



# **Diverging trends in the incidence of work-related and non-work related injury in Ontario 2004-2011**

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# Background

Injury is the leading cause of death among persons younger than 45

Injury responsible for 10% of the economic burden of illness in Canada, equivalent to that of cancer or cardiovascular disease

Work exposures responsible for as much as 25% of injury morbidity among working age adults (1)

(1) Smith GS, Wellman HM, Sorock GS, Warner M, Courtney TK, Pransky GS, Fingerhut LA. Injuries at work in the US adult population: contributions to the total injury burden. *Am J Public Health*. 2005 Jul;95(7):1213-9.



# Objective

To estimate trends in the incidence of occupational and non-occupational injury in Ontario over the period 2004-2011 for a complete population of adults aged 15-64





## Introduction

In the province of Ontario, citizens are universally insured for medically-necessary health care, including services provided in hospital emergency departments.

Similarly, a single publicly-administered insurance agency administers wage replacement benefits and purchases health care services in circumstances of work-related disability.

Both sources of information in this study are population based. Approximately 30% of the Ontario labour force are in employment relationships that are excluded from coverage by the workers' compensation insurance agency, the Workplace Safety & Insurance Board (WSIB).

Approximately 40% of work-related injury/illness is treated in emergency departments



## Introduction

In many settings, there are concerns about the reliability of workers' compensation administrative records as a source of surveillance information on the incidence of work-related injury and illness.

These controversies center on concerns about the integrity of workplace reporting of work-related injury and illness among particular groups of workers, or for certain types of injuries as well as concerns about some classes of workers (self-employed and independent contractors) who are excluded from insurance coverage.



Work Injuries requiring health care and/or time off work

Work Injuries requiring health care  
reported to the WSIB, 2004-2008

**A**  
Lost-time claims,  
N=435,336

**B**  
No Lost-time  
claims,  
N=887,562

**C**  
Work Injuries requiring health  
care **not** reported to the WSIB  
(N=unknown)

**D**  
Work Injuries not  
requiring health care,  
not required to be  
reported to the WSIB  
N= unknown

**E**  
Injuries presenting to Ontario emergency departments  
coded as work-related (N=699,196)



## Methods

### 1) National Ambulatory Care Reporting System (NACRS)

- All emergency department visits in Ontario
- 6,470,000 records (2004-2011), adults 15-64
- Occupational related incidents identified with the variable 'responsibility for payment' – assigned to the WSIB if incident clinically determined to be work-related
- ICD10-CA coding system
- Injuries (S & T coding series) + external cause codes
- 15 categories of external causes of injury
- Denominator: estimates from the Labour Force Survey and from the census focusing on working-aged adults (15-64)



## NACRS data quality

Data quality in NACRS is very high. Automated data quality checks applied at time of record submission. Annual data quality audits performed.

Patient postal code missing:  
0.98%

Triage time missing: 1.5%

Percent of records determined  
to be duplicate submissions:  
0.7%







## Responsibility for Payment

Provincial workers' compensation agencies are 'parallel payers' of insured health services

Physician services for the treatment of work-related conditions are reimbursed directly by OHIP. OHIP in turn recovers reimbursement expenditures from the WSIB.

Hospitals bill WSIB directly for ambulatory care services (diagnostic imaging, emergency department services) and for in-patient care.

Strong financial incentive for hospitals to accurately document work-related conditions: a source of revenue to supplement core funding from MOHLTC



## Responsibility for Payment

Health professionals document the diagnosis of a work-related condition to the WSIB by using a 'Form 8'

### ***Health Professional's Report (Form 8)***

*When your patient suffers a work related injury/illness and comes to see you, you must complete a Form 8 (281.2kb, PDF), even if that patient first visited an Emergency Department. When your completed form arrives at the WSIB, it is first scanned into the appropriate WSIB claim record and then sent for payment processing.*

*Use the Form 8 whether your patient states that an injury or illness is related to his or her work or whether you simply believe it is. Section 37 of the Workplace Safety and Insurance Act provides the legal authority for health care practitioners, hospitals and health facilities to submit, without consent, information relating to a worker claiming benefits to the WSIB.*



## Responsibility for Payment:

### What happens to a Form 8 submission

A worker who wishes to register a claim will file a Form 6. The WSIB will seek a corresponding employer report (Form 7) and will match the submitted Form 8.

If the WSIB only receives a Form 8 (no Form 6 is received), the claims will be coded 'partially registered' by the WSIB. 'Partially registered' claims are not included in the count of 'abandoned claims'.

Health care providers are reimbursed for the submission of Form 8 regardless of the outcome of the claim registration/adjudication.



## Percent change 2004-2008 among work-related emergency department records and lost-time claims

	Emergency department visits	Lost-time claims, WSIB	Ratio of emergency department visits to lost-time claims
2004	149,965	94,407	1.59
2005	153,010	93,306	1.64
2006	141,766	86,354	1.64
2007	134,915	83,656	1.61
2008	128,277	77,613	1.65

Percent change:  
2004-2008

-14.5%

-17.8%



## The Economic Recession

	Emergency department visits	Lost-time claims	Ratio of emergency department visits to lost-time claims
2004	149,965	94,407	1.59
2005	153,010	93,306	1.64
2006	141,766	86,354	1.64
2007	134,915	83,656	1.61
2008	128,277	77,613	1.65
<b>2009</b>	<b>106,450</b>	<b>64,899</b>	<b>1.65</b>

Percent change:  
2008-2009

-17.1

-18.0



## Injuries presenting to Ontario emergency departments, Rate per 1,000 persons, aged 15-64

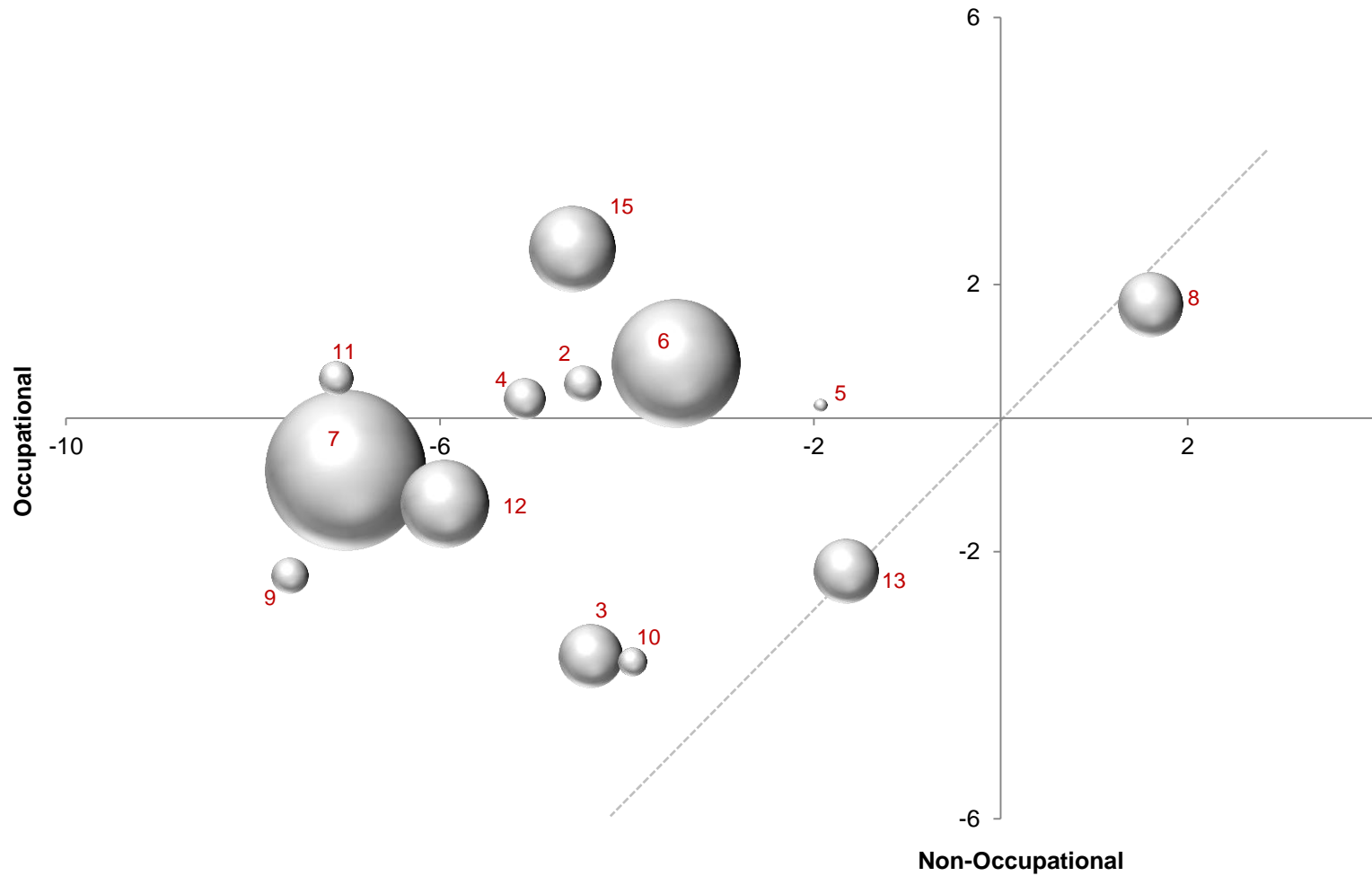
	Rate of injury per 1,000		Percent of all ED visits that are occupational
	Occupational <sup>1</sup>	Non-Occupational <sup>2</sup>	
2004	19.8	79.5	<b>20.0%</b>
2005	20.0	80.4	
2006	18.3	79.8	
2007	17.2	79.4	
2008	16.2	79.4	
2009	13.5	78.0	
2010	13.9	79.1	
2011	14.1	78.9	<b>15.2%</b>
<b>APC</b>	<b>-5.9%</b>	<b>-0.3%</b>	
<b>2004-2011</b>	<b>-28.7%</b>	<b>-0.7%</b>	

## Annual percent change (APC) in injury incidence, 2004-2011

by occupational and non-occupational and by external cause  
Emergency department records (NACRS); 15-64 year of age

External Cause	Non-occupational			Occupational		
	Annual Percent Change	95% CI		Annual Percent Change	95% CI	
Pedestrian	<b>1.15</b>	0.32,	1.98	<b>-3.72</b>	-6.05,	-1.33
Cyclist	0.52	-0.07,	1.11	<b>-4.48</b>	-8.36,	-0.42
Motor vehicle occupant	<b>-3.56</b>	-4.16,	-2.95	<b>-4.39</b>	-5.36,	-3.41
Other land transport	0.29	-0.88,	1.48	<b>-5.10</b>	-7.45,	-2.68
Other transport	0.20	-1.67,	2.10	-1.93	-6.64,	3.01
Fall	<b>0.82</b>	0.06,	1.60	<b>-3.48</b>	-4.98,	-1.95
Inanimate mechanical force	<b>-0.78</b>	-1.11,	-0.45	<b>-7.01</b>	-8.53,	-5.47
Animate mechanical force	<b>1.70</b>	1.25,	2.16	<b>1.60</b>	0.83,	2.38
Electricity / fire / hot object	<b>-2.35</b>	-3.02,	-1.68	<b>-7.61</b>	-9.19,	-6.00
Natural/environmental	-3.64	0.70,	-7.80	-3.94	-9.23,	1.66
Poisoning	0.60	-0.32,	1.53	<b>-7.11</b>	-8.61,	-5.59
Overexertion	<b>-1.28</b>	-1.65,	-0.91	<b>-5.96</b>	-7.38,	-4.51
Intentional Injury	<b>-2.28</b>	-2.76,	-1.80	<b>-1.66</b>	-2.60,	-0.71
Event of undetermined intent	<b>-4.37</b>	-6.04,	-2.67	<b>-12.22</b>	-15.44,	-8.87
Other or not specified	<b>2.54</b>	2.10,	2.98	<b>-4.59</b>	-5.98,	-3.18
<b>Total, all external causes</b>	<b>-0.25</b>	<b>-0.44,</b>	<b>-0.04</b>	<b>-5.95</b>	<b>-7.30,</b>	<b>-4.57</b>

**Bold** APC values represent statistically significant changes.



- 1. Pedestrian
- 2. Cyclist
- 3. Motor vehicle occupant
- 4. Other land transport
- 5. Other transport

- 6. Fall
- 7. Inanimate mechanical force
- 8. Animate mechanical force
- 9. Electricity/fire/hot object
- 10. Natural/environmental

- 11. Poisoning
- 12. Overexertion
- 13. Intentional injury
- 15. Other or not specified

----- Axis of concordant annual percent change





## Methods

### 2) The Canadian Community Health Survey

- Administered ~ 2 years
- Injury module: an injury experience within the last 12 month that was serious enough to limit normal activities
- Occupational related incidents prompted by a question on whether the injury occurred in the course of employment
- Respondents asked whether they also received medical attention by a health professional within 48 hours of the occurrence



## Analysis

- Survey weights applied to adjust health interview survey responses for probability of selection and non-response (CCHS)
- Bootstrap survey weights applied to account for the complex sampling design (CCHS)
- Injury trends calculated by fitting a negative binomial regression model to the incidence rates calculated with the emergency department records and self-report data
- Annual percent change (APC) estimated from the slope of the regression models.
- 95% confidence intervals of the APC estimated from the slope of the regression model and standard error



## Incidence of self-reported medically-attended injuries adults aged 15 to 64, by occupational and non-occupational cause, Ontario 2001-2010

	<b>Occupational injury</b> Rate per 100	<b>Non- occupational injury</b> Rate per 100	<b>Occupational injury as % of total (1)</b>
2001	2.9 (2.6, 3.3)	6.0 (5.6, 6.3)	27.7%
2003	2.0 (1.8, 2.3)	5.9 (5.5, 6.3)	22.3%
2005	2.1 (1.8, 2.3)	6.5 (6.1, 6.9)	21.2%
2009	1.1 (0.9, 1.3)	6.4 (5.8, 7.1)	12.4%
2010	1.6 (1.3, 2.0)	6.5 (5.9, 7.1)	16.9%
<b>APC (2)</b>	<b>-7.4</b>	<b>1.0</b>	

(1) Estimate is calculated from weighted frequencies of the self-reported incidence of medically attended injuries

(2) APC: Annual percent change



## Summary

Annual percent change in in the incidence of occupational injury was **-5.9%** in ED records and **-7.4%** among survey participants.

In contrast, annual percent change in the incidence of nonoccupational injury was **-0.3%** in ED records and **1.0%** among survey participants.

Among working age adults, the percentage of all injuries attributed to work exposures declined from 20.0% in 2004 to 15.2% in 2011 in ED records and from 27.7% in 2001 to 16.9% in 2010 among survey participants



## Summary

Among working age adults in Ontario, nearly all the observed decline in injury incidence over the period 2004-2011 is attributed to reductions in occupational injury

If the incidence of nonoccupational injury had declined at the same rate as that of occupational injury, the population of Ontario (ages 15-64) would have experienced **200,000** fewer annual injuries requiring ED medical attention among adults aged 15-64.

Chambers A, Ibrahim S, Etches J, Mustard C. Diverging Trends in the Incidence of Occupational and Nonoccupational Injury in Ontario, 2004-2011. *Am J Public Health*. 2014 Dec 18:e1-e6. [Epub ahead of print]



## Summary

Concordant surveillance findings in two population-based data sources strengthens confidence in conclusions

Only two Canadian provinces have mandated reporting of ED visits to NACRS (Level III): Ontario (2000), Alberta (2010)

The CCHS has inconsistently administered the injury module across all Canadian provinces and territories for each survey cycle. More detailed and consistent categories of injury type and cause would enhance the utility of the CCHS for injury surveillance.

Comprehensive national surveillance system for injury is an attainable goal.



## Discussion

Parallel reduction in injury burden attributed to motor vehicle collisions speaks to the effectiveness of vehicle safety design standards and road engineering investments

(Occupational APC: -4.39, Nonoccupational APC: -3.56)

However, for the majority of injury causes, the incidence of occupational injury declined much more substantially than non-occupational injury

Substantial difference in scale of injury prevention expenditures and investments

The annual employer expenditure on worker health protection may be as much as €1,000 per employee<sup>1</sup>

In contrast, per capita expenditures on public health in Canada are in the range of \$300, a small fraction of which is allocated to injury prevention)<sup>2</sup>

<sup>1</sup>International report by Braunig et al. (2013) International Social Security Association

<sup>2</sup>CIHI, National Health Expenditure Trends (2013)



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