------------|----------------|----------------|
| | Model | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 |
| | | | | | | |
| | [95% CI] | [95% CI] |
| Injury Year | | | | | | |
| 1995-1997 | | | | | Ref. | Ref. |
| 1998-2000 | | | | | 0.3 [0.1-0.5] | 0.3 [0.1-0.5] |
| 2001-2003 | | | | | 0.3 [0.1-0.6] | 0.3 [0.1-0.6] |
| 2004-2006 | | | | | 0.2 [-0.0-0.4] | 0.2 [-0.0-0.4] |
| 2007-2009 | | | | | 0.2 [-0.0-0.4] | 0.2 [-0.0-0.4] |
| 2010-2012 | | | | | 1.4 [1.2-1.7] | 1.5 [1.2-1.7] |
| Previous Claim in Past | | | | | | |
| 2 Years | | | | | | |
| Yes | | | | | | -0.2 [-0.30.0] |
| No | | | | | | Ref. |
| Constant | 9.0 [9.0-9.0] | 1.1 [0.6-1.6] | 1.4 [0.9-1.9] | 2.5 [2.0-3.0] | 1.9 [1.4-2.5] | 2.0 [1.4-2.5] |
| Ν | 883830 | 883830 | 883830 | 880364 | 880364 | 880364 |

Results for Covariates in the Final Model

Being a woman increased the disability duration by half a day (CI: 0.4-0.7). Age also had a significant effect on the relationship between immigration status and short-term disability duration for the study cohort, over the study period (age-squared: 0.002 days, CI: 0.002-0.003) (see Table 5).

Compared to injured workers from sales and services occupations, those in occupations from business, finance, and administration (-1.4 days, CI: -1.7- -1.1), and social science, education and government (-3.3 days, CI: -3.6- -2.9) had shorter disability durations; while, those in occupations from primary resources (6.2 days, CI: 5.9-6.4), health care (3.9 days, CI: 3.7- 4.1), trades and transport (1.4 days, CI: 1.3-1.6), management (1.6 days, CI: 1.2-2), and art, culture, recreation and sport (1.2 days, CI: 0.7-1.7) had longer disability durations.

Workers with strain injury claims had disability durations that were almost five days longer (CI: 4.7-4.9), compared to those with acute injuries. Compared to workers with an injury claim between 1995 and 1997, those with a claim between 2010 and 2012, had disability durations that were one and a half days longer. No significant difference was observed between those with and without a previous claim in the past two years (-0.2 days, CI:-0.3-0.0).

Post Estimation Tests

"Lincom computes point estimates, standard errors, t or z statistics, p-values, and confidence intervals for linear combinations of coefficients after any estimation command" (Stata13 Manual). In the final model, post estimation tests comparing the difference in disability duration between recent and established immigrants (established - recent), indicated a

disability duration difference of 0.2 days (CI: 0.1-0.2) at the 25th percentile of the distribution, a difference of 1.0 day (CI: 0.7-1.4) at 50th percentile, and a difference of 1.5 days (0.3-2.6) at 75th percentile. Since confidence intervals did not cover "0", the differences between recent and established immigrants were different from zero at a 95% confidence level. Post estimate tests for the unadjusted and adjusted models at the 50th percentile of the distribution are provided in Table 1.1 (see Appendix A).

Final Model Results

Table 6 and Figure 2 show the differences in disability durations between immigrants and Canadian-born workers, at the 25th, 50th, and 75th percentiles of the distribution for the final model. Results showed that both recent and established immigrants had longer work disability durations than Canadian-born workers, and that established immigrants had longer disability durations than recent immigrants, at all points of the distribution (Recent: 25th %, 0.9 days, 95% CI: 0.8-0.9; 50th %, 2.2 days, CI: 1.9-2.4; 75th%, 4.3 days, CI: 3.5-5.1; Established: 25th%, 1.0 day, CI: 0.9-1.1; 50th%, 3.2 days, CI: 2.9-3.4; 75th%, 5.8 days, CI: 4.8-6.7).

Sex Stratified Results

Tables 7 and Figure 3 present sex stratified results at the 25th, 50th, and 75th percentiles of the distribution. Effect modification by sex was found for recent immigrants. The relationship between immigration status and disability duration was stronger for recent immigrant men (75th%, 6.0 days, CI: 5.1-6.5) than for recent immigrant women (75th%, 0.1 days, CI: -1.3-1.6). Disability durations for established immigrant men (75th%, 5.3 days, CI: 4.2-6.5) and
women were similar, with women having slightly longer disability durations (6.0 days, CI: 4.5-7.5).

There was no indication that the disability durations of recent immigrant women were longer than those of their Canadian-born counterparts at any point of the distribution. However, recent immigrant men had significantly longer disability durations than their Canadian-born counterparts and showed a disability duration gradient across different points of the distribution, ranging from the lowest at the 25th percentile to the highest at the 75th percentile (Recent: 25th %, 0.9 days, 95% CI: 0.8-1.0; 50th %, 2.4 days, CI: 2.2-2.6; 75th%, 6.0 days, CI: 5.1-6.5; Established: 25th%, 0.9 days, CI: 0.8-1.0; 50th%, 2.7 days, CI: 2.4-3.0; 75th%, 5.3 days, CI: 4.2-6.5).

Age Stratified Results

Tables 8 and Figure 4 present age stratified results at the 25th, 50th, and 75th percentiles of the distribution. There was strong effect modification by age. Results of the age-stratification model showed that the relationship between disability duration and immigration status was stronger for younger immigrant workers (Recent: 75th%, 7.8 days, CI: 6.8-8.7; Established: 13.1 days, CI: 10.3-16.0) than for older immigrant workers (Recent: 75th%, 1.3 days, CI: 0.1-2.4; Established: 4.4 days, CI: 3.2-5.5), at all points of the distribution.

Like recent immigrant women, recent older immigrant workers did not show any indication that their disability durations were different from those of their Canadian-born counterparts at any point of the distribution.

Table 6. Differences in disability durations between immigrants and Canadian-born injured workers at 25th, 50th, and 75th percentiles of the distribution for the final model

| | Main Effect | | |
|----------------------|-----------------------------|-----------------------------|-----------------------------|
| | 25 th % [95% CI] | 50 th % [95% CI] | 75 th % [95% CI] |
| Immigration Status | | | |
| <10 years in Canada | 0.9 [0.8-0.9] | 2.2 [1.9-2.4] | 4.3 [3.5-5.1] |
| >=10 years in Canada | 1.0 [0.9-1.1] | 3.2 [2.9-3.4] | 5.8 [4.8-6.7] |
| Canadian-born | Ref. | Ref. | Ref. |
| Ν | 880364 | 880364 | 880364 |

Table 7. Differences in disability durations between immigrants and Canadian-born injured workers at 25th, 50th, and 75th percentiles of the distribution for sex-stratified, final model

| | Men | | |
|----------------------|-----------------------------|-----------------------------|-----------------------------|
| | 25 th % [95% CI] | 50 th % [95% CI] | 75 th % [95% CI] |
| Immigration Status | | | |
| <10 years in Canada | 0.9 [0.8-1.0] | 2.4 [2.2-2.6] | 6.0 [5.1-6.5] |
| >=10 years in Canada | 0.9 [0.8-1.0] | 2.7 [2.4-3.0] | 5.3 [4.2-6.5] |
| Canadian-born | Ref. | Ref. | Ref. |
| Ν | 620111 | 620111 | 620111 |
| | Women | | |
| | 25 th % [95% CI] | 50 th % [95% CI] | 75 th % [95% CI] |
| Immigration Status | | | |
| <10 years in Canada | 0.6 [0.5-0.8] | 1.3 [0.8-1.9] | 0.1 [-1.3-1.6] |
| >=10 years in Canada | 1.2 [1.0-1.3] | 4.0 [3.4-4.6] | 6.0 [4.5-7.5] |
| Canadian-born | Ref. | Ref. | Ref. |
| Ν | 260253 | 260253 | 260253 |

Table 8. Differences in disability durations between immigrants and Canadian-born injured workers at 25th, 50th, and 75th percentiles of the distribution for age-stratified, final model

| | Young (<35) | | |
|----------------------|-----------------------------|-----------------------------|-----------------------------|
| | 25 th % [95% CI] | 50 th % [95% CI] | 75 th % [95% CI] |
| Immigration Status | | | |
| <10 years in Canada | 1.0 [0.8-1.1] | 3.3 [3.1-3.5] | 7.8 [6.8-8.7] |
| >=10 years in Canada | 2.0 [1.5-2.5] | 6.0 [5.2-6.6] | 13.1 [10.3-16.0] |
| Canadian-born | Ref. | Ref. | Ref. |
| Ν | 337955 | 337955 | 337955 |
| | Older (35-64) | | |
| | 25 th % [95% CI] | 50 th % [95% CI] | 75 th % [95% CI] |
| Immigration Status | | | |
| <10 years in Canada | 0.7 [0.6-0.8] | 1.5 [1.1-1.8] | 1.3 [0.1-2.4] |
| >=10 years in Canada | 1.0 [0.9-1.1] | 3.0 [2.6-3.3] | 4.4 [3.2-5.5] |
| Canadian-born | Ref. | Ref. | Ref. |
| Ν | 542409 | 542409 | 542409 |

Figure 2. Differences in disability durations between immigrants and Canadianborn injured workers for the final model



Figure 3. Differences in disability durations between immigrants and Canadianborn injured workers for sex-stratified, final model



Figure 4. Differences in disability durations between immigrants and Canadianborn injured workers for age-stratified, final model



4.3 Sensitivity Tests Results

Tables 9, 10, and 11 show the differences in disability durations between immigrants and Canadian-born workers at 25th, 50th, and 75th percentiles of the distribution for fractures-only, first-claims-only, and 2004-2012-only models, respectively.

Results of sensitivity tests were consistent with those of the final model in most cases. Restricting the cohort to injured workers' first claim or to 2004-2012 years did not change the magnitude and direction of effects observed in the final model. However restricting the claims to fractures-only injuries increased the strength of the relationship between immigration status and short-term disability duration observed in the final model (Main Model: 50th%, Recent: 2.2 days, CI: 1.9-2.4; Established: 3.2 days, CI: 2.9-3.4; Fractures Model: 50th%, Recent: 15.5 days, CI: 13-18.3; Established: 12.1 days, CI: 8.7-15.4).

Moreover, the fractures-only model was the only model where recent immigrants (75th%, 26.4 days, CI: 20.2-29.1) had slightly longer short-term disability durations than established immigrants (75th%, 21.8 days, CI: 14.5-29.1). The difference between recent and established immigrants, however, was not statistically significant because the confidence interval of the lincom test included "0." Therefore, the difference between recent and established immigrants may not be different from zero at 95% confidence level. In the fractures-only model, post estimation tests, comparing the difference between recent and established immigrants (e.g. established - recent), were 1.2 (CI: -1.5-3.9) at 25th percentile of the distribution, 3.4 (CI: -0.8-7.7) at 50th percentile, and 4.6 (-4.7-13.9) at 75th percentile.

Table 9. Differences in disability durations between immigrants and Canadian-born injured workers at 25th, 50th, and 75th percentiles of the distribution for the fractures-only model

| | Final Model | | |
|----------------------|-----------------------------|-----------------------------|-----------------------------|
| | 25 th % [95% CI] | 50 th % [95% CI] | 75 th % [95% CI] |
| Immigration Status | | | |
| <10 years in Canada | 9.3 [7.5-11.1] | 15.5 [13.0-18.3] | 26.4 [20.2-29.1] |
| >=10 years in Canada | 8.1 [6.0-10.2] | 12.1 [8.7-15.4] | 21.8 [14.5-29.1] |
| Canadian-born | Ref. | Ref. | Ref. |
| Ν | 55324 | 55324 | 55324 |

Table 10. Differences in disability durations between immigrants and Canadianborn injured workers at 25th, 50th, and 75th percentiles of the distribution for the 1st claim-only model

| | Final Model | | |
|----------------------|-----------------------------|-----------------------------|-----------------------------|
| | 25 th % [95% CI] | 50 th % [95% CI] | 75 th % [95% CI] |
| Immigration Status | | | |
| <10 years in Canada | 0.8 [0.7-0.8] | 2.0 [1.8-2.2] | 4.3 [3.6-5.1] |
| >=10 years in Canada | 0.9 [0.8-1.0] | 2.6 [2.3-2.9] | 5.2 [4.1-6.2] |
| Canadian-born | Ref. | Ref. | Ref. |
| Ν | 485746 | 485746 | 485746 |

Table 11. Differences in disability durations between immigrants and Canadianborn injured workers at 25th, 50th, and 75th percentiles of the distribution for the 2004-2012-only model

| | Final Model | | |
|----------------------|-----------------------------|-----------------------------|-----------------------------|
| | 25 th % [95% CI] | 50 th % [95% CI] | 75 th % [95% CI] |
| Immigration Status | | | |
| <10 years in Canada | 0.7 [0.6-0.8] | 2.1 [1.7-2.5] | 4.4 [3.1-5.7] |
| >=10 years in Canada | 1.1 [1.0-1.2] | 3.3 [2.9-3.6] | 5.0 [3.8-6.3] |
| Canadian-born | Ref. | Ref. | Ref. |
| Ν | 419705 | 419705 | 419705 |

4.4 Post-hoc Results

Results of the final model showed that immigrants had longer disability durations than Canadian-born workers after adjusting for all covariates, except for recent immigrant women and recent older immigrant workers, who looked most like Canadian-born workers in their disability durations. Differences in the distribution of claim characteristics were investigated to see if they could explain differences in disability durations among different immigrant groups. Tables 12 and 13 (see Appendix B) describe claim characteristics for injured immigrant workers, by immigration status and sex and age, respectively.

Differences by Immigration Status and Sex

Compared to recent immigrant men, a higher proportion of recent immigrant women were older (66.4% vs. 61.1%), came from occupations in health care (19.7% vs. 1.5%) and sales and service (42.3% vs. 17.3%), had strains injuries (59.6% vs. 47.7), had a lower proportion of previous claims (14.3% vs. 20%), had a Bachelor's degree or greater (29% vs. 24.8%), and came to Canada from East Asia (20.5% vs. 17%) from within the economic immigration category (52.4% vs. 35.9%).

Differences by Immigration Status and Age

Compared to recent, younger immigrants, a higher proportion of recent older immigrants were women (28.3% vs. 23.8%), came from occupations in health care (7.7% vs. 4.2%) and sales and service (25.8% vs. 20.8%), had strains injuries (53% vs. 47.5%), had a Bachelor's degree or greater (30.2% vs. 18.8%), and came to Canada from East Asia (22.3% vs. 10.6%) from within the economic immigration category (52.1% vs. 20.8%).

Chapter 5. Discussion

5.1 Summary of Main Findings

The study makes two contributions to understanding the relation between immigration status and work disability duration. First, consistent with the first hypothesis, overall, injured immigrant workers had longer short-term disability durations compared to Canadian-born counterparts. The results persisted even after controlling for a variety of confounders, suggesting that differences in disability duration between immigrant and Canadian-born workers could not be explained by the differential distribution of sex, age, occupation, injury type, injury year and whether or not the worker had a previous claim. It appears that immigration status influences work disability duration independent of these variables.

These findings are consistent with Strong and Zimmermen's study (2005) that found that immigrant workers take more workdays off after an occupational injury, compared to USborn workers. In their study, the findings also persisted after controlling for demographic, occupational, and specific work-related factors. Strong and Zimmerman attributed the immigrant workers' longer disability durations to their more severe injuries and illnesses, differential wage replacement rates, and poorer overall perceptions of work due to discrimination, compared to non-immigrant workers.

Based on the study's conceptual framework and the table of individual, labour market and social context factors, immigrants' longer disability durations, compared to Canadian-born counterparts, may be attributed to their shorter job tenure and higher rates of serious injuries. Similarly, Krause and colleagues showed a positive relationship between injury severity and work disability duration and an inverse relationship between shorter job tenure and work

disability duration. This study, however, identifies additional factors, such as lower English proficiency and greater difficulties in navigating the workers' compensation and healthcare systems as possible explanations for immigrant workers' longer disability durations.

Second, contrary to my second hypothesis, established immigrant workers had longer disability durations than recent immigrants. Based on the study's conceptual framework, a longer disability duration for recent immigrants was hypothesized as compared to established immigrants because recent immigrant workers are more likely to have lower English proficiency and shorter job tenure, and attain more serious injuries because of their greater likelihood of working in dangerous occupations (Orrenius & Zavodny, 2009; Premji et al., 2010). However, these results can be explained by other factors that have been identified in my conceptual framework, such as job security and financial stability. Recent immigrants may be more motivated to return to work faster due to their higher levels of job insecurity and financial problems. They are more likely to have financial problems because they might be paying off debts associated with resettlement in their new country, sending money back home to friends or family, saving money to sponsor their immediate family members, and earning a lower income, compared to established immigrants with more social and financial support and resources, job security, and higher levels of income (Kosny et al., 2011; Morissette & Sultan, 2013; Chun & Cheong 2011; Statistics Canada, 2015c).

As well, the post hoc results showed that established immigrants had higher incidence of strain injuries and were more likely to work in health occupations, both of which have been associated with longer work disability durations (see Tables 12 and 13, Appendix B). The proportion of injured established immigrants in health occupations was almost twice as large as recent immigrants. Healthcare workers in Canada have the highest rate of lost-time claims

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and work absence of any sector (Engst et al., 2004 as cited in Franche et al., 2011). Immigrant workers with strain injuries are likely to have longer disability durations as they have more difficulties demonstrating the disabling nature of their injuries but also the link between work and injury, compared to those with acute injuries.

The observed longer disability duration among established immigrant, compared to recent immigrants, may be due in part to a decline in immigrants' overall health over time and a higher incidence of comorbidities among established immigrants, both of which have been shown to increase the duration of claims. Declines in health have been demonstrated to prolong the duration of work disability in a number of studies (Krause et al., 2001). Also, research in Canada showed that while the incidence of chronic conditions, such as diabetes, heart disease and arthritis, is lower among recent immigrants, it approaches native-born levels with increased length of time in Canada (Perez, 2002; McDonald & Kennedy, 2004).

Age Stratified Results

The age-stratified analysis yielded two main findings. First, the relationship between immigration status and work disability duration was greater for younger than for older injured immigrant workers. That is, younger immigrant workers had disability durations longer than Canadian-born counterparts of the same age, while older worker had similar disability durations compared to their Canadian-born counterparts. The finding that recent older immigrants had similar disability durations as Canadian-born workers of the same age can be explained by results of the post hoc analysis that showed that recent older immigrants have characteristics that would differentiate them from established older immigrants, and in some cases from recent younger immigrant workers. For example, compared to established older and recent younger immigrant workers, recent older immigrants had a higher proportion of Bachelor's degree or higher education and a lower proportion of secondary education or lower (see Table 13). Early return to work after an occupational injury has been associated with higher education (Hou et al., 2008). As well, a higher proportion of recent older immigrants were admitted to Canada under the economic class. Immigrants in the economic category are chosen for their skills and ability to contribute to the Canadian economy; thus, they might be particularly motivated to return to work faster (Statistics Canada, 2015d). As such, recent older immigrants have a higher socioeconomic status based on a combination of their education and economic class. A higher socioeconomic status has been linked to better health outcomes (Chen & Miller, 2013).

Second, younger immigrant workers who have been in Canada for 10 years or more had longer disability durations than their Canadian-born counterparts, compared with those who have been in Canada for less than 10 years. This finding can be explained by the results of the post hoc analysis that showed that established younger immigrants in this study were more likely to have arrived in Canada at a younger age (less than 18 years old), compared with recent younger immigrants, who were more likely to have arrived in Canada at an older age (older than 18) (see Table 13). It is therefore possible that younger established immigrant workers were more likely to be the dependent of an immigrant at the time of this study's data analysis; whereas, younger recent immigrant workers were more likely to be the economic head of their family, a role with more incentive to go back to work earlier. However, this interpretation needs to be explored by future research.

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Sex Stratified Results

Sex-stratified results showed that the relationship between immigration status and work disability duration was greater for immigrant men than for immigrant women. That is, compared to injured female immigrant workers, injured immigrant men had longer disability durations than Canadian-born workers of the same sex. Recent immigrant women had similar disability durations as Canadian-born women. The finding that recent immigrant women had similar disability durations as their Canadian-born counterparts can be explained by results of the post hoc analysis that showed that compared to established immigrant women and recent immigrant men, a higher proportion of recent immigrant women had a Bachelor's degree or greater and were admitted under the economic class (see Tables 12). A recent Canadian study (Hudon, 2015) also showed that 50% of recent immigrant women but only 38% of all immigrant women had a university certificate or degree.

As well, compared to established immigrant women, a higher proportion of recent immigrant women, were principal applicants. Principal applicants in the economic category must have educational credentials, work experience, and language skills that make them likely to succeed in the Canadian labour market (Kosny et al., 2012). As such, recent immigrant women's lower disability durations may represent their higher socioeconomic status that is associated with better health outcomes due to being knowledgeable about resources and accessing and navigating these resources (Chen & Miller, 2013).

Recent immigrant women also have characteristics that might advantage them compared with Canadian-born women. According to the 2011 National Household Survey, 13.6% of recent immigrant women aged 25 to 54 had a masters or doctorate degree, compared to 4.9% of Canadian-born women of the same age (Hudon, 2015).

Sensitivity Analysis

Restricting the claims to fractures-only injuries increased the strength of the relationship between immigration status and short-term disability duration. That is, controlling for type of injury increases the differences in work disability duration between immigrant and Canadianborn workers. This suggests that differences found in the final model may have been confounded by the type of injury in a way that biases the difference towards the null.

5.2 Strengths and Limitations

To my knowledge this is the first study to examine differences in work disability duration between immigrant and Canadian-born workers within a Canadian context. This study represents a unique opportunity given access to linkable, comprehensive data to investigate the effect of immigration status on workers' compensation experiences/outcomes.

The strength of this study was the use of detailed and comprehensive workers' compensation claims data, linked to the immigration data at the individual worker-level, as well as the ability to control for a rich set of confounders and covariates across multiple domains known to impact both immigration status and work disability duration. Population Data BC's approach to data linkage allowed for protecting injured workers' privacy and consistency in the linking of data across the two data sets (workers' compensation claims data and CIC data) in order to assure a high-quality data linkage. The large sample size afforded the ability to examine effect modifications and perform sensitivity analyses.

A potential limitation of studies relying on administrative data is residual confounding from unmeasured variables. While, it is not possible to fully adjust for all factors related to the outcome, given a multifactorial etiology for immigrants' work disability duration and a reliance on retrospective administrative data, some residual confounding could have biased results in either increasing or decreasing disability durations. Although I have controlled for six well-documented predictors of work disability duration, there are a lot of variables that are associated with work disability duration that I was not able to examine. These variables may include socio-demographic and socioeconomic factors, such as income, education level, and job tenure; psychological factors, such as a history of depression, and clinical measures, such as comorbidity.

However, while I did not have direct measures of socioeconomic status, I was able to examine several measures closely aligned with socioeconomic factors, such as education and immigration category, in the post hoc analyses. As well, literature suggests that psychological factors are not major determinants of work disability outcomes (Franche & Krause, 2002). Finally, even though I did not control for comorbidity, I was able to control for previous claims, which is a strong predictor of subsequent claims (Ruseckaite & Collie, 2011).

5.3 Future Research Areas

Controlling for Other Confounding/Moderating/Mediating Variables

Our results demonstrated that the length of work disability among immigrant workers is the result of many influences other than –or in addition to- the effect of sex, age, occupation, injury year, injury type, and whether or not the worker has had previous claims in the past

two years. Given the multifaceted etiology of work disability duration among injured immigrant workers, special attention should be given to the control of variables that are identified in my conceptual framework but not included in the final model. These variables include wage or other indicators of socioeconomic status, job tenure, and comorbidity, as well as measures of language proficiency and psychosocial factors, such as supervisor support and job satisfaction.

The post hoc analyses suggest that socioeconomic status may be a major determinant of work disability duration among injured immigrant workers. This is consistent with our understanding of socioeconomic-health response relationship, as indicated by this study's results for recent older immigrants' and recent immigrant women's education levels, as well as measures of entering Canada on an economic immigration category. This provides an indication for future studies that socioeconomic status may be important when examining the relationship between immigration status and work disability duration.

One of the persistent determinants for return to work is the support of supervisors, as well as a multidisciplinary approach to return to work among the supervisor, the worker and the health care provider (Franche et al., 2011; Franche & Krause, 2002). It is possible that new and young immigrants may not have the same social connections to the workplace initially due to cultural and language barriers that might impede this multidisciplinary approach to successful return to work.

Perception of an inability to change jobs, poor relationships with coworkers, and low job satisfaction have also been found to prolong sickness absence in a number of studies (Krause et al., 2001; Gjesdal et al., 2009; Oh & Shin, 2003; Cheadle et al., 1994). However, these

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studies did not examine the effect of immigration status, making it difficult to determine the extent to which the relationship between immigration status and duration of work absence may be confounded by these psychosocial factors. Adjusting for such variables will help us better understand the complexity of the relationship between immigration status and disability duration.

Accounting for Diversity Across Immigration Categories

Since diversity in socioeconomic status, culture, and experiences before and after immigrating to Canada exists across immigrant groups, the simplified classification of "immigrant" versus "Canadian-born" would likely disguise some of this diversity (Xiang et al., 2012), especially with the implementation of different immigration policies as well as global influences, such as economics and warfare, influencing the immigrant cohorts over time. Refugees, for example, come to Canada to escape war or political or religious persecution; they come to Canada to survive. Economic immigrants, however, come to Canada to seek a better life and future for their children. Socio-demographic characteristics can vary greatly among different categories of immigrants. Immigrants who are admitted under the points system (economic class) and the business class have higher entry earnings than family class immigrants and refugees (Phythian et al., 2009). Immigrants who have prior Canadian work experience (Canadian experience immigration category) earn even more than the average Canadian-born worker in their first year after immigration (Statistics Canada, 2015).

Examining Return-to-Work Outcomes

The complexity of the relationship between immigration status and work disability duration could be better understood by examining immigrant and Canadian-born injured workers'

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return-to-work trajectories, capturing the recurrences of work absence, the persistence of disability, and return-to-work status within and beyond the first year after the injury. The individual, labour market and social context characteristics identified in this study's conceptual framework might also impact the immigrant workers' return-to- work trajectory and status. Return-to-work trajectories and outcomes are important because they may influence workers' health, financial costs, and workplace productivity (Fan et al., 2010).

Are Canadian-born workers more likely to have a sustained return-to-work, compared to immigrant workers? Are Canadian-born workers more likely to have full return-to-work, as opposed to immigrants' greater likelihood of partial return-to-work? Are younger immigrant workers more likely to return to work before full recovery resulting in adverse health outcomes that impact retention in labour force over the long term?

5.4 Policy Implications

This study found that injured immigrant workers had longer disability durations compared to Canadian-born counterparts and that established immigrants had longer disability durations than recent immigrants. The results persisted after adjusting for six confounders known to be associated with both immigration status and work disability duration.

Immigrants come to Canada already disadvantaged, compared to Canadian-born counterparts due to lower English proficiency, lack of knowledge about Canadian social and health care programs, and lack of Canadian education and workplace experiences, among others. The results of this study, together with the occupational segregation and earning differences that particular immigrant groups experience compared to Canadian-born workers, provide evidence that the initial disadvantages of immigrants persist and cannot be explained by differences in key demographic and work characteristics. Immigrants experience a real and persistent disadvantage in the Canadian labour market and this also persists with respect to work disability and return to work after work injury. While the exact mechanism underlying these results are not known, the results of this study indicate the need for a policy response that may improve work disability outcomes for immigrant workers.

Recommendations to WorkSafeBC

The workers' compensation system should develop work disability management programs that are sensitive to the fact that immigrants may need additional and ongoing support to help facilitate their return to work process. These programs might include providing immigrants with interpretation services or an advocate at the start of a claim and throughout the claim management process and through making information on Canadian workers' compensation and healthcare systems available in multiple languages and in a timely manner. There have been a number of initiatives by WorkSafeBC aimed at injured immigrant workers in the past few years. In 2009, WorkSafeBC offered general information, online resources, and forms in seven languages (Korean, French, English, Chinese, Spanish, Vietnamese, and Punjabi) (Kosny et al, 2011). These resources provide workers and employers with information on how to report a work-related injury and start a claim, as well as links to WorkSafeBC's translated health and safety publications. However, not all publications are translated for all language groups, and while the WorkSafeBC language sites offer translated links to necessary documents, some documents are only available in English (Kosny et al, 2011).

The workers' compensation system has implemented an advocate program for individuals with sensitive claims (e.g. individuals with terminal cancer) to help them and their families

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navigate the system. A similar program could be developed and implemented for injured immigrant workers to help them and their families to access and navigate the system. This program may include a resource guide in multiple languages that details the compensation process. Training adjudicators to identify and refer injured immigrant workers to translation and interpretation services at the start of the claim and several times throughout the adjudication process could help facilitate immigrant workers' return to work. A labour market re-entry program could also identify other available job positions that meet the injured immigrant worker's skills, education and functional abilities. As well, the vocational rehabilitation programs could support and promote the development of pre-existing education or qualifications from the country of origin.

Recommendation for Citizenship and Immigration Canada

Higher rates of serious injury, and consequently longer disability durations, among immigrant workers have been associated with their greater likelihood of working in dangerous jobs, for which they may be overqualified, compared with Canadian-born counterparts. Prospective immigrants may have unrealistic expectations of job opportunities as very little information is provided to them about the types of occupations they are likely to end up in, or how long they will remain in low-paid, poor-quality jobs after arrival in Canada (Chen et al., 2010). As well, Canada's points system may create false occupational hopes among new immigrants (Bucklaschuk & Wilkinson, 2011). The points system selects immigrants based on their training and educational attainment. Yet, the skillsets new immigrants bring to Canada are rarely realized in the Canadian labour market. For example, "the Canadian points system recognizes the value of a foreign medical degree in terms of immigration but not necessarily for the ability to practice medicine" (McDonald et al., 2010, as cited in Bucklaschuk & Wilkinson, 2011, p. 13). Providing information on these challenges as they apply to move to Canada by Citizenship and Immigration Canada may encourage immigrants to pursue Canadian education and skill training before entering the workforce.

Changing the foreign credential assessment and recognition policies, improving access to credential assessment and verification services, and encouraging employers to hire immigrants based on their foreign education and experiences may lessen the financial strains associated with resettlement and working in low-paid jobs. This would facilitate earlier integration into the workplace that is commensurate with their education and skills, which, in turn, could improve the financial profile of this vulnerable group. This, however, may require some governing bodies to recognize foreign credentials or improve the process by which new immigrants can update their accreditations.

Recommendation for Immigrant Support Groups

Providing immigration support groups with the results of this study may draw attention to the inclusion of workers' compensation in any resources they provide on navigating and accessing benefits and health care. These resources may also include information on occupational health and safety, workplace rights, and how to invoke rights under the Occupational Health and Safety Act. New immigrants should receive this information in their native language and before they start work, particularly because many end up in dangerous, poor quality jobs, where they may be vulnerable to injury.

Recommendation for Employers

The study's conceptual framework identified higher rates of serious injury among inured immigrant workers as one of the major drivers of their observed longer work disability durations, compared with their Canadian-born counterparts. Higher rates of serious injuries among immigrants are due in part to their reluctance to report a work injury, which could aggravate their injury. In order to reduce the likelihood of under-reporting, employers can provide appropriate training and promote a culture in which raising safety issues and reporting injuries is encouraged rather than penalized. In doing so, employers need to try to understand the cultural background of their immigrant employees and their possible deference towards authority by clarifying that safety is integral to the job.

5.5 Conclusion

Immigrants, especially established immigrants, had longer disability durations than Canadian-born workers, following a work injury, after adjusting for demographic and occupational characteristics. Results indicated that immigrants may face barriers to returning to work following a work-related injury and that these barriers persist over time and are greater for younger immigrant workers and recent immigrant men.

The observed shorter disability durations of older immigrant workers and recent immigrant women might be due in part to their greater vulnerability in the workplace. For example, they may be more susceptible to demands from their employers for an early return to work. They return to work faster because they might have greater financial problems and receive lower wages. Future research may need to focus on interventions to reduce these inequalities.

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Appendix A: Lincom

Table 1.1 Post-estimation tests (lincom) for the unadjusted and adjusted models (established – recent), at 50th percentiles of the distribution.

| Unadjusted | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 |
|------------------|------------------|------------------|------------------|------------------|------------------|
| 3.0, CI: 1.9-3.0 | 1.5, CI: 1.2-1.8 | 1.3, CI: 0.9-1.6 | 1.1, CI: 0.8-1.5 | 1.0, CI: 0.7-1.4 | 1.0, CI: 0.7-1.4 |

Post estimation tests, comparing the difference between recent and established immigrants (established - recent) at the 50th percentile of the distribution, were 3.0 (CI: 1.9-3.0) for the unadjusted model, 1.5 (CI: 1.2-1.8) after controlling for sex and age, 1.3 (0.9-1.6) after adding occupation to the model, 1.1 (CI: 0.8-1.5) after adding injury type, and 1.0 (CI: 0.7-1.4) after adding injury year, 1.0 (CI: 0.7-1.4) after adding previous claims. Since confidence intervals did not cover "0", the differences between recent and established immigrants were different from zero at a 95% confidence level.

Appendix B: Claim Characteristics

Table 12. Socio-demographic and claim characteristics for injured immigrant workers, who had an accepted claim between 1995 and 2012, by immigration status and sex.

| | Recent Immigrants | | | | E | Total | | | |
|------------------------------|-------------------|-------------|-------|-----------|------|-------------|------------|-----------|--------------|
| | n=46,882 | | | | | 78,609 | | | |
| | Men | | Women | | Men | | Women | | |
| | n= | 34,407 | n= | 12,475 | n= | 20,324 | n= | 11,403 | |
| Variables | % | 95%CI | % | 95%CI | % | 95%CI | % | 95%CI | % |
| Age | | | | | | | | | |
| <35 | 38.9 | 38.4-39.4 | 33.6 | 33.0-34.4 | 5.9 | 5.5-6.0 | 5.8 | 5.4-6.2 | 24.7 |
| 35-64 | 61 | 60.5-61.6 | 66.4 | 65.6-67.2 | 94.1 | 93.8-94.4 | 94.2 | 94.0-94.6 | 75.3 |
| Occupation | | | | | | | | | |
| Management | 1.3 | 1.1-1.4 | 1.4 | 1.3-1.7 | 1.9 | 1.7-2.0 | 1.5 | 1.3-1.7 | 1.5 |
| Business | 3.8 | 3.6-4.0 | 3.6 | 3.3-3.9 | 4.2 | 3.9-4.5 | 3.9 | 3.6-4.3 | 3.9 |
| Natural/App. Sc. | 1.4 | 1.3-1.5 | 0.8 | 0.6-0.9 | 1.6 | 1.4-1.8 | 0.3 | 0.2-0.4 | 1.2 |
| Health | 1.5 | 1.4-1.6 | 19.7 | 19-20.4 | 2.7 | 2.5-2.9 | 32.8 | 31.9-33.7 | 9.2 |
| Social Science | 0.6 | 0.4-0.6 | 3.2 | 3.0-3.5 | 0.8 | 0.6-0.9 | 4.8 | 4.4-5.2 | 1.6 |
| Art/Culture | 0.5 | 0.4-0.6 | 0.8 | 0.7-1.0 | 0.5 | 0.4-0.6 | 0.5 | 0.4-0.6 | 0.6 |
| Sales/Service | 17.3 | 17.0-17.7 | 42.3 | 41.4-43.1 | 18.5 | 18.0-19.0 | 41.5 | 40.6-42.4 | 25.1 |
| Trades/Transp. | 35.5 | 35.0-36.0 | 4.1 | 3.8-4.5 | 44.7 | 44.0-45.4 | 3.8 | 3.5-4.2 | 28.3 |
| Primary | 3.1 | 3.0-3.3 | 2.1 | 1.8-2.3 | 3.0 | 3.0-3.1 | 1.1 | 0.9-1.3 | 2.6 |
| Process/Manuf. | 21.2 | 20.8-21.6 | 11.0 | 10.5-11.6 | 21.0 | 20.3-21.4 | 8.8 | 8.3-9.4 | 17.7 |
| Unspecified or a97 | 13.8 | 13.4-14.0 | 11.0 | 10.4-11.5 | 1.3 | 1.2-1.5 | 0.9 | 0.7-1.0 | 8.2 |
| Nature of Injury | 1010 | 1011 1 110 | 1110 | 1011110 | 110 | 112 110 | 017 | 017 110 | 0.2 |
| Strain | 47.7 | 47 2-48 2 | 59.6 | 58 8-60 5 | 54.8 | 54 1-55 5 | 67.6 | 66 7-68 4 | 54.3 |
| Acute | 52.3 | 51.8-53.0 | 40.4 | 39.4-41.2 | 45.2 | 44.5-45.9 | 32.4 | 31.6-33.3 | 45.7 |
| Iniury year | | | | | | | | | |
| 1005 1007 | 20.8 | 20 4 21 2 | 16.4 | 15 8 17 1 | 3.0 | 2731 | 1.9 | 1621 | 12.7 |
| 1008 2000 | 18.5 | 18 0 10 0 | 10.4 | 17.4 19.9 | 5.0 | 2.7-3.1 | 1.0 5.9 | 5463 | 12.7 |
| 2001 2003 | 16.5 | 16.0-19.0 | 17.0 | 16 4 17 7 | 0.2 | 163 173 | 13.5 | 120142 | 16.3 |
| 2001-2003 | 16.0 | 10.2 - 17.0 | 16.0 | 10.4-17.7 | 10.0 | 10.3 - 17.3 | 20.8 | 20 1 21 6 | 10.5 |
| 2004-2000 | 10.0 | 15.0-10.4 | 10.0 | 15.5-10.0 | 22.4 | 24.7-23.9 | 20.8 | 20.1-21.0 | 10.4 |
| 2007-2009 | 13.0 | 13.2-10.0 | 17.1 | 10.4-17.0 | 23.5 | 24.0-23.0 | 21.7 | 20.9-20.0 | 20.1 19.6 |
| 2010-2012 Previous claims | 12.3 | 12.2-15.0 | 13.4 | 14.8-10.0 | 24.5 | 25.5-24.9 | 50.5 | 29.4-31.0 | 18.0 |
| | 20.0 | 10 5 20 2 | 1/2 | 127150 | 22.1 | 21 5 22 7 | 20.2 | 10 6 21 2 | 10.6 |
| 1 es | 20.0 | 19.3-20.3 | 14.5 | 15.7-15.0 | 22.1 | 21.3-22.7 | 20.5 | 70.0.20.0 | 19.0 |
| Education | 80.0 | 80.0-80.3 | 05.7 | 05.1-00.5 | 11.9 | 11.5-16.5 | 19.1 | 79.0-80.0 | 00.4 |
| | 16.0 | 15 4 46 5 | 20.4 | 27.5.20.2 | 52.6 | 52.0.54.2 | 50.7 | 40 7 51 6 | 47.4 |
| Secondary or less | 46.0 | 45.4-46.5 | 38.4 | 37.5-39.2 | 53.6 | 52.9-54.3 | 50.7 | 49.7-51.6 | 47.4 |
| Some Univ. no degree | 6.4 | 6.2-6.7 | 7.4 | 6.9-7.8 | 1.3 | 6.9-7.6 | 1.4 | 6.9-7.9 | /.0 |
| Trade/Cert./Diploma | 22.8 | 22.3-23.2 | 25.2 | 24.5-26 | 23.8 | 23.2-24.3 | 25.6 | 24.8-26.5 | 23.8 |
| Bachelor's or greater | 24.8 | 24.3-25.2 | 29.0 | 28.2-30.0 | 15.3 | 14.8-15.8 | 16.3 | 15.6-17.0 | 21.8 |
| Country of Birth | | | | | | | | | |
| Europe | 14.5 | 14.1-15 | 12.9 | 12.3-13.5 | 17.6 | 17.1-18.2 | 14.5 | 13.9-15.1 | 15.1 |
| Africa | 4.8 | 4.6-5.0 | 3.6 | 3.3-4.0 | 4.0 | 3.7-4.2 | 3.3 | 3.0-3.7 | 4.2 |
| Caribb./Central Am. | 6.1 | 6.0-6.4 | 5.5 | 5.1-5.9 | 9.0 | 8.7-9.5 | 8.5 | 8.0-9.1 | 7.2 |
| East Asia | 17 | 16.6-17.4 | 20.5 | 19.8-21.2 | 13.5 | 13.0-14.0 | 13.6 | 13.0-14.2 | 16.1 |
| West/Central Asia | 5.6 | 5.4-5.9 | 3.9 | 3.5-4.2 | 4.8 | 4.5-5.1 | 3.5 | 3.2-3.9 | 4.8 |
| Southeast/South Asia | 43.8 | 43.3-44.3 | 46.3 | 45.4-47.2 | 42.4 | 42.0-43.0 | 47.3 | 46.4-48.2 | 44.3 |
| Eurasia/Oceania | 5.1 | 4.9-5.3 | 4.7 | 4.4-5.1 | 5.9 | 5.5-6.2 | 7.2 | 6.8-7.8 | 5.5 |
| North America | 3.0 | 2.8-3.2 | 2.5 | 2.3-2.8 | 2.7 | 2.5-2.9 | 2.0 | 1.6-2.1 | 2.7 |
| Unknown/Stateless | 0.03 | 0.01-0.05 | 0.02 | 0.01-0.06 | 0.1 | 0.04-0.6 | 0.04 | 0.02-0.1 | 0.04 |

| Tables 12. Continued | Recent Immigrants | | | | Established Immigrants | | | | Total |
|----------------------|-------------------|-----------------|------|-----------|------------------------|-----------|----------|-----------|-------|
| | n=46,882 | | | | | 78,609 | | | |
| | ľ | Men | | Women | | Men | | Women | |
| | n=. | 34,407 n=12,475 | | 12,475 | n=20,324 | | n=11,403 | | |
| Variables | % 95%CI | | % | 95%CI | % | 95%CI | % | 95%CI | % |
| Mother Tongue | | | | | | | | | |
| English/French | 9.6 | 9.3-10.0 | 8.7 | 8.2-9.2 | 9.9 | 9.4-10.3 | 8.3 | 7.8-8.8 | 9.3 |
| Chinese | 16.3 | 16.0-16.6 | 19.2 | 18.6-20 | 14.0 | 13.5-14.5 | 13.5 | 12.9-14.2 | 15.7 |
| Punjabi | 22.0 | 21.7-22.5 | 10.0 | 9.5-10.6 | 21.0 | 20.5-21.6 | 10.5 | 10.0-11.0 | 18.2 |
| Tagalog | 11.8 | 11.4-12.1 | 26.8 | 26.0-27.5 | 9.0 | 8.6-9.3 | 27.9 | 27.1-28.7 | 16.0 |
| Spanish | 5.4 | 5.1-5.6 | 4.6 | 4.3-5.0 | 8.1 | 7.7-8.5 | 7.4 | 6.9-7.9 | 6.2 |
| Persian | 3.7 | 3.5-3.9 | 3.4 | 3.1-3.7 | 3.5 | 3.2-3.7 | 3.0 | 2.6-3.2 | 3.5 |
| Others | 31.3 | 30.8-31.8 | 27.2 | 26.5-28 | 34.5 | 34.0-35.2 | 29.4 | 28.6-30.3 | 31.2 |
| Immigration Category | | | | | | | | | |
| Family class | 46.1 | 45.6-46.6 | 35.1 | 34.2-35.9 | 45.0 | 44.3-45.5 | 35.2 | 34.3-36.1 | 42.5 |
| Refugee class | 16.2 | 15.8-16.6 | 11.0 | 10.5-11.6 | 22.4 | 22.0-23.0 | 15.6 | 15.0-16.3 | 16.9 |
| Economic class | 35.9 | 35.4-36.4 | 52.4 | 51.5-53.3 | 29.7 | 29.1-30.0 | 46.4 | 45.5-47.3 | 38.4 |
| Others | 1.8 | 1.6-1.9 | 1.5 | 1.3-1.7 | 2.9 | 2.7-3.2 | 2.8 | 2.5-3.1 | 2.2 |
| Family Status | | | | | | | | | |
| Principal applicant | 84.0 | 83.7-84.4 | 77.8 | 77.0-78.0 | 82.4 | 82.0-83.0 | 72.9 | 72.0-73.6 | 81.0 |
| Spouse/dependents | 16.0 | 15.5-16.3 | 22.2 | 21.5-23.0 | 17.6 | 17.0-18.0 | 27.1 | 26.0-28.0 | 19.0 |

| | Recent Immigrants | | | | - | Total | | | |
|-----------------------|-------------------|----------------------------------|------------|-------------------------------|-----------|--------------------|----------|-----------|------|
| | n=46,882 | | | | | n=3 | n=31,727 | | |
| | Your n= | 1 ger (<35) =17.585 | Olde n= | er (35-64) 29.297 | You n= | ng (<35) =1.852 | n=29,875 | | |
| Variables | % | 95%CI | % | 95%CI | % | 95%CI | % | 95%CI | % |
| Sex | | | | | | | | | |
| Men | 76.2 | 75.5-77.0 | 71.7 | 71.2-72.2 | 64.4 | 62.0-66.5 | 64.0 | 63.5-64.6 | 69.6 |
| Women | 23.8 | 23.2-24.4 | 28.3 | 27.8-29.0 | 35.6 | 33.5-38.0 | 36.0 | 35.4-36.5 | 30.4 |
| Occupation | | | | | | | | | |
| Management | 1.3 | 1.1-1.4 | 1.3 | 1.2-2.5 | 1.5 | 1.0-2.1 | 1.7 | 1.6-1.9 | 1.5 |
| Business | 4.0 | 3.7-4.2 | 3.6 | 3.4-3.8 | 3.1 | 2.4-4.0 | 4.2 | 3.9-4.4 | 4.0 |
| Natural/App. Sc. | 0.8 | 0.7-1.0 | 1.5 | 1.3-1.6 | 0.4 | 0.2-0.8 | 1.2 | 1.1-1.3 | 1.2 |
| Health | 4.2 | 3.8-4.4 | 7.7 | 7.4-8.0 | 8.3 | 7.1-1.0 | 13.9 | 13.5-14.2 | 9.2 |
| Social Science | 0.7 | 0.6-0.8 | 1.6 | 1.5-1.7 | 1.9 | 1.3-2.6 | 2.2 | 2.1-2.4 | 1.6 |
| Art/Culture | 0.6 | 0.5-0.7 | 0.6 | 0.5-0.7 | 0.4 | 0.2-0.9 | 0.5 | 0.4-0.6 | 0.6 |
| Sales/Service | 20.8 | 20.2-21.4 | 25.8 | 25.3-26.3 | 23.0 | 21.0-25.0 | 27.0 | 26.5-27.5 | 25.0 |
| Trades/Transp. | 28.0 | 27.4-29.0 | 26.6 | 26.0-27.0 | 30.0 | 28.0-32.0 | 30.0 | 29.5-30.5 | 28.3 |
| Primary | 3.4 | 3.1-3.7 | 2.6 | 2.4-2.7 | 3.0 | 2.4-4.0 | 2.2 | 2.1-2.4 | 2.7 |
| Process/Manuf. | 18.6 | 17.6-18.2 | 18.4 | 18.0-18.8 | 22.2 | 20.4-24.2 | 16.2 | 15.8-16.6 | 17.7 |
| Unspecified pre-1997 | 17.6 | 17.1-18.2 | 10.3 | 9.9-10.6 | 6.2 | 5.1-7.3 | 0.9 | 0.8-1.0 | 8.2 |
| Nature of Injury | | | | | | | | | |
| Strain | 47.5 | 47.0-48.0 | 53.0 | 52.3-54.0 | 57.0 | 55.0-59.0 | 59.5 | 59.0-60.0 | 54.3 |
| Acute | 52.5 | 52.0-53.0 | 47.0 | 46.5-47.6 | 43.0 | 41.0-45.0 | 40.5 | 40.0-41.0 | 45.7 |
| Injury Year | | | | | | | | | |
| 1995-1997 | 25.8 | 25.2-26.5 | 16.0 | 15.5-16.4 | 11.9 | 10.5-13.4 | 1.9 | 1.8-2.1 | 12.7 |
| 1998-2000 | 20.2 | 19.6-21.0 | 17.0 | 16.8-17.6 | 16.8 | 15.0-18.6 | 6.7 | 6.5-7.1 | 14.0 |
| 2001-2003 | 16.4 | 15.8-16.9 | 17.0 | 16.5-17.3 | 26.5 | 24.5-28.5 | 15.0 | 14.5-15.3 | 16.3 |
| 2004-2006 | 13.9 | 13.4-14.4 | 17.2 | 16.8-17.8 | 22.6 | 21.0-24.5 | 21.8 | 21.3-22.3 | 18.4 |
| 2007-2009 | 13.1 | 12.6-13.6 | 17.8 | 17.3-18.2 | 13.5 | 12.1-15.2 | 27.0 | 26.5-27.5 | 20.0 |
| 2010-2012 | 10.6 | 10.0-11.0 | 15.0 | 14.5-15.3 | 8.7 | 7.5-10.0 | 27.6 | 27.0-28.0 | 18.6 |
| Previous Claims | | | | | | | | | |
| Yes | 18.0 | 17.5-18.6 | 18.6 | 18.0-19.0 | 22.8 | 21.0-25.0 | 21.4 | 21.0-22.0 | 19.6 |
| No | 82.0 | 81.4-82.5 | 81.4 | 81.0-82.0 | 77.2 | 75.2-79.0 | 78.6 | 78.0-79.0 | 80.4 |
| Education | | | | | | | | | |
| Secondary or less | 54.4 | 53.6-55 | 37.7 | 37.2-38.3 | 78.3 | 76.4-80 | 51.0 | 50-51 | 47.4 |
| Some Univ. no degree | 6.8 | 6.5-7.3 | 6.6 | 6.3-6.9 | 7.1 | 6.0-8.3 | 7.3 | 7.0-7.6 | 7.0 |
| Trade/Cert./Diploma | 20.0 | 19-20.6 | 25.5 | 25.0-26.0 | 10.7 | 9.4-12.2 | 25.3 | 25.0-25.8 | 23.8 |
| Bachelor's or greater | 18.8 | 18.2-19.3 | 30.2 | 30.0-31.0 | 3.9 | 3.1-4.9 | 16.4 | 16.0-16.8 | 21.8 |
| Country of birth | | | | | | | | | |
| Europe | 13.2 | 12.7-13.7 | 14.6 | 14.2-15.0 | 11.2 | 9.9-1.3 | 16.8 | 16.4-17.3 | 15.1 |
| Africa | 5.0 | 4.6-5.3 | 4.2 | 4.0-4.5 | 3.8 | 3.0-4.7 | 3.7 | 3.5-4.0 | 4.2 |
| Caribb./Central Am. | 6.0 | 5.7-6.4 | 6.0 | 5.6-6.2 | 7.3 | 6.2-8.6 | 9.0 | 8.7-9.3 | 7.2 |
| East Asia | 10.6 | 10.2-11.1 | 22.3 | 22.0-23.0 | 4.0 | 3.2-5.0 | 14.0 | 13.7-14.5 | 16.1 |
| West/Central Asia | 4.2 | 3.9-4.5 | 5.7 | 5.5-6.0 | 2.7 | 2.1-3.6 | 4.4 | 4.2-4.7 | 4.8 |
| Southeast/South Asia | 51.4 | 51.0-52.0 | 40.3 | 40.0-41.0 | 56.3 | 54.0-58.0 | 43.4 | 43.0-44.0 | 44.3 |
| Eurasia/Oceania | 6.6 | 6.3-7.0 | 4.0 | 3.8-4.2 | 13.5 | 12.0-15.0 | 6.0 | 5.6-6.2 | 5.5 |
| North America | 3.0 | 2.7-3.2 | 2.8 | 2.6-3 | 1.2 | 0.8-1.8 | 2.5 | 2.3-2.7 | 2.7 |
| Unknown/Stateless | 0.02 | 0.01-0.06 | 0.03 | 0.01-0.05 | 0.00 | 0.00 | 0.08 | 0.05-0.1 | 0.04 |

Table 13. Socio-demographic and claim characteristics for immigrant workers, who had an accepted claim between 1995 and 2012, by immigration status and age.

| Table 13. Continued | Recent Immigrants | | | | Established Immigrants | | | | Total |
|----------------------|-------------------|-----------|-------------|-----------|------------------------|-----------|-------------|-----------|--------|
| | n=46,882 | | | | n=31,727 | | | | 78,609 |
| | Young (<35) | | Old (35-64) | | Young (<35) | | Old (35-64) | | |
| | n= | 17,585 | n=29,297 | | n= | n=1,852 | | n=29,875 | |
| Variables | % | 95%CI | % | 95%CI | % | 95%CI | % | 95%CI | % |
| Mother Tongue | | | | | | | | | |
| English/French | 8.6 | 8.2-9.0 | 9.8 | 9.5-10 | 5.3 | 4.4-6.5 | 9.5 | 9.2-10.0 | 9.3 |
| Chinese | 10.2 | 9.8-10.7 | 21.1 | 20.7-21.6 | 5.0 | 4.0-6.0 | 14.4 | 14.0-15.0 | 15.7 |
| Punjabi | 32.7 | 32-33.4 | 10.6 | 10.3-11.0 | 40.6 | 38.0-43.0 | 15.8 | 15.4-16.2 | 18.2 |
| Tagalog | 9.4 | 8.9-9.8 | 19.6 | 19.0-20.0 | 3.4 | 2.7-4.3 | 16.5 | 16.0-17.0 | 15.8 |
| Spanish | 5.3 | 5-5.6.0 | 5.1 | 4.8-5.3 | 6.8 | 5.7-8.0 | 7.9 | 7.6-8.2 | 6.2 |
| Persian | 2.7 | 2.4-2.9 | 4.1 | 3.9-4.4 | 1.9 | 1.4-2.7 | 3.4 | 3.2-3.6 | 3.6 |
| Others | 31.1 | 30.4-31.8 | 29.7 | 29.0-30.0 | 37.0 | 35.0-39.0 | 32.5 | 32.0-33.0 | 31.2 |
| Immigration Category | | | | | | | | | |
| Family class | 62.9 | 62.1-63.6 | 31.3 | 31.0-32.0 | 70.2 | 68-72.3 | 40.0 | 39.0-40.2 | 42.5 |
| Refugee class | 15.1 | 14.6-15.7 | 14.6 | 14.2-15.0 | 19.8 | 18-21.6 | 20.0 | 19.5-20.4 | 16.9 |
| Economic class | 20.8 | 20.2-21.4 | 52.1 | 51.5-53.0 | 7.9 | 6.8-9.2 | 37.0 | 37.0-38.0 | 38.4 |
| Others | 1.2 | 1.0-1.3 | 2.0 | 1.8-2.2 | 2.1 | 1.5-2.8 | 3.0 | 2.7-3.1 | 2.2 |
| Family status | | | | | | | | | |
| Principal applicant | 83.5 | 83.0-84.0 | 81.7 | 81.3-82.2 | 64.6 | 62.3-67 | 80.0 | 79.4-80.3 | 81.0 |
| Spouse/dependents | 16.5 | 16.0-17.0 | 18.3 | 17.8-19.0 | 35.4 | 33.3-38 | 20.0 | 19.7-20.6 | 19.0 |
| Age at Landing | | - | · | · | | · | | | |
| 0-18 | | | | 1.70 | | | | 15.0 | 3.0 |
| 19+ | | | | 98.3 | | | | 85.0 | 97.0 |