July 2014

Final Report

Work Injury and Poverty: Investigating Prevalence across Programs and Over Time (WSIB #11034)

Institute for Work & Health

Research Excellence Advancing Employee Health

If you have questions about this report, please contact us at:

Institute for Work & Health

481 University Avenue, Suite 800

Toronto, Ontario M5G 2E9

info@iwh.on.ca

www.iwh.on.ca

Institute for Work & Health

Work Injury and Poverty: Investigating Prevalence across Programs and Over Time

(WSIB #11034)

Principal Investigator(s): Emile Tompa

Co-Investigator(s): Heather Scott-Marshall, Peri Ballantyne, Ron Saunders, Sheilah Hogg-Johnson

Analyst: Qing Liao

Date: 29 July 2014

Contents

Acknowledgements

Funding for this study was provided by the Ontario Workplace Safety & Insurance Board's Research Advisory Council (WSIB-RAC).

Plain Language Summary

In this study we investigate the prevalence of poverty amongst permanently impaired injured workers across different time periods and receiving benefits from different legislative programs. The study draws on the linkage of a 20% sample of injured workers receiving benefits from four different workers' compensation programs to a Revenue Canada tax file. The four programs are the pre-1990 Ontario program (Bill 101), the 1990-1997 Ontario program (Bill 162), the 1998 Ontario program (Bill 99), and the bifurcated British Columbia (pre-Bill 49) program. A sample frame of injured workers from each program was matched with uninjured controls based on age, gender, pre-injury earnings, and family characteristics.

The Low Income measure (LIM) was used as a cut-off to identify individuals and their families in poverty, and was defined as individual/family earnings being below the LIM. We considered three categories of poverty as follows: deep poverty (0-50% of LIM), poverty (51-100% of LIM), and near poverty (101-150% of LIM). Differences in poverty levels were compared within and across time periods/programs. We focus on analysis results at the family level in this summary.

Three hypotheses were proposed, the first as follows:

> Hypothesis 1: The prevalence of poverty has increased over time amongst permanently impaired injured workers by a larger amount than amongst able-bodied workers.

We did not find support for this hypothesis. Based on after-tax family income adjusted for family size, deep poverty, poverty and near poverty levels were similar across programs from different time periods. For deep poverty the range was between 0-2% of the sample. For poverty the range was 2-6%. Lastly, for near poverty the range was between 6-12%. We did find that poverty levels (i.e., the proportion of the sample) within each cohort increased with time post injury.

The second hypothesis is about the impact of legislations and related programs on the probability of poverty. It reads as follows.

> Hypothesis 2: Programmatic features bear on the probability of being in poverty for injured workers, even after controlling for temporal factors associated with labour-market changes.

This hypothesis proposes that more recent programs have higher levels of poverty relative to controls, which we identify by taking the difference in the proportion of injured workers in a poverty category less the proportion of controls. We found that differences in the deep poverty category were similar across programs (difference were just under 0% for all programs), though there were some modest differences for the poverty and near poverty categories. In these latter two categories, the LOE and FEL/NEL programs had somewhat higher differences in some years post-injury compared to the PD program and the BC program. Specifically, for the poverty category differences range from just under -1% to just over 2%, with the LOE program having the highest differences, followed by the FEL/NEL program. For the near poverty category, differences range from -2% to 4%, also with the LOE program having the highest differences, followed by the FEL/NEL program. So ultimately, there is some support for Hypothesis 2.

Additionally, when we consider family income over a ten-year period, the LOE program had the largest difference between the proportion of injured m workers and their matched controls in near poverty compared to the other programs, suggesting that injured worker families receiving benefits from this program do not fare as well over longer periods of time as individuals receiving benefits from the other programs. Specifically, a larger proportion is closer to poverty than in the older programs based on income over a ten year period. The difference is 2.5% for near poverty for the LOE program, 0.5% for the FEL/NEL program, no difference for the PD program, and -0.6% for the BC program.

The third hypothesis follows on the second, adding to the mix controls for demographic and contextual factors through regression modeling analysis.

Specifically, the hypothesis reads as follows:

> Hypothesis 3: In a more fully specified statistical model that controls for individual and contextual factors, the probability of poverty for injured workers will be higher in more recent time periods and will also be related to the program under which benefits are received.

For this hypothesis we considered only two programs, the PD and FEL/NEL ones. Based on the first set of regression models which only included injured workers (i.e., matched controls were not included), what we found was that for the FEL/NEL program the families of injured women were slightly more likely to be in poverty than if in the PD program, whereas the reverse was true for men. In contrast, near poverty levels were higher for the PD program for both women and men. Lastly, for the above poverty category, injured workers in the FEL/NEL program had a slightly higher probability of being in this category, for both women and men. Adding controls into the modeling, we find that for both women and men, the odds of being in the near poor category are significantly higher for injured worker families than for control families (odds ratios are in the 1.25-1.3 range). This is the case for both the FEL/NEL and PD programs, though there is no significant difference between the two programs for this category, either for women or men. For the poor category, only injured women's families have significantly higher odds of being in the category relative to controls (odds rations are in the 1.1 range). This is not the case for injured men's families. Again, there is no significant difference between the two programs for this category, either for women or men. So it seems that there is little support for Hypothesis 3, based on a comparison of the PD and FEL/NEL programs.

Our study adds substantially to the literature on long-term outcomes of injured workers. It is the first study to rigorously assess the poverty levels across different programs and across different time periods. The sample of claimants was very representative, and the earnings information very reliable given it come from administrative files. Our use of cotemporaneous matched controls helps address some of the contextual factors that may bear on

outcomes that vary across time periods and cohorts such as unemployment rates and labour-market contracting practices. Our comparison of four different programs also provides invaluable insight into whether workers' compensation programmatic features bear on the probably of poverty.

Future work in this area needs to further explore programmatic, demographic and contextual factors that bear on the probability of poverty for injured workers and their families. In particular, the most recent program investigated in this study, i.e., the Ontario LOE program, requires a large sample frame so that it can be included in the regression modeling analysis. Additional characteristic could be added to the model such as occupation, industry, and nature of injury, in order to better understand the factors that bear on labour-market earnings recovery post injury and the probability of poverty. These variables were not available to us, but are available in the workers' compensation administrative data files.

Abstract

Objective. In this study we investigate the prevalence of poverty amongst permanently impaired injured workers across different time periods and receiving benefits from different legislative programs.

Methods. This study draws on the linkage of a 20% sample of injured workers receiving benefits from four different workers' compensation programs to a Revenue Canada tax file. A sample frame of injured workers from each program was matched with uninjured controls based on age, gender, pre-injury earnings, and family characteristics. The Low Income measure (LIM) was used as a cut-off to identify individuals and families in poverty, and was defined as individual/family earnings being below the LIM. Differences in poverty were compared within and across time periods/programs.

Results. At the individual earnings levels in which after-tax labour-market earnings plus workers' compensation benefits were considered, benefits were an important part of what kept poverty levels low for injured workers. Though differences in poverty levels between injured workers and their matched controls were modest at the individual earnings level, the differences increase over time. At the census family level in which after-tax family income from all sources was considered, poverty levels of injured worker families were similar to their matched controls.

Conclusions. Poverty levels were low for injured workers across the different programs considered in this study, and workers' compensation benefits were an important part of the earnings that kept them out of poverty. Overall the Bifurcated Benefits program from British Columbia had the lowest proportion of injured worker census families in poverty in absolute terms.

Brief Review of the Relevant Research

Introduction

Permanent impairment from a work injury is a major negative life event with implications for the long-term well-being of injured workers and their families. Consequences may include difficulties with earning a livelihood and ongoing physical and mental health issues associated with disability (Ballantyne, 2001; Dembe, 2001; MacEachen, Ferrier, Kosny, & Chambers, 2007). Research on the economic impact of work disability has found that impaired workers have reduced labour-market earnings, suffer significant long-term financial losses, and are at increased risk of poverty (Breslin et al., 2003; Dembe, 2001; Tompa et al, 2009). There is also some preliminary evidence that suggests the proportion of impoverished injured workers is rising (Ontario Network of Injured Workers' Groups, 2009; Thunder Bay & District Injured Workers' Support Group, 2008), although this preliminary evidence is based on a sample of convenience. Furthermore, little is known about the specific factors contributing to injured worker poverty and the reasons for its possible increase. One explanation might be that key changes in labour-market contracting practices (e.g., increased use of contingent labour) have made it more difficult for permanently impaired workers to maintain paid employment. Another possibility is that changes in the workers' compensation legislative and policy context have eroded the support structures that facilitate labour-market reentry and/or have reduced access to adequate benefits. For example, in Ontario the current benefits system is based on loss-of-earnings capacity with only a subset of individuals who sustain a permanent impairments receiving long-term disability benefits—those who have been deemed to have a loss-of-earnings capacity—where as in the pre-1990 program all injured workers received long-term disability pensions if they sustain a permanent impairment.

Without question, there is a need to know the prevalence of poverty amongst permanently impaired injured workers claimants to ensure that

appropriate supports are provided. In this study we investigate this prevalence across different time periods and different legislative programs. We also investigate whether programmatic and temporal factors are associated with probability of being in poverty. Such knowledge is essential to developing policies and programs that support improved outcomes for permanently impaired workers – e.g., via better targeting of financial assistance measures and labour-market re-entry supports.

Labour-market Engagement and Earnings Post Injury

It is well known that unemployment/out of the labour force rates for individuals sustaining a permanent impairment from a work injury are quite high several years post-injury (Burkhauser and Daly, 2000; Butler et al., 1995; Johnson and Baldwin, 1993). But even though work disability is one of the most costly and prevalent health issues in North America (Butler et al., 1995), only a few studies have investigated the labour-market re-entry and earnings success of individuals who have sustained a permanent impairment from a work injury. Most of the studies are based on data from U.S. jurisdictions (Berkowitz and Burton, Jr., 1987; Biddle, 1998; Boden and Galizzi, 1999; Cheit, 1961; Ginnold, 1979; Johnson et al., 1979; Peterson et al., 1998). These studies find that many permanently impaired workers suffer substantial long-term earnings losses. Peterson et al., (1998) found that proportional earnings losses were very similar for individuals with impairment ratings from 1-20%, 4-5 years post-injury in a sample of permanent-partial disability beneficiaries injured in the early 1990s in California (California had an impairment-based system of compensation at that time), suggesting that degree of permanent impairment is not necessarily related to level of earnings loss.

There are a few Canadian studies as well. A survey undertaken in 1988 by the WSIB spawned several studies (Butler et al., 1995; Cater, 2000; Cater and Smith, 1999; Hyatt, 1996; Johnson et al., 1995; Johnson and Baldwin, 1993). These studies provided invaluable insight into the labour-market re-entry experience of permanently impaired individuals who received benefits

from the Ontario program in existence prior to 1990. Issues investigated included factors affecting the duration of first absence from work and the duration of re-employment with the injury employer, as well as labour-market re-entry success. An important finding of this body of work is that first return to work is not an accurate predictor of labour-market re-entry success; though 85% of workers in the sample returned to work, only 50% were employed several years later (Butler et al., 1995).

A more recent qualitative study on a sample of injured workers receiving benefits from the pre-1990 WSIB program was undertaken to review the injured workers' experiences with the Ontario board and to evaluate their quality of life (Ballantyne, 2001). The study found that interviewed subjects experienced chronic employment instability throughout their post-injury years. Less than half of them had secure employment at the time of interview, defined as employment with a large and/or unionized firm.

Causes and Consequences of Poverty

Several recent reports from diverse sources have documented the extent of poverty in Ontario and across the country (World Health Organization, 2008; Lightman et al., 2008; Laurie, 2008; Community Social Planning Council of Toronto, 2009). In Canada, poverty rates have remained relatively unchanged since 1989 (Campaign 2000, 2007). Persistently high poverty rates are evident in specific groups: female-headed single parent families, new immigrants, racialized families, First Nations individuals and families living both in and outside of First Nation communities, and persons with disabilities (Campaign 2000, 2007). In Ontario, Laurie (2008) reports similar trends in poverty— people with disabilities, children, Aboriginals, single parents and new Canadians experienced the highest rates of poverty in this province in 2005.

In these reports, it is evident that poverty is a complex condition resulting from socio-structural or institutional as well as individual characteristics. For

example, a jurisdiction‘s labour policies and regulations; income and tax policies; occupational health and safety legislation; insurance programs; and social assistance, housing, education and health care policies all influence opportunities for economic security and risk of poverty for individuals and groups living within that jurisdiction. At the international level, broad global economic downturns and upturns determine the capacity of autonomous jurisdictions to support its citizens, and to promote labour-market and educational opportunities for them. Individuals, families and social groups are particularly reliant on the presence and adequacy of the social safety net within their jurisdiction to buffer the impact of economic downturns on their lives. At the individual level, human capital (i.e., education, formal skills training, health), personal support systems, and negative or positive experiences in a competitive labour market are important factors.

The costs of poverty are broad and far reaching, as Laurie (2008) asserts, and are reflected in remedial (related to health care and crime), intergenerational and opportunity costs. The economic costs of poverty in Ontario have been estimated at 5.5% to 6.6% of Ontario‘s gross domestic product, costing the federal and provincial governments at least 10 to 13 billion dollars; and costing every household in Ontario from $2,299 to $2,895 every year (Laurie, 2008). A key cost to governments, taxpayers, and to individuals and families living in poverty is the ill-health burden of poverty. Socio-economic inequality and poverty have long been understood as among the key social determinants of health. Recent documentation of the general and specific health costs of poverty is alarming. Examining national data, Lightman et al. (2008) documented health inequalities among income groups across a range of chronic conditions and health measures. The authors found that the poorest one fifth of the Canadian population have more than double the rate of diabetes and heart disease, a sixty percent greater rate of having two or more chronic conditions, more than three times the rate of bronchitis, and almost double the rate of arthritis or rheumatism, as compared to the richest one fifth of the population. The poor experience major health inequalities in terms of mental and behavioural disorders, circulatory

conditions, and chronic conditions, according to this report. The poorest quintile group was reported to be significantly less likely to have access to a regular physician, to spend more time as overnight patients in health care institutions, and to report having greater levels of unmet health care needs than those Canadians in the highest income quintile group (Lightman et al., 2008).

In Ontario in 2005, social assistance recipients had significantly higher rates of poor health and chronic conditions, compared to the non-poor, for 38 out of 39 health indicators including disability, stress, diabetes, heart disease, migraines, chronic bronchitis, asthma and arthritis and rheumatism. Suicide attempts were 10 times higher among social assistance recipients compared to the non-poor (Community Social Planning Council of Toronto, 2009). The social assistance and working poor groups were significantly more likely to report that they did not have access to a family physician, and were less likely to have accessed various preventive health measures than the non-poor in Ontario (Community Social Planning Council of Toronto, 2009).

The relationship of poverty and physical and mental health is of particular concern when one considers persons living with chronic health conditions and disabilities. We include in this group injured workers with permanent impairments arising from a work injury. Recent research indicates that injured workers frequently suffer further physical and mental health declines after an initial workplace injury (Lippel et al., 2007; Ballantyne, 2001), a process described by Ballantyne as —injury cascading. Other studies have shown that workers who are unable to return to work, or who experience persisting employment instability following a work injury often experience mental health consequences such as a decreased sense of well-being and self-worth, depression, anger, role disruption and powerlessness, as well as social problems such as marital and family stress, financial strain, and substance abuse (Ballantyne, 2001; Beardwood et al., 2005; Cacciacarro and Kirsh, 2006; Franche et al., 2003; Gamborg et al., 1992; Kirsh and McKee, 2003; Lippel et al., 2007; MacEachen et al., 2004; Stone, 2003; Stone et al., 2002;

Tompa et al., 2009). Ultimately, the spiral downward may lead to social isolation and social exclusion more generally (Reid, 2007; Kawachi, et al., 1997).

Changing Labour-market Experiences

Aggregate statistics reveal the impact of labour-market conditions on the integration of disabled individuals in the paid labour force. Nationwide, the overall unemployment rate of disabled persons is higher than for able bodied individuals. For example, in 2008 it was 10.4% compared to only 6.8% of individuals without disabilities (Statistics Canada, 2008). These numbers are from prior to the recent global recession. Without question, downturns in the business cycle have a greater impact on the unemployment rates of the disabled.

More critically, structural change in the economies of industrialized countries have given rise to fundamental changes in labour markets, work systems, firm structures, employment relations and hence, individual labour-market experiences (Herzenberg et al., 1998), making it even more difficult for marginalized individuals to maintain adequate employment. The forces of globalization coupled with rapid technological innovation has meant that the long-term viability of firms relies on their ability to respond to constant and mounting pressure to innovate or cut costs in response to rapidly changing product and service markets (Luttwak, 1998; Scott-Marshall, 2007). In turn, a large proportion of employers have adopted —flexible staffing practices that enable them to quickly respond to market shifts (Scott, 2004; Smith, 1997; Tompa et al, 2007). Workers are increasingly hired under a range of non-standard employment contracts, such as temporary and part-time contracts or self-employed contractors (Burke and Shields, 1999; Chaykowski, 2005). As a consequence, an increasing proportion of workers lack job security, earnings adequacy, income security benefits, and opportunities for job and career advancement (Burke and Shields, 1999; Grimshaw et al., 2002; Osterman et al., 2002; Vosko, 2006). Not surprisingly, the economic impacts

of such changes have not fallen equally upon all labour-force participants (Scott-Marshall, 2009). Although a portion of workers – particularly those with specialized skills – tend to thrive within flexible labour markets, this is not the case for workers with a history of disadvantage in the workplace – e.g., low-skilled workers, women, people of colour, and individuals with disabilities.

Legislative and Policy Context

The proposed study draws on a linkage of workers compensation claims data to a 20% longitudinal databank of Revenue Canada tax files. The sample frames are from two jurisdictions, Ontario and British Columbia. The Ontario data is from three different legislative time periods. In total there are four different programs represented in the linked data. The extensiveness of this time limited linkage provides an unprecedented opportunity to document the prevalence of poverty across three different time periods, two jurisdictions, and four legislative programs and to investigate how programmatic and temporal factors have contributed to the poverty rate using a very large (approximately 30,000 observations), extremely representative sample (a 20% simple random sample of the injured worker population).

In Ontario the first time period is under Bill 101 (pre-1990), the second Bill 162 (1990 to 1997), and the third Bill 99 (1998 onward). Benefits determination under these three legislations was quite different. Prior to 1990, a single benefit award program called the Permanent Disability (PD) program was in effect. Under this program, the amount of benefits received was based on a formula that considered the percentage of permanent impairment (using a ratings guide similar to the American Medical Association Guide) and pre-injury earnings. Specifically, injured workers received 90% of after-tax pre-injury earnings times the percentage of total bodily impairment. PD benefits were received for life, whether an injured worker was able to continue to participate in the labour market or not.

In January 1990, there was a major change in the determination of benefits. A dual award program was introduced that provided for a future economic loss (FEL) benefit as well as a non-economic loss (NEL) award. Injured workers received FELs if they sustained a temporary total impairment lasting 12 months or longer, or a permanent impairment, and were deemed unable to earn an income comparable to their pre-injury earnings. The FEL benefit was based on a formula that took into consideration both pre-injury earnings and post-injury earnings potential, and was given as a periodic payment for the time period an injured worker was deemed unable to earn their pre-injury earnings, and up until age 65. Specifically, benefits were estimated as 90% of the difference between after-tax pre-injury earnings and after-tax post-injury earnings potential. NELs were received as compensation for pain and suffering and loss of quality of life by injured workers sustaining permanent impairments from work-related injuries and illnesses. The amount awarded was based on a formula that took into consideration the percentage of impairment (using the American Medical Association guide) and the age of the recipient. It was usually awarded as a lump sum payment.

In January 1998, Bill 99 came into effect. This bill introduced the Workplace Safety and Insurance Act which replaced the Workers' Compensation Act of 1990. The new paradigm moved the system from a compensation board to an insurance board with greater emphasis on prevention of work injurys. In the new system there was an increased focus on the roles of the sector-specific health and safety agencies and an expanded role for firm-level financial incentives. In addition, there was an increased responsibility placed on workers and employers for the return-to-work (RTW) process, with the intent of enhancing the self-reliance of injured workers and injury employers. Additionally, the Labour-market Re-entry (LMR) program was introduced to replace the older vocational rehabilitation program. There were also changes in the structure of wage replacement benefits. Temporary and long-term benefits were blended into one program called Loss of Earnings (LOE). Thus no distinction was made between short-term and long-term disability benefits. All time loss claims received LOE

benefits, with assessments being reviewed on a less scheduled basis compared to the FEL. Furthermore, wage-replacement benefits were reduced from 90% to 85% of net earnings. Injured workers sustaining a permanent impairment continued to receive a NEL award based on the same formulation.

The British Columbia sample is from the pre-Bill 49 era, during which the province had a bifurcated program for determining long-term disability benefits. This program was substantially changed in 2002 with the introduction of Bill 49. With the bifurcated program two methods of wage-replacement benefit calculations were considered for all injured workers with permanent impairments—one based on loss-of-function (LOF)/permanent-impairment (using a ratings guide similar to the American Medical Association Guide) and another based on loss-of-earnings-capacity (LOE). A worker was eligible for whichever benefit was higher. Specifically, injured workers received either 75% of pre-injury before-tax earnings times the percentage of permanent impairment, or 75% of the difference between pre-injury before-tax earnings and post-injury before-tax earnings. Approximately 85% of injured workers received an LOF award and 15% an LOE award.

Preliminary Research Undertaken by the Research Team

We have undertaken preliminary work on low income following permanent impairment from a work injury using data from the linked database described above. More details about the linked samples are provided in the methods section. The findings we report on here are of the Ontario PD and FEL/NEL programs and the British Columbia bifurcated program.

We used Statistics Canada‘s Low Income Measure (LIM) to identify an injured worker in poverty. The LIM is defined as 50% of median income. The LIM is adjusted for composition and size of the family using an equivalence scale in which the first individual is assigned a weight of one, subsequent individuals are assigned a weight of 0.4 if they are aged 16 or over, and 0.3 if

they are younger than 16. No adjustments are made for community size and region of residence. The LIM is meant to be used as a relative measure. LIM values have changed over time with the business cycle and on average have increased over time with the growth of income of the Canadian population.

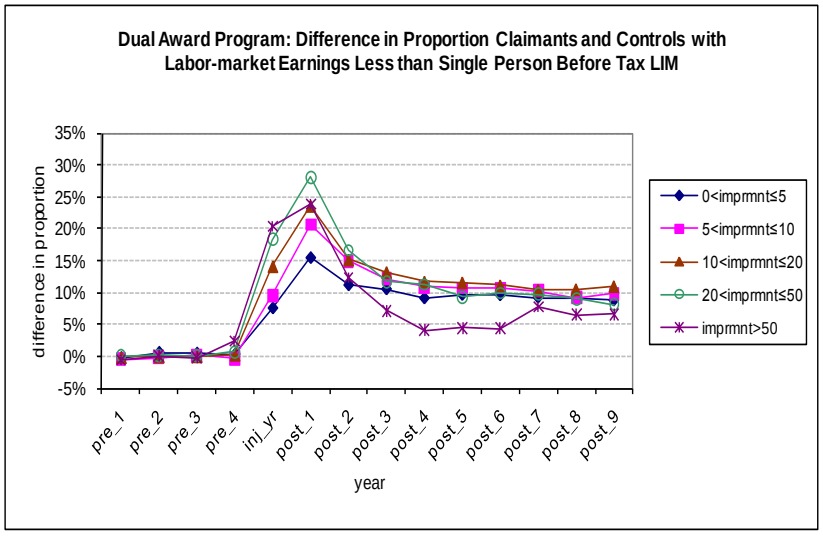
We consider only the earnings of injured workers in the two samples and a matched, non-injured control group (i.e., family income was not considered in this preliminary analysis). The principle matching characteristics were age, gender and labour-market earnings amounts and trajectories in the four years prior to work injury, as well as a propensity score.

Graphs 1, 2 and 3 present the differences between the proportions of injured workers and controls whose before-tax labour-market earnings are below the LIM value for a single individual in each year. The three samples have been stratified by impairment bracket. One would expect the proportion of injured workers and controls below the LIM to be similar in the years prior to the injury, since the matching was based on pre-injury labour-market earnings. As might be expected, the difference in proportions increases post-injury for all brackets. Noteworthy is the fact that the difference in proportions is relatively similar for all brackets, ranging from 5-13% nine years post-injury. One might have expected the difference to increase substantially with higher impairment brackets, but this is not the case. For the post-1990 BC program the range of differences is a little higher, from 9-13%, than for the Ontario PD and FEL/NEL programs. What can be established from these graphs is that a small fraction of the injured workers from all three programs have a higher probability of having inadequate income compared to their control counterparts, if they were to rely solely on their labour-market earnings. This probability appears unrelated to impairment level.

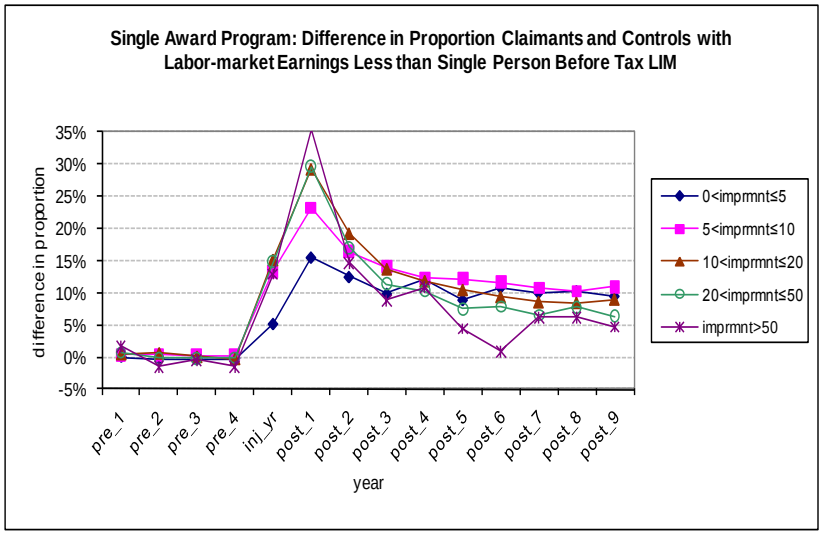
We have also undertaken a preliminary investigation of the distribution of earnings recovery by impairment bracket for three of the long-term disability programs—the Ontario PD, Ontario FEL/NEL and BC bifurcated programs. We found some evidence that type of program may affect labour-market earnings post injury. Specifically, an analysis of the distribution of earnings

recovery over 9 years post injury identified that the bifurcated program had a greater proportion of injured workers in the top two labour-market earnings recovery quartiles (i.e., recovering >50% of control labour-market earnings) than the other two programs for all impairment brackets. This may, in part, be attributable to the fact that the sociodemographic characteristics of the BC cohort are different from the two Ontario cohorts. Principally, the BC cohort has more men. Sectoral composition in the two provinces is also different, and these differences may be represented in the occupations of injured workers, though we do not have occupation available in the linked data. Details of the yearly differences in earnings recovery by cohort are provided in Graph 1 below.

Graph 1 Ontario PD Program



Graph 2 Ontario FEL/NEL Program



Graph 3 British Columbia Program

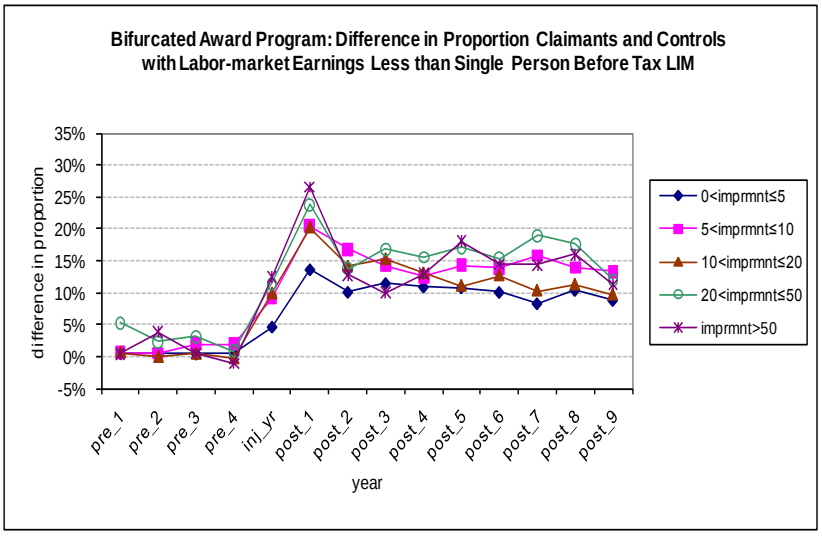


Table 1: Proportion of Injured Workers Recovering > 50% of Control Earnings

		Number of Years Post Accident								
Impairment Bracket	**Program**	**post_1**	**post_2**	**post_3**	**post_4**	**post_5**	**post_6**	**post_7**	**post_8**	**post_9**
0<impairment<=5	ON- Single Award (PD)	66%	67%	65%	60%	57%	57%	57%	57%	56%
	ON- Dual Award (FEL/NEL)	60%	62%	61%	62%	63%	63%	63%	64%	64%
	BC- Bifurcated	65%	69%	69%	68%	69%	67%	68%	68%	68%
5<impairment<=10	ON- Single Award (PD)	48%	51%	50%	48%	46%	45%	46%	48%	49%
	ON- Dual Award (FEL/NEL)	51%	54%	54%	55%	56%	56%	57%	57%	58%
	BC- Bifurcated	49%	53%	55%	56%	56%	60%	59%	61%	62%
10<impairment<=20	ON- Single Award (PD)	36%	39%	38%	36%	35%	34%	34%	35%	36%
	ON- Dual Award (FEL/NEL)	41%	43%	44%	45%	45%	46%	48%	50%	49%
	BC- Bifurcated	44%	50%	56%	52%	53%	55%	53%	56%	56%
20<impairment<=50	ON- Single Award (PD)	30%	30%	27%	26%	23%	20%	20%	19%	19%
	ON- Dual Award (FEL/NEL)	28%	30%	29%	29%	29%	31%	32%	32%	34%
	BC- Bifurcated	37%	43%	37%	37%	37%	41%	42%	43%	42%
impairment>50	ON- Single Award (PD)	23%	20%	16%	12%	12%	11%	14%	12%	8%
	ON- Dual Award (FEL/NEL)	17%	--	12%	12%	13%	15%	14%	13%	15%
	BC- Bifurcated	18%	25%	--	17%	18%	14%	11%	12%	--

Research Objectives

We investigate the prevalence of poverty across different time periods and different legislative programs using a large representative sample of injured workers who have sustained a permanent impairment from a work injury. The sample includes injured workers who received benefits from four programs—the pre-1990 Ontario program (Bill 101), the 1990-1997 Ontario program (Bill 162), the 1998 Ontario program (Bill 99), and the bifurcated British Columbia (pre-Bill 49) program. The following table provides a summary of the key characteristics of the four programs and details on the sample frames for each cohort.

Table 2: Summary of Four Programs

Key Characteristics	Post-1998 (Bill 99) LOE cohort (1998)	Post-1990 (Bill 162) FEL/NEL cohort (1990-1994)	Pre-1990 (Bill 101) PD cohort (1986-1989)	BC Bifurcated (Pre-Bill 49) BC cohort (1990-1994)
Core benefit type	Loss-of-earnings capacity based	Loss-of-earnings capacity based	Impairment based	Two possibilities Loss-of-earnings, or Loss-of function
Duration of benefits	Until no loss of earnings capacity assessed, or age 65	Until no loss of earnings capacity assessed, or age 65	lifetime	lifetime
Replacement rate	85%	90%	90%	90%
Other characteristics	Labour-market Re-entry (LMR) less structured Self-reliance	Labour-market Re-entry (LMR) highly structured	Vocational Rehabilitation (VR)	Vocational Rehabilitation (VR)

We investigate the association between programmatic and temporal factors and the probability of poverty for injured workers receiving benefits under each of the four programs. The analyses address the following specific research questions:

1. What is the prevalence of poverty amongsts injured workers with permanent impairments and how does it differ from that of matched, uninjured controls?

2. Has the prevalence of poverty amongst injured workers changed over time?

3. Does the program under which injured workers receive benefits bear on the prevalence of poverty?

4. What is the magnitude and significance of the relationship between individual, programmatic, temporal, and other contextual factors on the probability of poverty for injured workers?

We use Statistics Canada's Low Income Measure (LIM) to define poverty, i.e., earnings below the LIM would be considered poverty. Labour-market earnings, labour-market earnings plus workers' compensation benefits, and family earnings from all sources adjusted for family size are each considered in our analyses.

Methods

Hypotheses

Based on our review of the literature, we have identified the following specific hypotheses that will be central to our analyses:

> Hypothesis 1: The prevalence of poverty has increased over time amongst permanently impaired injured workers by a larger amount than amongst able-bodied workers.
>
> Hypothesis 2: Programmatic features bear on the probability of being in poverty for injured workers, even after controlling for temporal factors associated with labour-market changes.
>
> Hypothesis 3: In a more fully specified statistical model that controls for individual and contextual factors, the probability of poverty for injured workers will be higher in more recent time periods and will also be related to the program under which benefits are received.

Data Sources

The principal database used in this study is the Longitudinal Administrative Databank (LAD). The LAD is a simple random sample of 20% of Canadian tax filers. The database contains yearly information on individuals beginning in 1982 through to most recent time periods. New years are added as the tax files become available. The LAD has become increasingly representative of the Canadian population with time, particularly with the introduction of tax credits in the late 1980s that encouraged low-income individuals to file tax returns. Upwards of 95% of adults of working age file taxes, so the database is particularly representative of the working age population. Individuals are selected into the LAD via their Social Insurance Number (SIN). Once selected, they are picked up every year, if present, along with their census family. There is no age restriction for selection into the LAD, but individuals

must have a SIN. Individuals without a SIN can only be present in the family component of the file. Each year the LAD file is topped off with 20% of new tax filers in order to keep the database representative of the tax filing population, both cross sectionally and longitudinally. Longitudinal profiles of individuals and their census families are created by linking the yearly LAD files via an individual identifier.

This study draws on the linkage of WSIB and WorkSafeBC claims data consisting of injured workers with long-term disability claims from four different programs. The size of the sample frame for each of the legislations programs are as follows:

1) Ontario PD program (Bill 101): 1986-1989, sample frame of 79,222 injured workers;

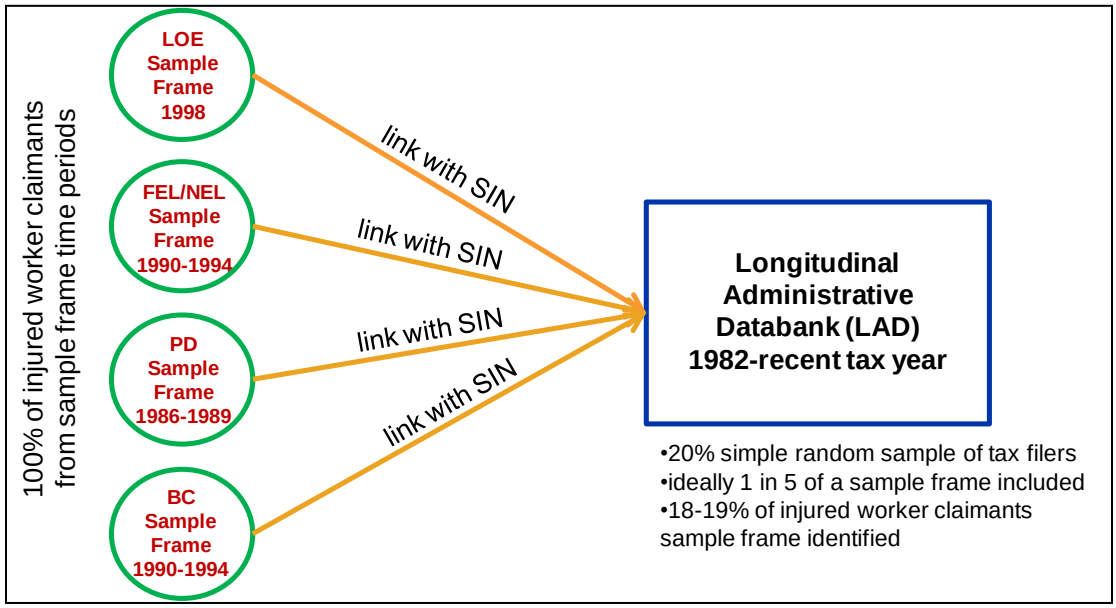
2) Ontario FEL/NEL program (Bill 162): 1990-1994, sample frame of 79,757 injured workers;

3) Ontario LOE program (Bill 99): 1998, sample frame of 8,304 injured workers; and

4) WorkSafeBC bifurcated program (pre-Bill 49): 1990-1994, sample frame of 21,240 injured workers.

The following diagram provides a visual representation of how the linkage was undertaken.

Diagram 1: Representation of the Linkage Process



The following table provides a summary of the key characteristics of injured worker cohorts linked to the LAD file.

Table 3: Characteristics of Linked Samples from Four Programs^^

	LOE	FEL/NEL	PD	BC
	1998	(1990-1994)	(1986-1989)	(1990-1994)
Linked cohort	1,245	11,975	11,190	2,765
females	32%	34%	29%	17%
males	68%	66%	71%	83%
age<=24 in injury year	4%	5%	7%	6%
25<=age<=34 in injury year	21%	27%	26%	26%
35<=age<=49 in injury year	51%	45%	42%	42%
50<=age<=59 in injury year	24%	24%	25%	25%
0%<impairment<=5%	19%	23%	28%	64%
5%<impairment<=10%	19%	21%	29%	19%
10%<impairment<=20%	35%	33%	31%	11%
20%<impairment<=50%	25%	22%	11%	5%
impairment>50%	2%	1%	1%	1%
pre-injury income<$20K	12%	13%	12%	14%
$20K<=pre-injury income<$40K	35%	35%	31%	26%
$40K<=pre-injury income<$60K	29%	32%	32%	30%
pre-injury income>=$60K	25%	20%	25%	31%

Highlighted cells represent substrata within a characteristic (sex, age bracket, impairment bracket and pre-injury earnings bracket) with the largest proportion of observations.

Due to the nature of the LAD sampling process (i.e., a simple random sample) we would expect to identify, at an optimum, 20% of each of the injured worker sample frames in the LAD. The linkage identified between 18-19% of the sample frames, which suggests the linkage was quite successful. Consequently, we can be confident that the injured workers identified in the LAD through this linkage are a good representation of all the injured workers from our sample frames. Furthermore, since we started with the full sample frame of all injured workers in the window period who met the inclusion criteria, we can be confident that other individuals in the LAD are not injured with workers' compensation claimants from our sample frame or during the sample frame time period.

The primary claims information is total days on benefits, type and amount of benefit receives each year, percentage of permanent impairment, percentage of loss of earnings capacity (if applicable), FEL decision dates (if

applicable), FEL percentages (if applicable), and information on previous and subsequent claims (if applicable).

The LAD files have yearly information on four categories of variables: individual, spouse, family, and children. The files contain data on income sources and amounts, taxation data, and socio-demographic information for each category of variables. Changes in tax legislation over the years have resulted in some variables not being available for all years and have caused other variables to vary slightly in definitions in some years, but labour-market earnings sources and amounts and key socio-demographic variables are available and consistent in all years.

The analytic component of the analysis draws on two methodological approaches. The first is a matching process in which injured workers in each sample are matched with uninjured controls in the LAD based on key characteristics associated with the outcome of interests (i.e., low income/poverty). The second is multivariate regression modeling of the determinants of low income. Reville et al. (1999) presents criteria for assessing the merits of employing a matching approach versus a regression approach given the characteristics of a dataset. A matching approach is useful if the dataset has few covariates but many potential controls, whereas a regression approach is useful if there are many covariates but few potential controls. Other merits of the matching approach cited by Reville et al. (1999) are that it is more nonparametric and intuitive.

Research Methodology 1: Injured Worker-control Matching and Analysis

The method we use for matching is known as the “nearest available Mahalanobis metric matching within calipers defined by the propensity score” (Rosenbaum and Rubin, 1985). In this approach bias is substantially reduced by use of a propensity score. The propensity score is an estimate of the conditional probability of exposure (in this case exposure is defined by being a injured worker with a workers’ compensation claim in the jurisdiction and

window period of interest) given a set of covariates taken from before the exposure of interest. As Rosenbaum and Rubin point out, the propensity score is the most important scalar matching variable (Rosenbaum and Rubin, 1985, p. 35).

To match injured workers to controls, we select up to ten controls for each injured worker based on pre-injury labour-market earnings, sex, age, family type (e.g., single, married no children, married with children) and family income. Five controls per cohort is considered sufficient for matching purposes, but given the large size of our database, we have found that it is possible to identify as many as 10 good matches for our injured worker samples. In fact, in previous studies using the LAD, we have been able to identify 5-10 controls for more than 80% of injured workers. The essential criterion for candidate controls is that they are living in Ontario/British Columbia in the injury year of the candidate injured worker match, that they have wage and salary earnings in the injury year, and that they are present in the database in at least one of the four years prior to the injury year of the candidate injured worker match. Some of matching characteristics require an exact match between the injured worker and control and the others require a match within some acceptable range. Four of the exact match characteristics are province of residence, sex, marital status, and presence of kids under 18 in any of 4 years prior to injury year. The non-exact match characteristics are age, presence patterns in the database in each of the four years prior to injury, wage and salary earnings in each of those four years, average size-adjusted family income in the four years prior to injury, and a propensity score.[1] After candidate controls meet the exact match criteria and fulfill the propensity score criteria a weighted distance (closeness of the match) is calculated for the non-exact match characteristics. The following formula is used to calculate the weighted distance between an injured worker and a

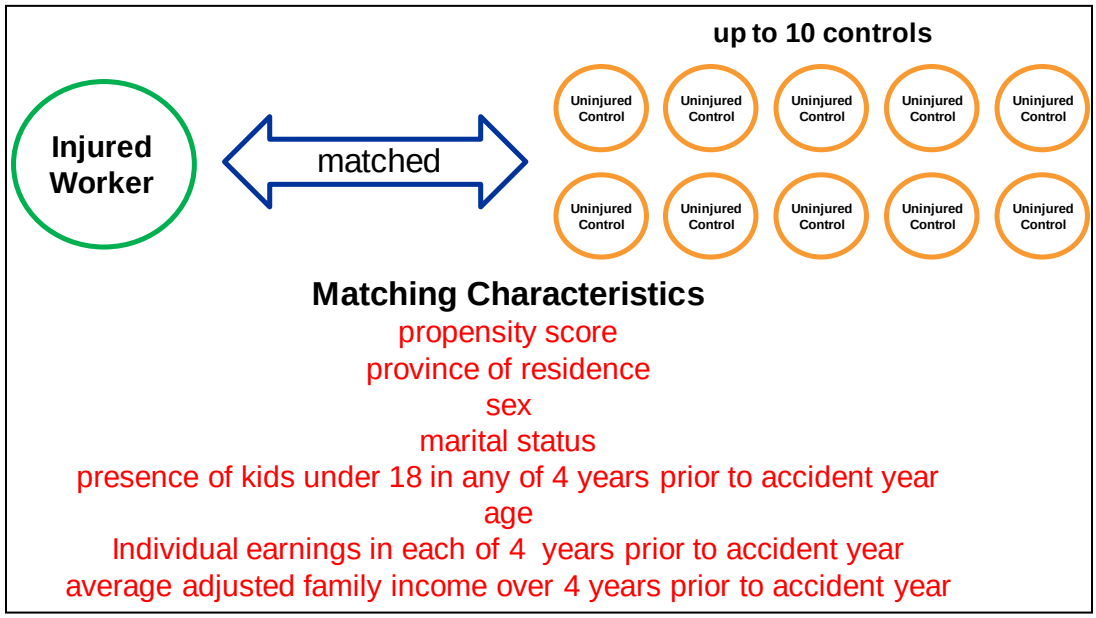
[1] Propensity scores is calculated based on a logit regression model of the probability of being an injured worker in the sample frame based on explanatory variables including age, zex, individual labour-market earnings, total family income, region of residence, substantial self-employment income, presence patterns, and year of injury.

candidate control:

$$D_{ec} = w_1|age_e - age_c| + \sum_{t=1}^{t=4} w_2(dummy_{ect}) + \sum_{t=1}^{t=4} w_3|log(labour\ earnings_{et}) - log(labour\ earnings_{ct}) + w_4(\sum_{t=1}^{t=4} log(faminc_{et})/4 - \sum_{t=1}^{t=4} log(faminc_{ct})/4)$$

where D_{ec} is the total distance between the injured worker/event (e) and candidate control (c), w_1 is the weight given to the age difference, w_2 is the weight given to the matching of years, $dummy_{ect}$ is 0 if the presence pattern matches in year t and 1 otherwise, w_3 is the weight given to labour-market earnings differences between event and control, $labour\ earnings_{et}$ and $labour\ earnings_{ct}$ are event and candidate control labour-market earnings in year t, w_4 is the weight given to the difference in average adjusted family income, and $faminc_{et}$ and $faminc_{ct}$ are adjused family income for event and control in the four years prior to injury. The selection of controls is randomized and undertaken without replacement in order to simplify the weighting of observations for statistical purposes. Final selection of controls is based on the smallest total distance between an injured worker and control. A maximum of ten controls are selected for each injured worker observation. Following is a diagram depicting the matching process.

Diagram 2: Depiction of Matching Process



There are several reasons for matching injured workers with contemporaneous controls:

- Injured workers from different time periods may differ in their demographic profiles;
- Comparison with pre-injury earnings varies by age group because earnings growth is more dramatic at younger ages;
- Economic conditions also vary over time; and
- Matching provides insights into whether differences in outcome across injured worker cohorts are attributable to differences in individual characteristics, labour-market conditions, or programmatic supports.

We also look at absolute levels of poverty as well as levels relative to controls.

After completing the matching, we address the various hypotheses and objectives described above. As noted, to determine if an injured worker or

control is in poverty, we use the LIM and first consider only income from labour-market earnings at the individual level and then consider labour-market earnings plus workers' compensation benefits at the individual level. At the family level, we consider after-tax income from all sources adjusted for family size. The following table provides an example of LIM values for different family compositions for the year 2007.

Table 4: 2007 After-tax LIM Values

	Number of children					
	0	1	2	3	4	5
2007	dollars					
1 adult	16,025	22,435	27,243	32,050	36,858	41,665
2 adults	22,435	27,243	32,050	36,858	41,665	46,473
3 adults	28,845	33,653	38,460	43,268	48,075	52,883
4 adults	35,255	40,063	44,870	49,678	54,485	59,293

We also use some additional LIM related constructs in the analysis as follows:

- Deep Poverty: <50% of LIM
- Poverty: 51-100% of LIM
- Near Poverty: 101-150% of LIM
- Above Poverty: >150% of LIM

Key questions addressed are: what is the prevalence of low poverty following a work injury that results in a permanent impairment, and has it increased over time with more recent workers' compensation programs? To address Hypothesis 1, we use a difference-in-difference approach. The first level of differencing is based on the difference between the post-injury probabilities of poverty for injured workers versus their matched controls. The second level of differencing is based on the difference between incremental

injured worker-control probabilities of being in poverty across the four programs. Details are as follows:

Difference in probability of poverty in Cohort 1 at time t

$= D_{cohort1,t} = [_{e=1}\sum^{e=N}$ injured worker has low income $(0/1)_t] / N -$

$[_{e=1}\sum^{e=N} (_{c=1}\sum^{c=10}$ control has low income $(0/1)_{t,c} /C)] / N$

Difference in difference between two injured worker cohorts = $D_{cohort1,t} - D_{cohort2,t}$

where $D_{cohort1,t}$ and $D_{cohort2,t}$ are the differences between the probability of poverty between injured workers and controls at *t* years post injury for cohort 1 and 2; *N* is the number of injured workers in a particular sample/sub-sample; and *C* is the number of controls associated with a particular injured worker in a particular year.

Alternatively, the calculation of poverty can be assessed over a set interval of time (e.g., over the ten years post-injury). The purpose of such an approach would be to address the "lumpiness" of workers' compensation benefits, which are sometimes paid as a lump sum or on occasion retrospectively. We take this approach, using a 10-year time period, for family income adjusted for family size.

Research Methodology 2: Regression Modeling Analysis

We undertake two sets of regression models. In the first set, three categories of poverty are considers— above poverty (>150% of LIM), near poverty (101-150% of LIM), and in poverty (0-100% of LIM). In these models we only include the FEL/NEL and PD cohorts due to small sample size of the LOE cohort. The BC cohort is not included since it is contemporaneous to the FLE/NEL cohort. In the models we controlled for program, years since injury,

demographic characteristics, region of residence, impairment level, and pre-injury earnings. Separate models are estimated for women and men.

In the second set of regression models we include both claimants and controls in order to identify the incremental probability of poverty for claimants in each program. Here too we only included FEL/NEL and PD cohorts. We create 4 categories indentifying program cohort and claimant/ control: PD claimant, PD control, FEL claimant, FEL control. This allowe us to identify odds ratios of poverty levels for claimants versus controls for each of the two programs.

Results

Individual Earnings Analyses

Results for earnings analyses at the individual level include two categories of earnings:

1. Yearly after-tax labour-market earnings only; and

2. Yearly after-tax labour-market earnings plus workers' compensation benefits.

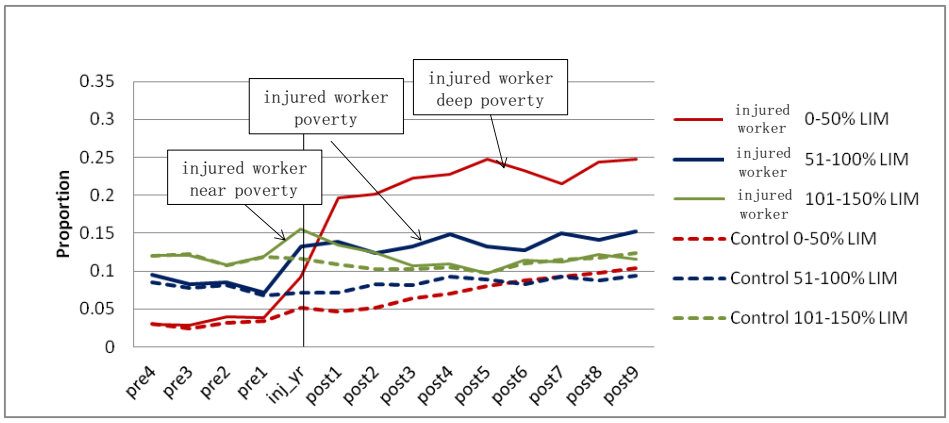
These yearly earnings categories are compared to the yearly LIM values to identify the proportion of injured workers and their control counterparts that would be in poverty. This analysis can be viewed as a hypothetical scenario since injured workers may have had earnings from other sources. Furthermore, the convention for poverty analyses is to estimate poverty levels at the family level with all income sources considered. The purpose of thee individual earning analyses is to assess whether the combination of after-tax labour-market earnings and workers' compensation benefits would be sufficient to keep injured workers out of poverty.

We begin with the LOE program to demonstrate the analysis approach taken. Graph 4 presents results only for the LOE program. It identifies the proportion of the injured workers and controls from that program who were in deep poverty (0-50% LIM), poverty (51-100% LIM) and near poverty (101-150% LIM) in each year starting with 4 years prior to the injury year, on through to 9 years post injury. Only after-tax labour-market earnings of these individuals were considered in this graph.

As is apparent in Graph 4, the proportion of the injured workers in poverty in each category is the same as the controls prior to the injury year and then increases thereafter, particularly for the deep poverty category. For example, nine years post injury it was 25% of the sample for injured workers, and only 10% for controls, i.e., 2.5 times larger. Graph 5 shows the same results, but in

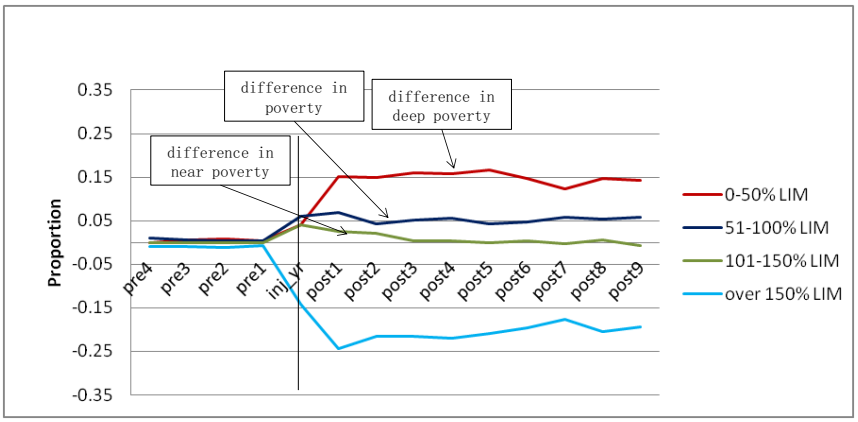
difference form, i.e., the proportion of injured workers in each category less the proportion of controls. Note that this is an absolute difference of the proportion in poverty, rather a proportional difference.

Graph 4: LOE program yearly poverty *levels* of injured workers and controls with hypothetical scenario of only after-tax labour-market earnings



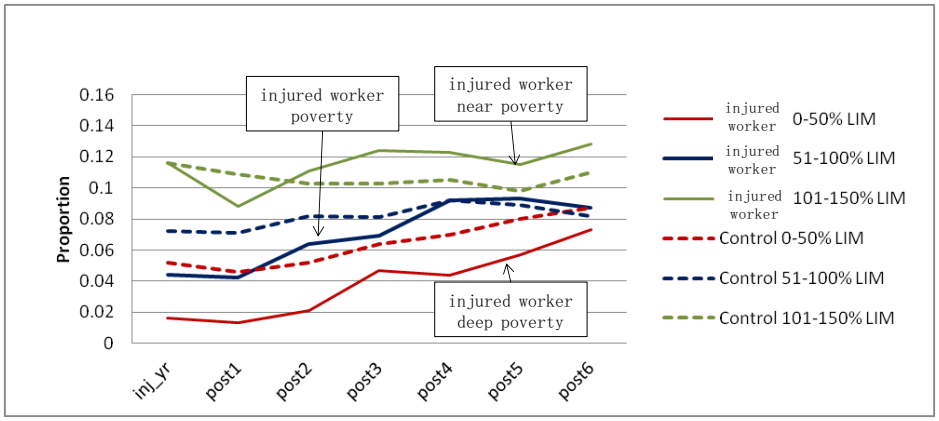
NB: The 151%+ group (being well above poverty) is not shown.

Graph 5: LOE program *differences* in yearly poverty levels of injured workers versus control with hypothetical scenario of only after-tax labour-market earnings



Graph 6 also presents the poverty categories for injured workers and controls for the LOE program, but in this graph benefits have been added to their after-tax earnings. Consequently, the proportion of injured workers in each of the poverty categories is smaller. In fact, the proportions in deep poverty (0-50% LIM) and poverty (51-100% LIM) are nominally smaller for injured workers than controls. Noteworthy is that the proportions in each of the poverty categories increase over time for both injured workers and controls.

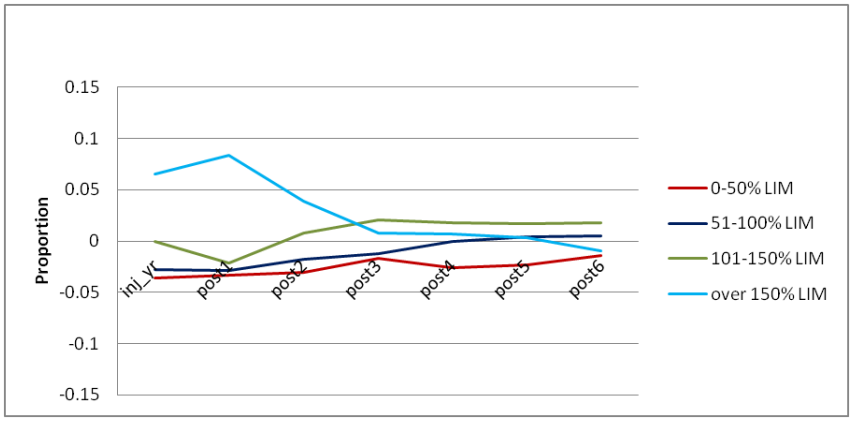
Graph 6: LOE program yearly poverty *levels* with hypothetical scenario of after-tax labour-market earnings + benefits



NB Only 6 years post-injury are considered in this analysis because workers' compensation benefits information was only available for 6 years. The 151%+ group is not shown.

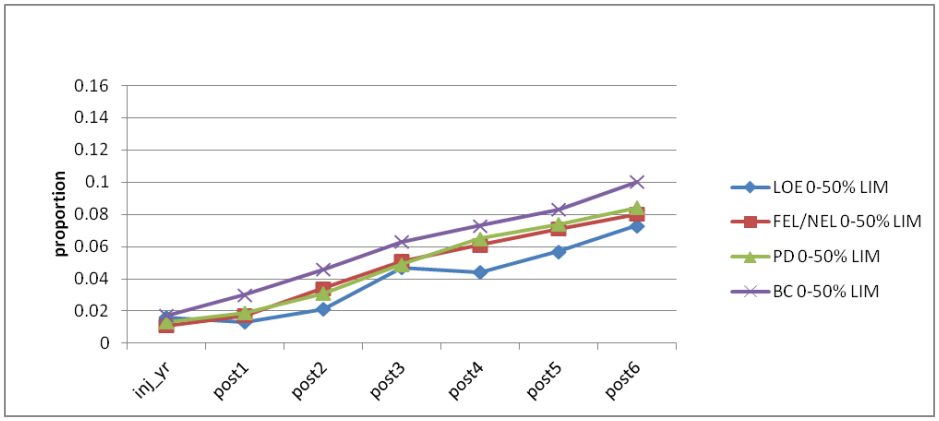
Graph 7 used the same data as Graph 6, but presents it in difference form, i.e., the proportion of injured workers in each category less the proportion of controls.

Graph 7: LOE program *differences* in yearly poverty levels of injured workers versus control with hypothetical scenario of after-tax labour-market earnings + benefits

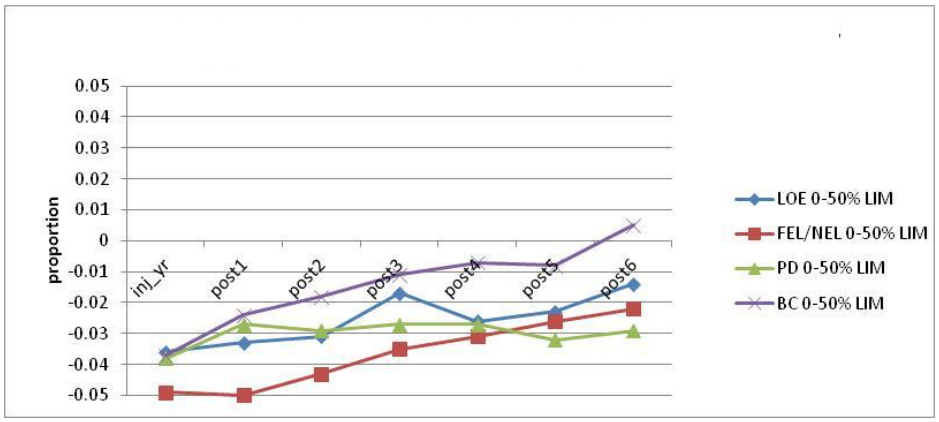


In the following graphs we present all four programs in each graph in order to be able to compare the poverty outcomes across programs. We start with the deep poverty category (0-50% LIM). In Graph 8, the deep poverty category for all four programs is presented. The proportions are based on labour-market earnings plus workers compensation benefits. Deep poverty levels range from a low of 2% to a high of 10%. The proportions in deep poverty are lowest for the LOE program and highest for the BC program. Noteworthy is that the proportions for all four programs increases over time from the injury year. Graph 9 presents the difference in the proportion in deep poverty between injured workers and controls for each of the four programs. This graph is based on labour-market earnings plus workers' compensation benefits. In this hypothetical scenario injured workers appear to have slightly lower levels of deep poverty than controls.

Graph 8: LOE, FEL/NEL, PD, and BC programs yearly deep poverty *levels* for injured workers with hypothetical scenario of after-tax labour-market earnings + benefits

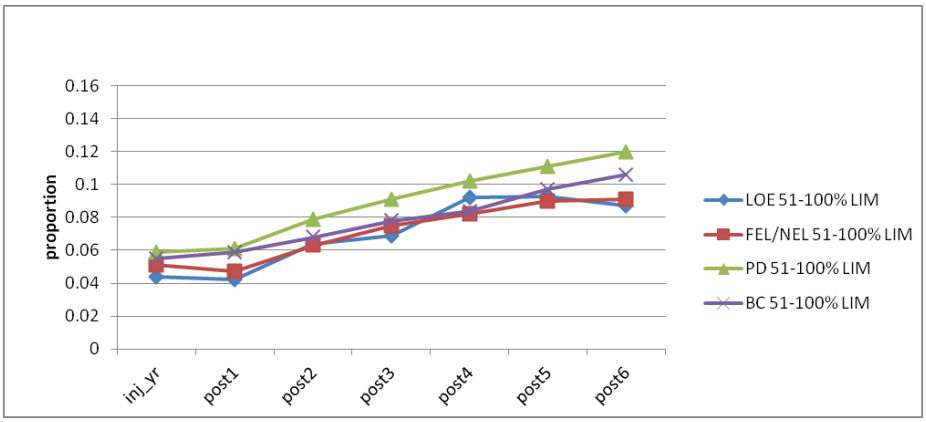


Graph 9: LOE, FEL/NEL, PD, and BC programs yearly *differences* in deep poverty levels for injured workers versus controls with hypothetical scenario of after-tax labour-market earnings + benefits

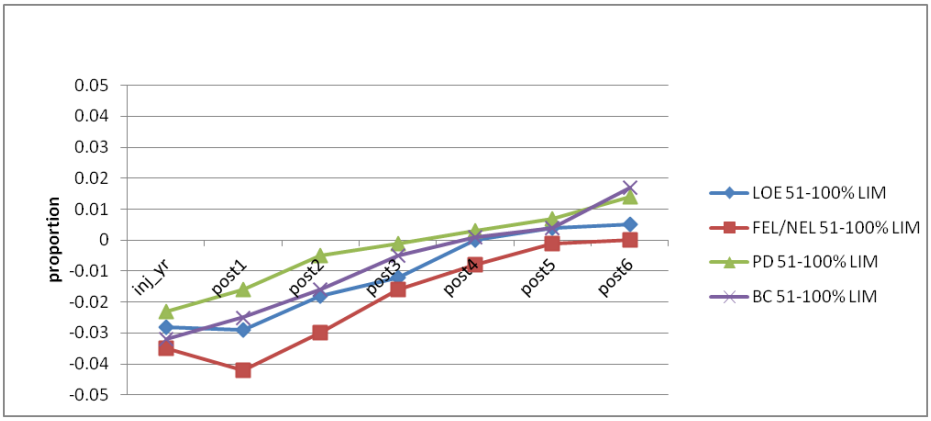


Next we consider the poverty category (51-100% LIM). Graph 10 present the poverty category for the four programs. Poverty levels range from low of 4% to a high of 12% and also increase over the time post injury year. Levels appear similar for the LOE, FEL/NEL, and BC programs, but are nominally higher for the PD program. Graph 11 presents the difference in poverty levels between injured workers and controls. Poverty level differences are below zero for most programs in most years, but increase with time following the injury year.

Graph 10: LOE, FEL/NEL, PD, and BC programs yearly poverty *levels* for injured workers with hypothetical scenario of after-tax labour-market earnings + benefits



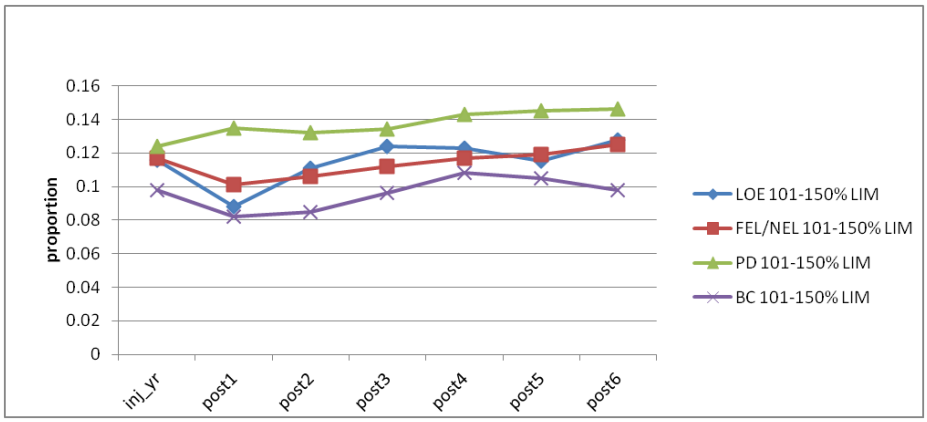
Graph 11: LOE, FEL/NEL, PD, and BC programs yearly *differences* in poverty levels for injured workers versus controls with hypothetical scenario of after-tax labour-market earnings + benefits



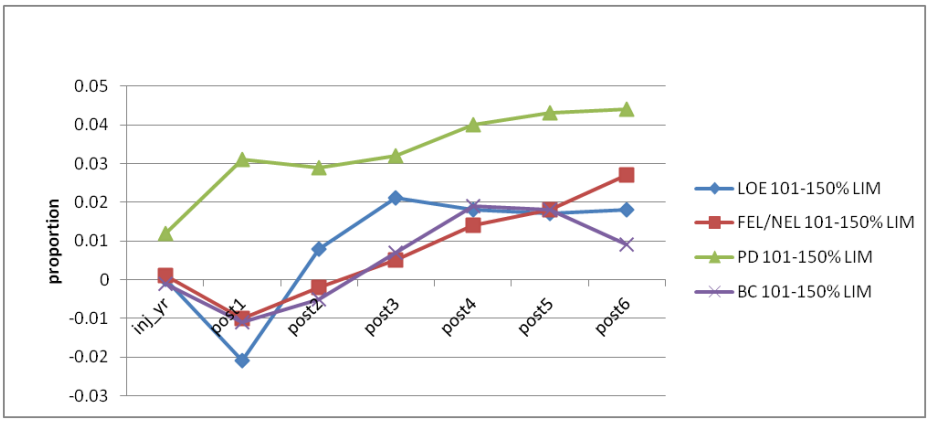
Lastly we consider the near poverty category (101-150% LIM). Graph 12 presents the near poverty category for the four programs. Near poverty levels range from a low of 8% to a high of 14%, with PD program having the highest levels. There appears to be less of a growth in the proportion in near poverty

over time compared to the trend observed with deep poverty and poverty categories. Graph 13 presents the difference in near poverty levels between injured workers and controls. Poverty level differences increase with time following the injury year, but remain low. Near poverty level differences are highest for the PD program (3-4% higher than controls).

Graph 12: LOE, FEL/NEL, PD, and BC programs yearly near poverty *levels* for injured workers with hypothetical scenario of after-tax labour-market earnings + benefits



Graph 13: LOE, FEL/NEL, PD, and BC programs: yearly *differences* in near poverty levels for injured workers versus controls with hypothetical scenario of after-tax labour-market earnings + benefits



Family Earnings Analysis

Results for earnings analysis at the family level are clustered into two broad categories:

1. After-tax family income from all sources (adjusted for family size) on a yearly basis; and

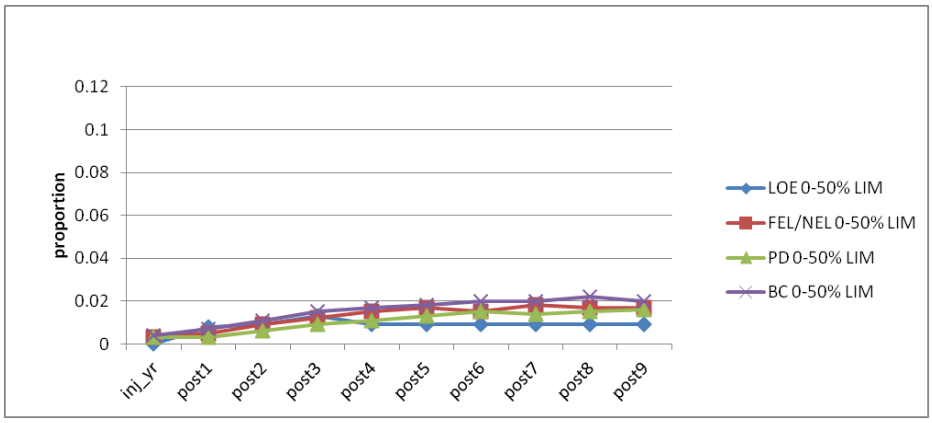
2. After-tax family income from all sources (adjusted for family size) over 10 years, discounted to the year of injury.

In the next set of graph, yearly after-tax total family income is used to assess the differences in poverty levels, by category, for injured worker families and the families of their matched controls. Family income is adjusted for family size for all calculations. Using adjusted family income is the accepted approach for assessing poverty.

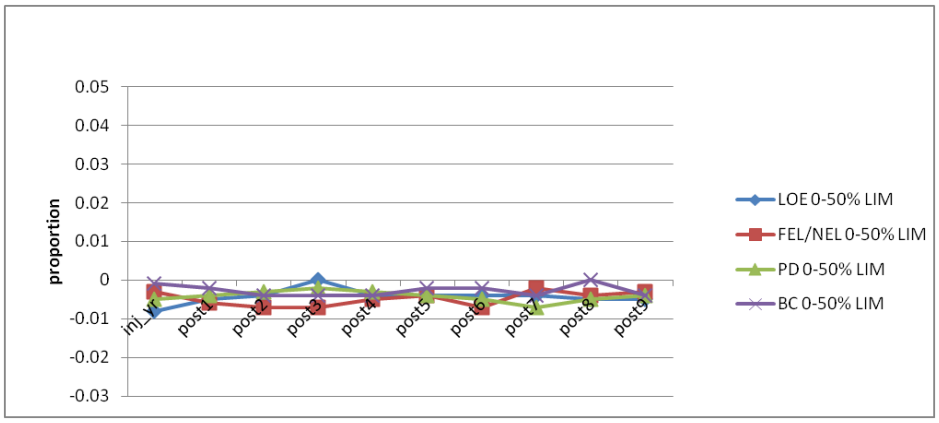
We start with the deep poverty category. Graph 14 presents the deep poverty category for the four programs. With family income, deep poverty levels are low for all programs, i.e., in the 2% range. Graph 15 presents the

differences deep poverty. Difference in deep poverty levels between claimants and controls are modest, i.e., slightly below zero.

Graph 14: LOE, FEL/NEL, PD, and BC programs yearly deep poverty *levels* for injured workers with after-tax family income adjusted for size

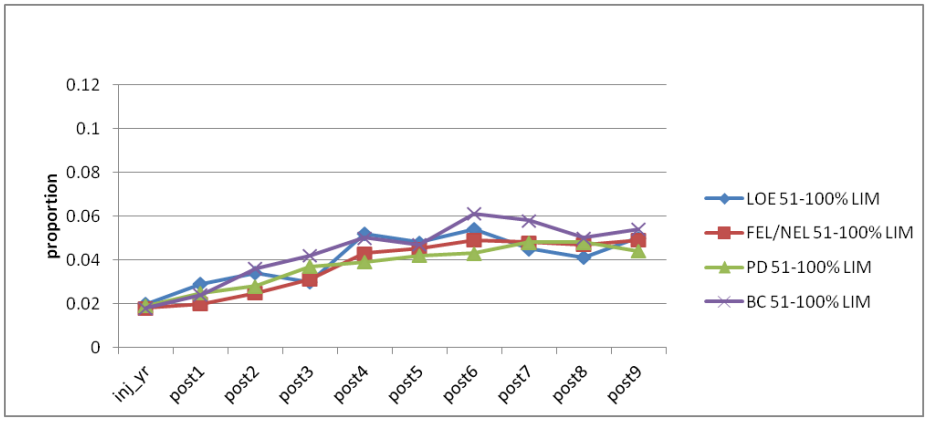


Graph 15: LOE, FEL/NEL, PD, and BC programs yearly *differences* in deep poverty levels for injured workers versus controls with after-tax family earnings adjusted for size

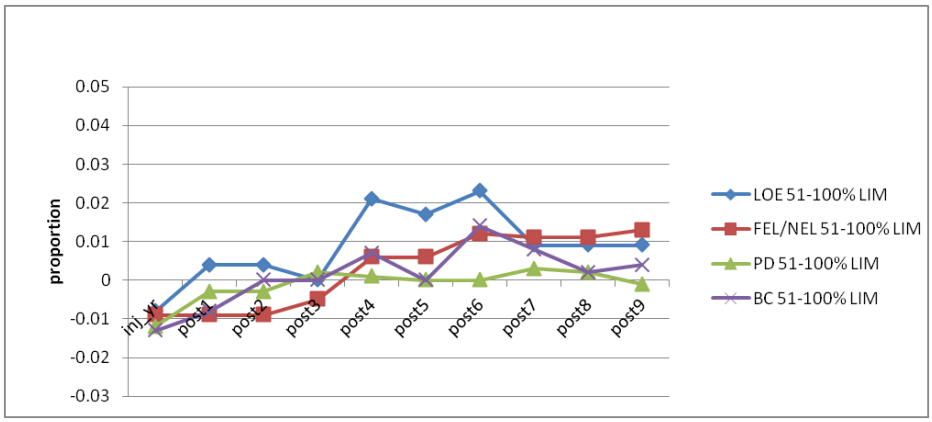


Next we consider the poverty category. Graph 16 presents the poverty category for the four programs. With family income, poverty levels range from 2-6% and increase in the years following injury. Graph 17 presents the differences in this category. Difference in poverty levels between injured workers and controls range from -1% to 2%, and increase slightly over time.

Graph 16: LOE, FEL/NEL, PD, and BC programs yearly poverty *levels* for injured workers with after-tax family income adjusted for size

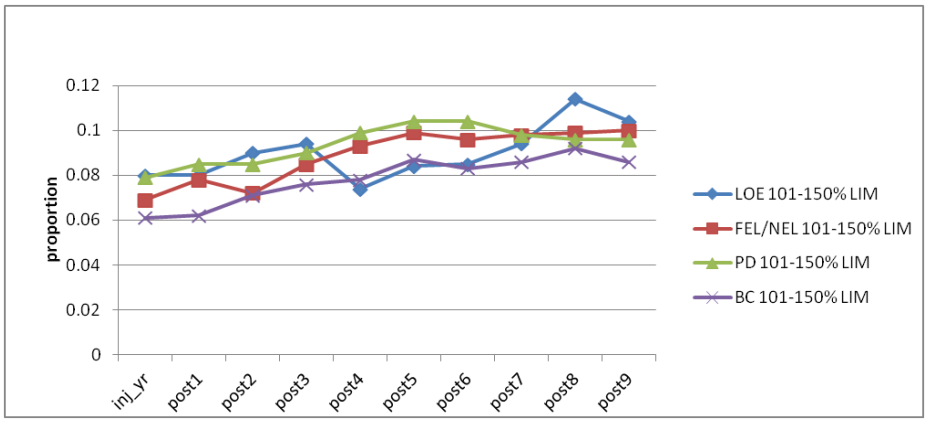


Graph 17: LOE, FEL/NEL, PD, and BC programs yearly *differences* in poverty levels for injured workers versus controls with after-tax family earnings adjusted for size

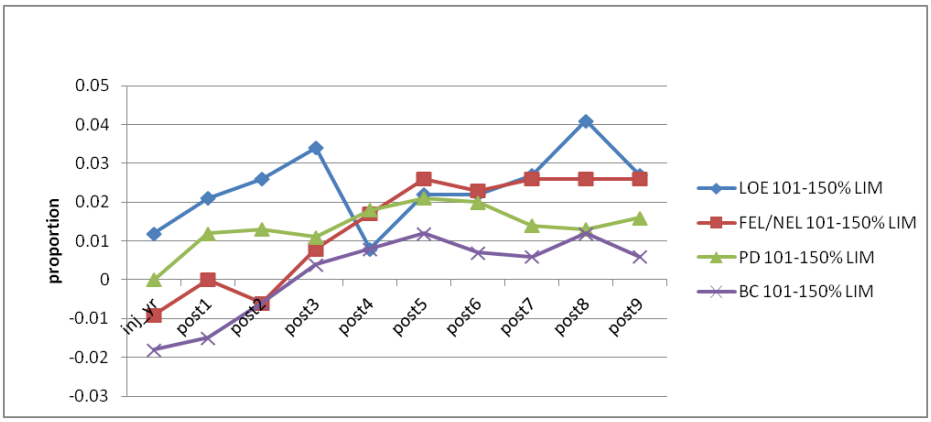


Lastly we consider the near poverty category. Graph 18 presents the near poverty category for the four programs. With family income, near poverty levels range from 6-11%. Graph 19 presents the differences for this category. Differences in near poverty levels between injured workers and controls range from -2% to 4%.

Graph 18: LOE, FEL/NEL, PD, and BC programs yearly near poverty *levels* for injured workers with after-tax family income adjusted for size



Graph 19: LOE, FEL/NEL, PD, and BC programs yearly *differences* in near poverty levels for injured workers versus controls with after-tax family earnings adjusted for size



In the last set of descriptive analyses we consider adjusted family income over 10 years discounted to the year of injury for both injured worker families and the families of their matched controls. To determine if an individual's family is in poverty over this 10-year period, the discounted adjusted family earnings are compared to the discounted LIM value for the 10 year period. As noted previously, this analysis is undertaken to address the "lumpiness" of some earnings such as workers' compensation benefits. Additionally, this analysis considers within family poverty levels over time, whereas the previous analysis was cross sectional, considering poverty levels at a point in time. Consequently one could not determine whether the same individuals were in poverty over several years, or whether it was different individuals each year.

Chart 1 presents the results of this 10-year analysis for the LOE program for three categories—deep poverty, poverty and near poverty. There is no difference in the proportion in deep poverty and only a modest difference in the proportion in poverty for claimant families versus the families of their matched controls. The major difference is in the near poverty category, where

there is a 2.8% higher probability of for injured worker families being in this category.

Chart 2 presents the same analysis but for the FEL/NEL program. With this program the differences between claimants and controls in the proportions are modest across all three categories.

Chart 1: LOE program 10 years of after-tax family income adjusted for family size compared to LIM

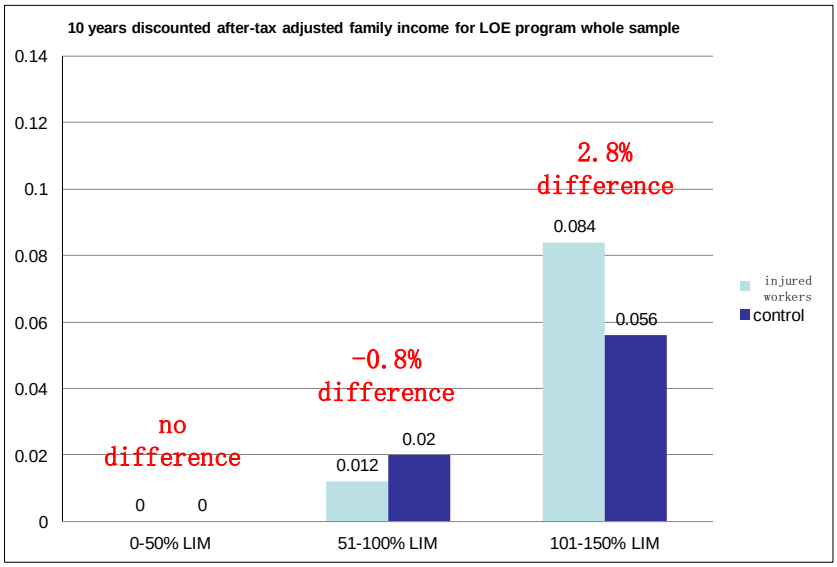


Chart 2: FEL/NEL program 10 years of after-tax family income adjusted for family size compared to LIM

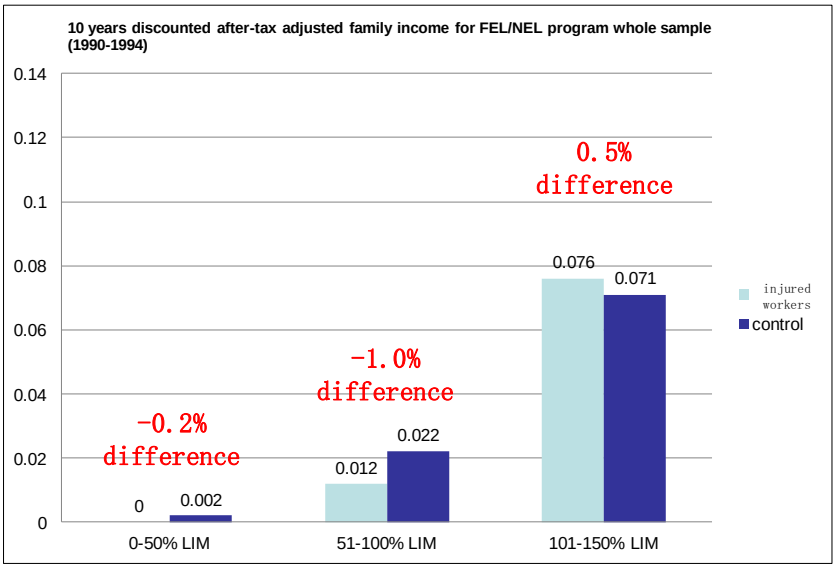


Chart 3 present this analysis for the PD program. With this program the difference in proportions is also modest across the three categories. The same is true for the BC program, shown in Chart 4. With the BC program, the differences in all three categories are negative, indicating that fewer claimant families are in these poverty categories compared to the families of their matched controls.

Chart 3: PD program 10 years of after-tax family income adjusted for family size compared to LIM

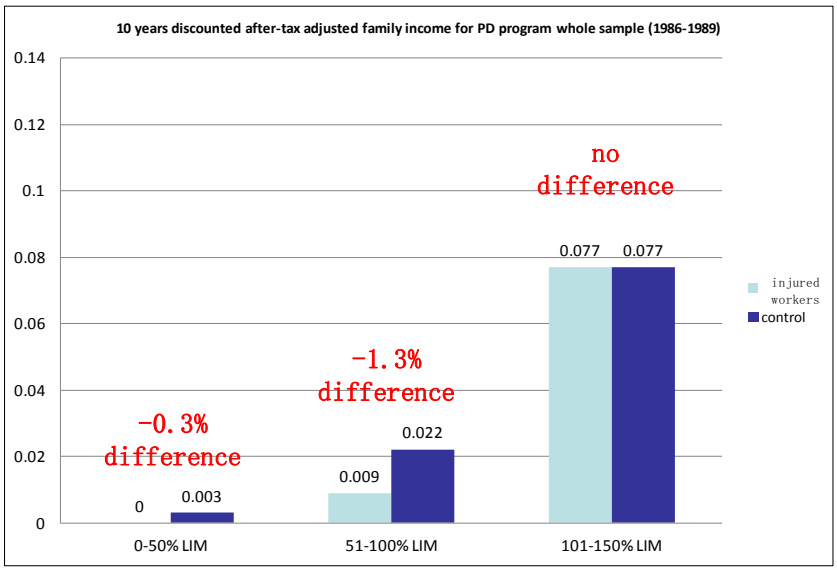
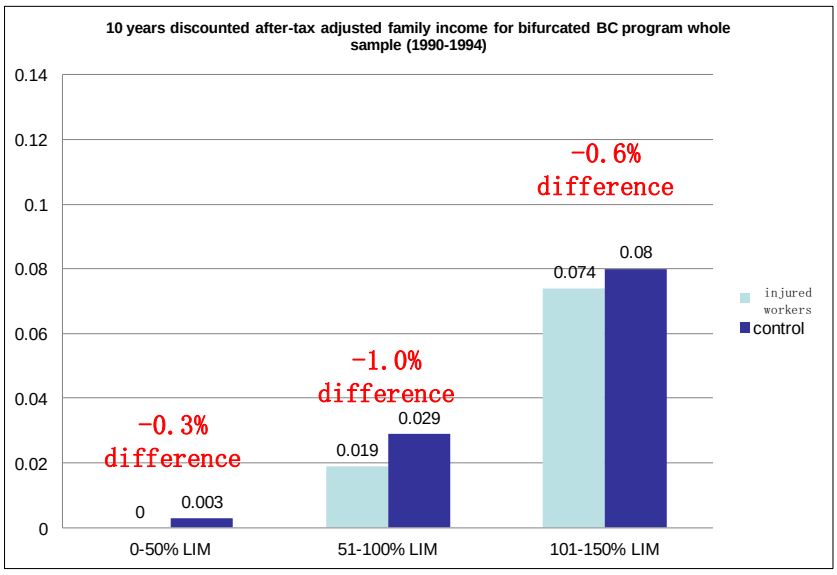


Chart 4: BC program 10 years of after-tax family income adjusted for family size compared to LIM



Regression Modeling Analysis

For regression modeling of the probability of being below the LIM we consider only the two program cohorts—the PD program and FEL/NEL program cohorts. Only these two programs are considered due to cohort sample size issues. Specifically, the LOE program cohort is a small sample (only one year of the program) with not enough observations to include it in a multinomial regression model. The BC bifurcated program cohort was deemed to be too different and therefore a less meaningful comparison, so it too is not included in this analysis.

For the first set of regressions, three categories of poverty are considers—in poverty (0-100% of LIM), near poverty (101-150% of LIM), and above poverty (>150% of LIM). In terms of explanatory variables, we control for program (PD versus FEL/NEL), years since injury, demographic characteristics, region of residence within Ontario (based on the first letter of the postal code), impairment bracket, and pre-injury labour-market earnings bracket. Separate models are estimated for injured workers and controls, as well as separate models for women and men. In the tables that follow, we present the finding for women and men separately, and only for a particular strata for each sex, namely individuals aged 35-49, within impairment bracket 11-20%, pre-injury labour-market earnings bracket of $20-40K, having one child under 16, and living in the Toronto area. All the modeling characteristics used in the analysis needed to be considered in order to identify the probability of being in a certain poverty category, hence the reason for focussing on the one stratum defined by these characteristics. In the graphs that follow, we look at each poverty category separately.

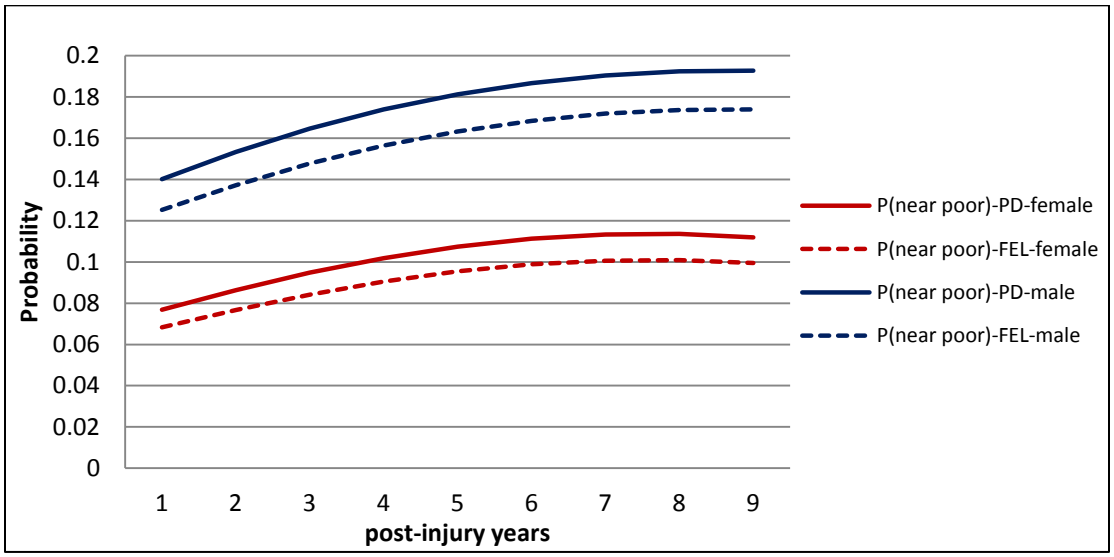
Graph 20 presents the results for the poverty category. For both injured women and men, the probability of their family being in poverty increases over time post injury from approximately 3%, till years 7-8 where it is just under 10%, and then decreases slightly in year 9. The probability of being in poverty is higher for men than women (approximately 2% higher the later years). For men, the probability of being in poverty is higher in the PD

program than the FEL/NEL program, whereas it is the reverse for women. These differences are modest, i.e., less than 1%.

Graph 20: Estimated probability of being in poverty for married injured workers aged 35 to 49, impairment bracket 11-20%, pre-injury earnings bracket 20k-40k, having 1 child under16 and living in Toronto urban area

For the near poverty category, there is a notable difference in probability levels of injured worker families being in poverty between women and men. Specifically, men have a much higher probability of being in poverty (as high as 19% for men compared to a high of 11% for women), and it is higher for the PD program than for the FEL/NEL program, with differences between 1-2%.

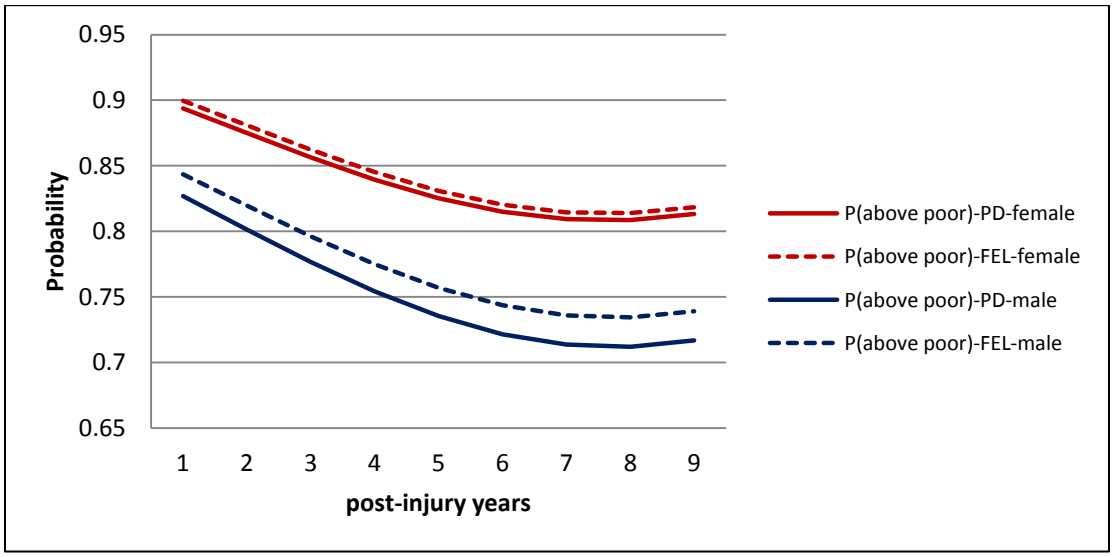
Graph 21: Estimated probability near poverty for married injured workers aged 35 to 49, impairment bracket 11-20%, pre-injury earnings bracket 20k-40k, having 1 child under16 and living in Toronto urban area



Graph 22 presents the results for the above poverty category. For this category the probabilities decrease over time till 7 to 8 years post injury and then increase slightly in the 9th year. The families of injured women are more likely to be in this category than men. For women it starts at approximately 90% and decreases to approximately 80%. For men it starts at approximately 83% and decreases to approximately 73%. For both men and women, individuals in the FEL/NEL program are more likely to be in it than those in

the PD program.

Graph 22: Estimated probability above poverty for married injured workers aged 35 to 49, impairment bracket 11-20%, pre-injury earnings bracket 20k-40k, having 1 child under16 and living in Toronto urban area

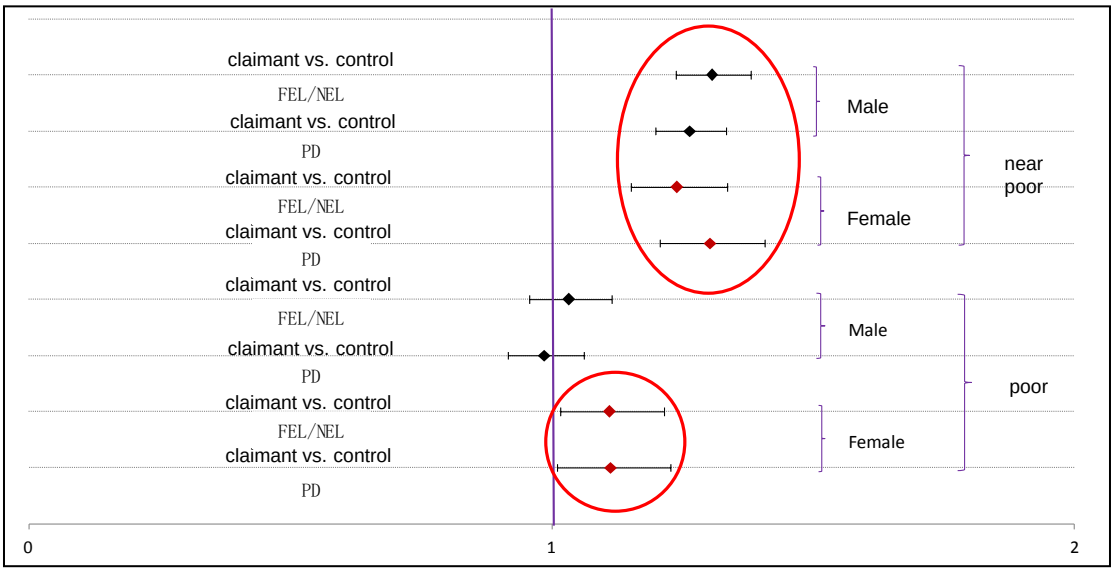


For the second set of regressions both injured workers and controls are included in the same models in order to identify the incremental probability of poverty for injured worker families in each program of the two programs considered in the analysis. Separate models are run for women and men. We created 4 categories indentifying program cohort and injured worker/ control as follows: 1) PD injured worker, 2) PD control, 3) FEL/NEL injured worker, and 4) FEL/NEL control. This allows us to identify odds ratios of the probability of being in a poverty category for injured workers versus controls for each program. Chart 5 presents these odds ratios along with their confidence intervals.

For both women and men, the odds of being in the near poor category are significantly higher for injured worker families than for control families (odds

ratios are in the 1.25-1.3 range). This is the case for both the FEL/NEL and PD programs, though there is no significant difference between the two programs for this category, either for women or men. For the poor category, only injured women's families have significantly higher odds of being in the category relative to controls (odds rations are in the 1.1 range). This is not the case for injured men's families. Again, there is no significant difference between the two programs for this category, either for women or men.

Chart 5: Odds ratio of injured worker versus control in poverty or near poverty



Summary, Conclusions and Discussion

Workers' compensation benefits are an important part of earnings at the individual level. They are an important part of what keeps injured workers with permanent impairments out of poverty. In the descriptive analysis we found that if only injured workers' after-tax earnings from employment are taken into consideration, many would be in poverty. But when after-tax earnings from employment plus WCB benefits are considered, poverty levels are lower. These are hypothetical scenarios since many individuals have multiple sources of earnings, and poverty levels are generally assessed at the family income level.

Bringing uninjured controls into the analysis provide some understanding of how well injured workers fare compared to their non-injured peers. We found that differences in poverty levels between injured workers and controls were modest across the four programs, but appear to increase with year post injury in some categories, based on the hypothetical scenario with only after-tax labour-market earnings plus WCB benefits. With adjusted after-tax family income, differences in poverty levels between claimant families and the families of their matched controls are modest.

Regression model results suggest that the families of injured workers receiving benefits from the PD and FEL/NEL programs are more likely to be near in poverty than the families of their matched controls, after controlling for demographic and contextual characteristics. Only families of female injured workers (i.e., not male injured workers) in the two programs are more likely to be in poverty than their matched controls.

We began this study with three hypotheses. The first hypothesis is as follows:

> Hypothesis 1: The prevalence of poverty has increased over time amongst permanently impaired injured workers by a larger amount than amongst able-bodied workers.

We did not find support for this hypothesis. Based on after-tax family income adjusted for family size, deep poverty, poverty and near poverty levels were similar across programs from different time periods. For deep poverty the range was between 0-2% of the sample. For poverty the range was 2-6%. Lastly, for near poverty the range was between 6-12%. We did find that poverty levels (i.e., the proportion of the sample) within each cohort increased with time post injury.

The second hypothesis is about the impact of legislations and related programs on the probability of poverty. It reads as follows.

> Hypothesis 2: Programmatic features bear on the probability of being in poverty for injured workers, even after controlling for temporal factors associated with labour-market changes.

This hypothesis proposes that more recent programs have higher levels of poverty relative to controls, which we identify by taking the difference in the proportion of injured workers in a poverty category less the proportion of controls. We found that differences in the deep poverty category were similar across programs (difference were just under 0% for all programs), though there were some modest differences for the poverty and near poverty categories. In these latter two categories, the LOE and FEL/NEL programs had somewhat higher differences in some years post-injury compared to the PD program and the BC program. Specifically, for the poverty category differences range from just under -1% to just over 2%, with the LOE program having the highest differences, followed by the FEL/NEL program. For the near poverty category, differences range from -2% to 4%, also with the LOE program having the highest differences, followed by the FEL/NEL program. So ultimately, there is some support for Hypothesis 2.

Additionally, when we consider family income over a ten-year period, the LOE program had the largest difference between the proportion of injured m workers and their matched controls in near poverty compared to the other programs, suggesting that injured worker families receiving benefits from this program do not fare as well over longer periods of time as individuals

receiving benefits from the other programs. Specifically, a larger proportion is closer to poverty than in the older programs based on income over a ten year period. The difference is 2.5% for near poverty for the LOE program, 0.5% for the FEL/NEL program, no difference for the PD program, and -0.6% for the BC program.

The third hypothesis follows on the second, adding to the mix controls for demographic and contextual factors through regression modeling analysis. Specifically, the hypothesis reads as follows:

> Hypothesis 3: In a more fully specified statistical model that controls for individual and contextual factors, the probability of poverty for injured workers will be higher in more recent time periods and will also be related to the program under which benefits are received.

For this hypothesis we considered only two programs, the PD and FEL/NEL ones. Based on the first set of regression models which only included injured workers (i.e., matched controls were not included), what we found was that for the FEL/NEL program the families of injured women were slightly more likely to be in poverty than if in the PD program, whereas the reverse was true for men. In contrast, near poverty levels were higher for the PD program for both women and men. Lastly, for the above poverty category, injured workers in the FEL/NEL program had a slightly higher probability of being in this category, for both women and men. Adding controls into the modeling, we find that for both women and men, the odds of being in the near poor category are significantly higher for injured worker families than for control families (odds ratios are in the 1.25-1.3 range). This is the case for both the FEL/NEL and PD programs, though there is no significant difference between the two programs for this category, either for women or men. For the poor category, only injured women's families have significantly higher odds of being in the category relative to controls (odds rations are in the 1.1 range). This is not the case for injured men's families. Again, there is no significant difference between the two programs for this category, either for women or men. So it seems that there is little support for Hypothesis 3, based on a

comparison of the PD and FEL/NEL programs.

Our study adds substantially to the literature on long-term outcomes of injured workers. It is the first study to rigorously assess the poverty levels across different programs and across different time periods. The sample of claimants was very representative, and the earnings information very reliable given it come from administrative files. Our use of cotemporaneous matched controls helps address some of the contextual factors that may bear on outcomes that vary across time periods and cohorts such as unemployment rates and labour-market contracting practices. Our comparison of four different programs also provides invaluable insight into whether workers' compensation programmatic features bear on the probably of poverty.

Future work in this area needs to further explore programmatic, demographic and contextual factors that bear on the probability of poverty for injured workers and their families. In particular, the most recent program investigated in this study, i.e., the Ontario LOE program, requires a large sample frame so that it can be included in the regression modeling analysis. Additional characteristic could be added to the model such as occupation, industry, and nature of injury, in order to better understand the factors that bear on labour-market earnings recovery post injury and the probability of poverty. These variables were not available to us, but are available in the workers' compensation administrative data files.

Additional characteristic could be added to the model such as occupation, industry, and nature of injury, in order to better understand the factors that bear on labour-market earnings recovery post injury and the probability of poverty. These variables were not available to us, but are available in the workers' compensation administrative data files.

Dissemination of Research Findings

Results from this study have been presented/published in several forums as follows:

- An Institute for Work & Health Internal Plenary on June 9, 2014
- A presentation held at Injured Workers Consultants on July 23, 2014 and given to a select group of injured worker representatives
- A presentation given at the International Forum on Disability Management (IFDM) conference held in Melbourne Australia from November 16-19, 2014
- A presentation given at the Victorian WorkCover Authority on November 20, 2014;
- An abstract published in the International Journal of Disability Management (Volume 9, 2014).

Citations for these presentations/publications are as follows:

Tompa E. (2014). The Impact of Work Injury and Permanent Impairment on the Probability of Poverty. International Journal of Disability Management. Volume 9, 2014, e60. DOI: http://dx.doi.org/10.1017/idm.2014.22 (About DOI)

Tompa E, Scott-Marshall H, Ballentyne P, Saunders R, Hogg-Johnson S, Liao Q. The Impact of Work Injury and Permanent Impairment on the Probability of Poverty. International Forum on Disability Management. Melbourne, Australia, November 16-19, 2014.

Tompa E, Scott-Marshall H, Ballentyne P, Saunders R, Hogg-Johnson S, Liao Q. The Impact of Work Injury and Permanent Impairment on the Probability of Poverty. International Forum on Work Disability Management. Melbourne, Australia, November 16-19, 2014.

Tompa E. Long-term Outcomes Following Permanent Impairment from a Work Injury: Analysis of Labour-market Earnings Trajectories, Benefits Adequacy and Poverty. Presentation for the Institute for Safety, Compensation and Recover Research (SCRR) and Victorian WorkCover Authority (VWA), the Transport Accident Commission (TAC) and Monash University. November 20, 2014.

Plans are to publish two articles from this study in peer reviewed manuscripts. Submissions of manuscripts for peer review will be made in 2015.

References

Ballantyne P. (2001). The Workplace Safety and Insurance Board Pre-1990s Claims Unit Study. Final Report. Institute for Work & Health.

Beardwood B, Kirsh B, Clark N. (2005). Victims Twice Over: The Perceptions and Experiences of Injured Workers. Qualitative Health Research, 15, 30-48.

Berkowitz, M., Burton, J. F. (1987). Permanent Disability Benefits in Workers' Compensation. Michigan: W.E. Upjohn Institute for Employment Research.

Biddle, J. (1998). Estimation and Analysis of Long Term Wage Losses and Wage Replacement Rates of Washington State Workers' Compensation Claimants. Working Paper. Washington State Workers' Compensation System.

Boden, L. I., Galizzi, M. (1999). Economic Consequences of Workplace Injuries and Illnesses: Lost Earnings and Benefits Adequacy. American Journal of Industrial Medicine, 36, 487-503.

Breslin, C., Koehoorn, M., Smith, P., Manno, M. (2003). Age Related Differences in Work Injuries and Permanent Impairment: A Comparison of Workers' Compensation Claims Among Adolescents,

Young Adults and Adults. Occupational and Environmental Medicine, 60(e10), 1-6.

Burke, M., Shields, J. (1999). The Job-Poor Recovery: Social Cohesion and the Canadian Labour Market. A Research Report of the Ryerson Social Reporting Network. Toronto: Ryerson Polytechnic University.

Burkhauser, R.V., Daly, M. C. (2000). Employment and Economic Well-Being Following the Onset of a Disability, the Role for Public Policy. Michigan: W.E. Upjohn Institute for Employment Research.

Butler RJ, Johnson WG, Baldwin M. (1995). Managing Work Disability: Why First Return to Work is not a Measure of Success. Industrial and Labor Relations Review, 48, 452-469.

Cacciacarro L, Kirsh B. (2006). Understanding the mental health needs of injured workers. Canadian Journal of Occupational Therapy, 73(3), 178-187.

Cater BI. (2000). Employment, Wage and Accommodation Patterns of Permanently Impaired Workers. Journal of Labor Economics 18:74-97.

Cater BI, Smith BJ. (1999). Inferring Disability from Post-injury Employment Duration. Applied Economics Letters, 6, 747-751.

Cheit EF. (1961). Measuring Economic Loss due to Occupational Death and Disability. In: Injury and Recovery in the Course of Employment, John Wiley & Sons, pp 61-93.

Community Social Planning Council of Toronto. (2009). Sick and Tired: the Compromised Health of Social Assistance Recipients and the Working Poor in Ontario.

Campaign 2000 (2007). 2007 Report Card on Child and Family Poverty in Canada. Family Services Association of Toronto. ISBN 1-894250-50-8

Chaykowski, R. P. (2005). Non-standard Work and Economic Vulnerability. Vulnerable Worker Series (No. 3). Ottawa: Canadian Policy Research Networks.

Dembe, A. (2001). The Social Consequences of Occupational Injuries and Illnesses. American Journal of Industrial Medicine, 40, 403-417.

Franche R-L, Mustard C, Krause N, Hepburn G, Breslin C, Kosny A, et al. (2003). Summary of the Return-to-work Pilot Study. Institute for Work & Health document, Toronto, Canada.

Gamborg BL, Elliott WS, Curtis KW. (1992). Chronic disability syndrome. Canadian Family Physician, 37, 1966-1973.

Ginnold R. (1979). A Following Study of Permanent Disability Cases under Wisconsin Workers' Compensation. In: Research Report of the Interdepartmental Workers' Compensation Task Force, Education and Research Center, University of Oregon, pp 79-93.

Grimshaw, D., Beynon, H., Rubery, J., Ward, K. (2002). The Restructuring of Career Paths in Large Service Sector Organizations: Delayering, Upskilling, and Polarisation. The Sociological Review, 50(1), 89-116.

Herzenberg, S. A., Alic, J. A., Wial, H. (1998). New Rules for a New Economy: Employment and Opportunity in Postindustrial America. Ithaca, NY: Cornell University Press.

Hyatt DE. (1996). Work Disincentives of Workers' Compensation Permanent Partial Disability Benefits: Evidence for Canada. Canadian Journal of Economics, 29, 289-308.

Johnson, W. G., Butler, R. J., Baldwin, M. L. (1995). First Spells of Work Absences Among Ontario Workers. In T. Thomason & R. P. Chaykowski (Eds.), Research in Canadian Workers' Compensation (pp. 72-84): Industrial Relations Press.

Johnson WG, Baldwin ML. (1993). Returns to Work by Ontario Workers with Permanent Partial Disabilities. Ontario Workers' Compensation Board, Toronto, ON.

Johnson WG, Cullinan PR, Curington WP. (1979). The Adequacy of Workers' Compensation Benefits. In: Research Report of the Interdepartmental Workers' Compensation Task Force, The Maxwell School, Syracuse University, pp 95-121.

Kawachi I, Kennedy BP, Gupta V, Prothrow-Stith D. Women's Status and the Health of Women and Men: A view from the States, Social Science Medicine, 48, 21-32.

Kirsh B, McKee P. (2003). The Needs and Experiences of Injured workers in Ontario: A Participatory Research Project. Work, 21, 221-231.

Laurie N. (2008). The Cost of Poverty: An Analysis of the Economic Cost of Poverty in Ontario. Toronto, Ontario: Ontario Association of Food Banks.

Lightman E., Michell A. and Wilson B. (2008). Poverty is Making Us Sick. A Comprehensive Survey of Income and Health in Canada. Toronto, Ontario.

Lippel K., Lefebvre MC, Schmidt C, Caron J. (2007). Managing Claims or Caring for Claimants: Effects of the Compensation Process on the Health of Injured Workers. Research Report UQÀM Service aux collectivités Université du Québec à Montréal.

Luttwak, E. (1998). Turbo Capitalism: Winners and Losers in the New Global Economy. London: Weidenfeld & Nicholson.

MacEachen E, Ferrier S, Kosny A, Chambers L. (2007). A Deliberation on 'Hurt Versus Harm' Logic in Early-Return-to-Work Policy. Policy and Practice in Health and Safety, 5, 41-62.

MacEachen E, Kosny A, Ferrier S. (2004). Exploring the Experiences of Injured Workers Outreach Services: Achievements, Issues, and Community Needs. Report to the Workplace Safety and Insurance Board.

Ontario Network of Injured Workers' Groups. (2009). Is This What Justice Meredith Envisioned?: A Study of the Economic and Social Impacts of Workplace Injury and Illness. Stoney Creek, Ontario, Canada.

Osterman, P., Kochan, T. A., Locke, R., Piore, M. J. (2002). Working in America: A Blueprint for the New Labour Market. Cambridge, Massachusetts: MIT Press.

Peterson MA, Reville RT, Stern RK, Barth PS. (1998). Compensating Permanent Workplace Injuries: A Study of the California System. RAND, Santa Monica, CA.

Reid, Colleen (2007). Women’s Health and the Politics of Poverty and Exclusion. In: Women’s Health in Canada. Critical Perspectives on

Theory and Policy. Morrow M, Hankivsky O, Varcoe C (Eds.) Toronto: University of Toronto Press.

Reville RT. (1999). The Impact of Disabling Workplace Injury on Earnings and Labor Force Participation. In: The Creation and Analysis of Linked Employer-Employee Data: Contributions to Economic Analysis, (ed. J Lane), Elsevier Science, North Holland.

Rosenbaum PR and Rubin DB. (1985). Constructing a control group using multivariate matches sampling methods that incorporate the propensity score. The American Statistician, 39: 33-38.

Scott, H. K. (2004). Reconceptualizing the Nature and Health Consequences of Work-Related Insecurity for the New Economy: The Decline of Workers' Power in the Flexibility Regime. International Journal of Health Services, 34(1), 143-153.

Scott-Marshall, H. (2007). Work-Related Insecurity in the New Economy: Evaluating the Consequences for Health. Research in Political Sociology, 16, 21-60.

Scott-Marshall, H. (2009). The Social Patterning of Work-Related Insecurity and Its Health Consequences. Social Indicators Research (epub ahead of print: DOI 10.1007/s11205-009-9480-3, Published online: 08 May 2009).

Shier, M., Graham, J. R., Jones, M. E. (2009). Barriers to Employment as Experienced by Disabled People: A Qualitative Analysis in Calgary and Regina, Canada. Disability & Society, 24(1), 63-75.

Smith, V. (1997). New Forms of Work. Annual Review of Sociology, 23, 315-325.

Statistics Canada. (2008). Unemployment Rates for Persons With and Without Disabilities in Canada by Province.

Stone SD. (2003). Workers without work: Injured workers and well-being. Journal of Occupational Science, 10(1), 7-13.

Stone SD, Hill ME, Kawchuk K, Lefrancois E, Maki K, Mantis S, Pilato B. (2002). Connecting for change: Injured workers in Northwestern Ontario and the Effectiveness of Peer Support. Final Report submitted to the Workplace Safety and Insurance Board (Ontario).

Thunder Bay & District Injured Workers' Support Group. (2008). Poverty in Motion: The Rippling Effects (pp. 1-14). Thunder Bay, Ontario: Lakehead Labour Centre.

Tompa, E., Mustard, C., Sinclair, S., Fang, M., Scott-Marshall, H. (2009). Post-Accident Earnings and Benefits Adequacy and Equity, Final Report for the National Institute for Occupational Safety and Health. Toronto, Ontario Canada: Institute for Work & Health.

Tompa E, Scott-Marshall H, Dolinschi R, Trevithick S, Bhattcharyya S. (2007). Precarious Employment Experiences and their Health Consequences: Towards a Theoretical Framework. Work: A Journal of Prevention, Assessment and Rehabilitation, 28.7, 209-224.

Vosko, L. F. (Ed.). (2006). Precarious Employment: Understanding Labour Market Insecurity in Canada. Montreal & Kingston: McGill-Queen's University Press.

World Health Organization (2008). Closing the Gap in a Generation: Health Equity through Action on the Social Determinants of Health. Geneva, Switzerland.

Appendices

Appendix 1: IFDM Conference Abstract

The Impact of Work Injury and Permanent Impairment on the Probability of Poverty

Objectives: We investigate the prevalence of poverty across different workers compensation programs using large representative samples of workers' compensation claimants who have sustained a permanent impairment from a work injury. The programs, which have existed in the provinces of Ontario and British Columbia, Canada over the last 25 years, are the Permanent Disability (PD) program, the Future Economic Loss (FEL) program, the Loss of Earnings (LOE) program, and the Bifurcated Benefits (BB) program. The nature of benefit determination and the return to work supports provided by the four programs are very different. The focus of the study is on evidence of programmatic impact on the probability of poverty in the nine years post injury.

Methods: The study included claimants sampled from each of the four programs who sustained a permanent impairment from a work injury. Claimants were identified in a Revenue Canada tax database know as the Longitudinal Administrative Databank (LAD), which is a longitudinal 20% simple random sample of all Canadian tax filers. Each claimant was matched with similar uninjured controls that were also in the LAD, based on sex, age, labour-market earnings amounts and trajectories in the four years prior to injury, family income, marital status, number of children, and a propensity score. Descriptive analysis was undertaken to compare near poverty, poverty and deep poverty levels of claimants relative to their match controls using data on family and individual earnings over a ten-year period post injury. Statistical modeling was used to determine the probability of poverty and near poverty for claimants versus controls. A key issue of interest was to determine was whether the probability of poverty differed between programs.

Results: Based on after-tax adjusted family income, the level of poverty was quite low, less than 2% in every program over a ten-year period. The level of poverty was also lower for claimants than their matched controls, but only nominally so. The BB program had the lowest proportion of poverty followed by the PD program, the FEL program and then the LOE program. In the statistical modelling analysis male claimants did not have a higher probability of poverty compared to controls, though female claimants did. Both male and female claimants had a higher probability of near poverty.

Conclusions: Poverty levels are very low for workers' compensation claimants who sustain permanent impairments from a work injury across different programs and time periods in Ontario and British Columbia. Overall the Bifurcated Benefits program from British Columbia had the lowest proportion of claimants in poverty in absolute terms and relative to non-injured workers. Increased levels of poverty due to work injury and permanent impairment are particularly a concern for female claimants, though both female and male claimants have a higher chance of near poverty compared to non-injured workers.

Appendix 2: Victorian WorkCover Authority Presentation Abstract

Long-term Outcomes Following Permanent Impairment from a Work Injury:

Analyses of Labour-market Earnings Trajectories, Benefits Adequacy, and Poverty Levels based on Micro-data Linkages with Tax files

Exploiting a date resource created by linking workers' compensation claims files from different programs in Ontario and British Columbia with a longitudinal tax file consisting of 20% of the Canadian population, this research program examines long-term outcomes for injured workers sustaining a permanent impairment from a work injury. Outcomes considered include earnings trajectories, benefits adequacy and poverty levels over a 10-year period following work injury.

Each claimant identified in the tax files was matched with up to 10 similar uninjured controls that were also in the files, based on sex, age, labour-market earnings amounts and trajectories in the four years prior to injury, and a propensity score. Other characteristics were also used to match claimants with controls that were relevant to specific outcomes. Statistical modeling analysis was undertaken to compare outcomes of claimants relative to their matched controls using data over the 10 years post injury.

The unique data resource created by the linkage has facilitated addressing a number of pressing questions about long-term outcomes for injured workers that could not be adequately addressed with existing data sources. For example, we were able to compare long-term labour-market earnings recovery, benefits adequacy, and poverty levels across different programs in Ontario and British Columbia with substantial precision, given the size and

robustness of the longitudinal tax files. Other outcomes considered in studies include mortality/life expectancy, marital breakup and marital formation following work injury.

Appendix 3: International Journal of Disability Management Abstract Publication

Objectives: We investigate the prevalence of poverty across different workers compensation programs using large representative samples of workers' compensation claimants who have sustained a permanent impairment from a work injury. The programs, which have existed in the provinces of Ontario and British Columbia, Canada over the last 25 years, are the Permanent Disability (PD) program, the Future Economic Loss (FEL) program, the Loss of Earnings (LOE) program, and the Bifurcated Benefits (BB) program. The nature of benefit determination and the return to work supports provided by the four programs are very different. The focus of the study is on evidence of programmatic impact on the probability of poverty in the nine years post injury.

Methods: The study included claimants sampled from each of the four programs who sustained a permanent impairment from a work injury. Claimants were identified in a Revenue Canada tax database know as the Longitudinal Administrative Databank (LAD), which is a longitudinal 20% simple random sample of all Canadian tax filers. Each claimant was matched with similar uninjured controls that were also in the LAD, based on sex, age, labour-market earnings amounts and trajectories in the four years prior to injury, family income, marital status, number of children, and a propensity score. Descriptive analysis was undertaken to compare near poverty, poverty and deep poverty levels of claimants relative to their match controls using data on family and individual earnings over a ten-year period post injury. Statistical modeling was used to determine the probability of poverty and near poverty for claimants versus controls. A key issue of interest was to determine was whether the probability of poverty differed between programs.

Results: Based on after-tax adjusted family income, the level of poverty was quite low, less than 2% in every program over a ten-year period. The level of poverty was also lower for claimants than their matched controls, but only nominally so. The BB program had the lowest proportion of poverty followed

by the PD program, the FEL program and then the LOE program. In the statistical modelling analysis male claimants did not have a higher probability of poverty compared to controls, though female claimants did. Both male and female claimants had a higher probability of near poverty.

Conclusions: Poverty levels are very low for workers' compensation claimants who sustain permanent impairments from a work injury across different programs and time periods in Ontario and British Columbia. Overall the Bifurcated Benefits program from British Columbia had the lowest proportion of claimants in poverty in absolute terms and relative to non-injured workers. Increased levels of poverty due to work injury and permanent impairment are particularly a concern for female claimants, though both female and male claimants have a higher chance of near poverty compared to non-injured workers.