



# Emergency Department Encounter Records as a Source of Enhanced Information on Work-Related Traumatic Injury

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IWH Speaker Series  
June 8, 2021

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# Learning Objectives

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1. Understand the elements of emergency department electronic records relevant for estimating the frequency of work-related injury and illness in Ontario
2. Understand trends over the period 2004 – 2017 in the incidence of work-related injury and illness presenting for treatment in Ontario emergency departments
3. Recognize that 35-40% of emergency department visits for the treatment of work-related injury and illness do not match to a parallel record in the provincial workers compensation authority

# Background

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Among working age adults, approximately 1 of every 5 traumatic injuries are work-related

One of every three work-related traumatic injuries present for medical care in an Ontario emergency department

In a typical year, Ontario emergency departments treat approximately 100,000 work-related injuries or illnesses

Since 2000, in Ontario, all emergency department encounters are reported in an electronic record to the National Ambulatory Care Reporting System (NACRS) maintained by the Canadian Institute of Health Information (CIHI).

The 'Nature of Injury' and 'External Cause of Injury' are coded to ICD-10. No information is recorded on occupation or industry.

# Background

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Under-reporting (Under-claiming) to provincial workers' compensation authorities is substantial

Surveys of Canadian workers who have experienced a work-related injury or illness estimate under-reporting to be in the range of 40-60% of all potential compensable conditions.

Under-reporting can be due to a number of factors: workers unaware of entitlement, workers/employers preferring to use sick leave benefits, improper pressure or inducement on the part of an employer

Nadalin V, Smith PM. Examining the impact of occupational health and safety vulnerability on injury claim reporting in three Canadian provinces. *Am J Ind Med.* 2020 May;63(5):435-441. doi: 10.1002/ajim.23094. Epub 2020 Feb 3. PMID: 32011746.

Shannon HS, Lowe GS. How many injured workers do not file claims for workers' compensation benefits? *Am J Ind Med.* 2002 Dec;42(6):467-73. doi: 10.1002/ajim.10142. PMID: 12439869.

# Background: Some administrative details

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The determination of a work-related condition in an Emergency Department setting is based on clinical history. Clinical history determination is recorded on the NACRS record.

Healthcare providers' treatment reimbursement claims submitted to OHIP indicate 'responsibility for payment' is assigned to the Ontario WSIB

Ontario hospitals submit reimbursement claims directly to the WSIB for recovery of expenditures associated with the treatment of work-related injury or illness.

Reimbursement of healthcare providers for the treatment of work-related conditions is not conditional on the submission and approval of a workers' compensation claim. Healthcare providers are reimbursed for the submission of a Form 8 regardless of the outcome of the claim registration/adjudication.

In the event a worker does not submit a Form 6 and the healthcare provider submits a Form 8, the WSIB classifies the episode as 'partially registered'. The annual count of 'partially registered' claims is not publicly reported by the WSIB.

# Study Objectives

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Evaluate emergency department encounter records as a source of information for monitoring work-related injury and illness in Ontario

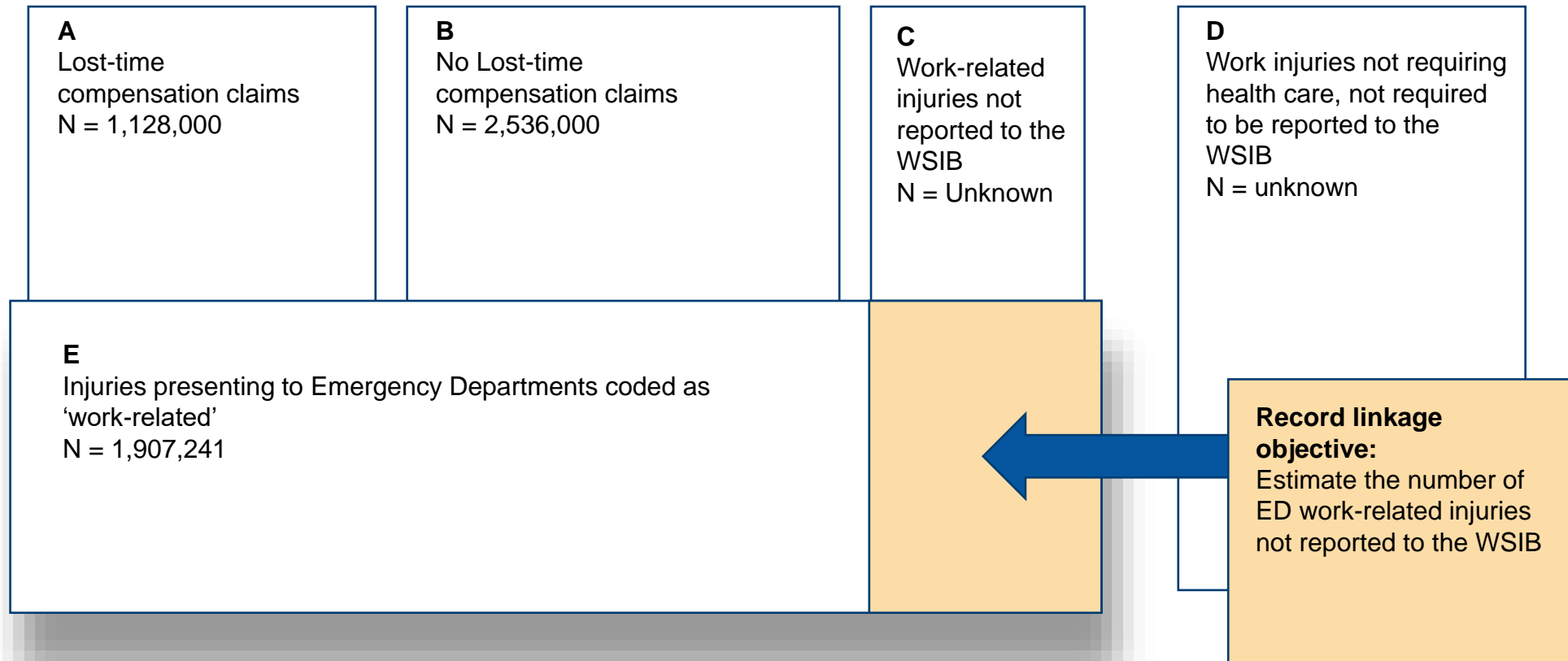
Assess the feasibility of a formal record linkage between WSIB compensation claim records and emergency department encounter records

Estimate the frequency of work-related injury/illness treated in emergency departments that is not reported to the Ontario Workplace Safety & Insurance Board

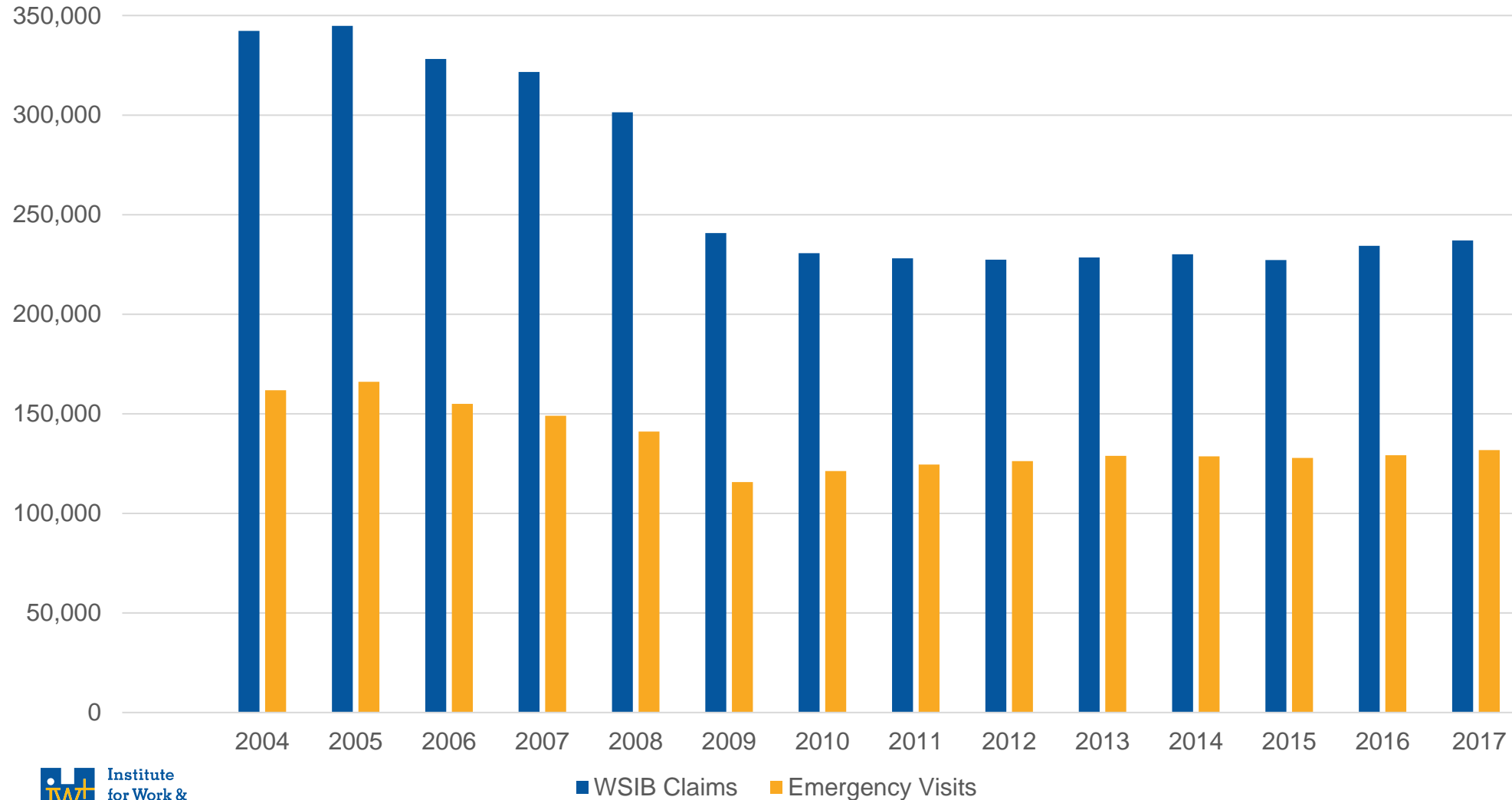
Among emergency department encounter records that link to WSIB compensation claims, assess the value of information on the nature of injury and injury event information

# Surveillance of work-related injury/illness: Conceptual framework

Work-related injury/illness reported to the WSIB  
2004-2017, N=3,664,000

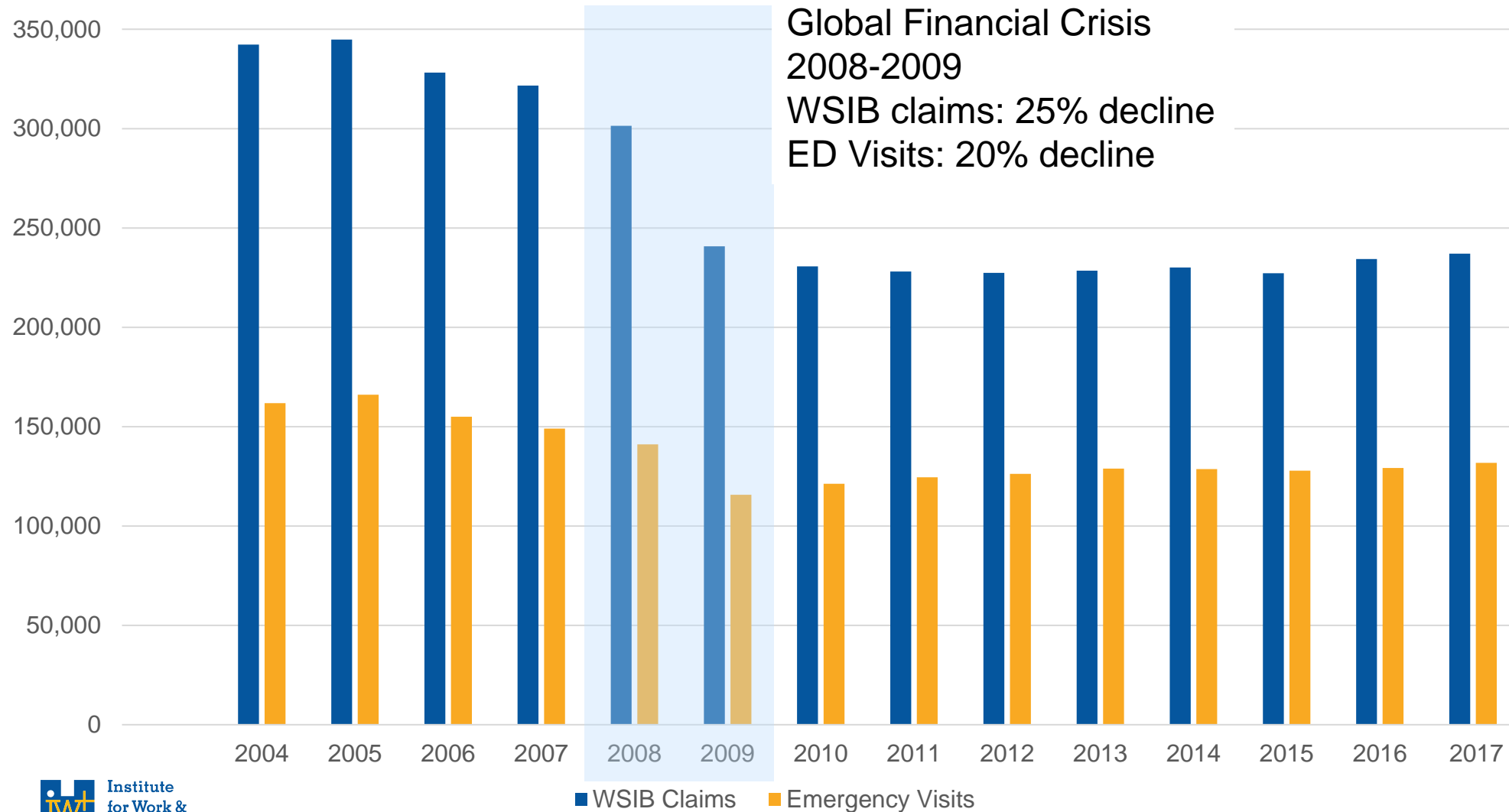


# Trends in work-related injury/illness in two administrative data sources, 2004-2017





# Trends in work-related injury/illness in two administrative data sources, 2004-2017



Claim Count  
Ratio  
2017 : 2004  
**0.69**

ED Visit  
Count Ratio  
2017 : 2004  
**0.81**

# Global Financial Crisis 2008-2009

Decline in compensation claims much greater than the decline in hours of work

	Decline in hours of work	Decline in compensation claims
British Columbia	5.1%	27%
Alberta	5.6%	19%
Ontario	4.6%	18%

## The Canadian recession and the compensation of work-related injury and illness

In 2009, the Institute for Work & Health (IWH) published an *Issue Briefing* summarizing previous research on the impact of the business cycle on workers' compensation claim rates. The briefing noted that there has been a long-term trend in Canada, the United States and other developed countries towards fewer workers' compensation claims per hours worked. The research suggests that, relative to this trend, the frequency of workers' compensation claims per hours worked tends to decline in recessions and increase in times of economic recovery.

In this *Issue Briefing*, we look at changes in accepted compensation claims in the most recent recession by examining data from several provinces for the years 2006 to 2010. The global financial crisis that climaxed in 2008 triggered recessions in most developed economies. Canada experienced a shallower and shorter recession than many of our trading partners. Three central questions arise regarding the impact of the recession on the frequency of workers' compensations claims in Canada:

- Given the relatively mild recession, did claim frequency decrease as expected?
- Were the effects of the recession on claim frequency most significant in those provinces hardest hit by the recession?
- Did those industries hardest hit see the largest decreases in claim frequency?

This *Issue Briefing* examines data from three industry groups across five provinces to provide answers to these key questions.

### Scope and approach

The 2008-2009 recession was experienced unevenly across Canadian provinces and economic sectors. Alberta, British Columbia and Ontario saw substantial decreases in hours worked from 2008 to 2009, while Saskatchewan and Manitoba recorded much smaller decreases. Some economic sectors, such as construction, are more sensitive to the business cycle, while sectors dominated by public-sector expenditures, such as health care, are less

### KEY MESSAGES

- Data on workers' compensation claims and hours worked in five Canadian provinces and three sectors of the economy indicate that the 2008-2009 recession was associated with a sharp decline in workers' compensation claim rates.
- The fall in claim rates was greatest in provinces and sectors that experienced the sharpest fall in employment.
- These findings are broadly consistent with previous research on workers' compensation claims over the business cycle, as summarized in an earlier *Issue Briefing* published by IWH in March 2009.

sensitive to the business cycle. To take these complexities into account, this briefing analyzes trends in employment and trends in compensation claims by both province and industry. The briefing focuses on the experiences of five provinces (Ontario, Manitoba, Saskatchewan, Alberta and British Columbia) and three key industries (construction, health care and transportation).

The briefing draws on two key sources of data. Counts of lost-time claims (LTCs) and no-lost-time claims (NLTCs) were obtained from provincial workers' compensation boards, through published statistical supplements and custom data requests.

In the province of Ontario, the Workplace Safety and Insurance Board (WSIB) provides wage-replacement benefits and health-care payments for work-related injuries and illnesses. A work injury or illness is classified as "lost time" if, after the day of injury or onset of illness, the worker is absent from work or present at work but earning less pay (through reduced hours of work or lower wages). A work injury or illness is classified as "no-lost time" if the worker requires health care (arising from the work injury or illness), but is not absent from work other than the day of injury or illness, and suffers no loss in pay as a result of the injury/illness.

# Global Financial Crisis 2008-2009

Why would the decline in compensation claims be much greater than the decline in hours of work?

- Hazardous industries experienced the largest declines in hours worked
- Oldest (and less safe) equipment taken out of use
- Pace of work was slower
- Under-reporting due to worker fear of job loss

Issue Briefing argues that lower workplace risk (not under-reporting) as the dominant explanation

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# Record Linkage Methods

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Extracts of WSIB claims (2004-2017), lost-time and no lost-time claims, persons aged 15-65, N = 3,700,000

Extracts of NACRS records (2004-2017), non-scheduled ED visits, 'responsibility for payment' = WSIB, persons aged 15-65, N = 1,900,000

## **Linkage variables common to both data sources:**

Gender, Birthdate, six-digit residential postal code, Date of Injury (WSIB), ED visit date (NACRS)

## **Linkage procedure**

Perfect match required on Gender, Birthdate, Residential Postal Code  
ED Visit Date and WSIB Date of Injury allowed a window of 3 days

(ED visits clustered into episodes if multiple ED visits occurred within 60 days of index visit)

# Record Linkage Results

## Overall linkage rate: 64%

(ED records matching a WSIB claim)

Minor variation in linkage rate by geography ('N': 67%, 'M': 58%)

No variation by gender

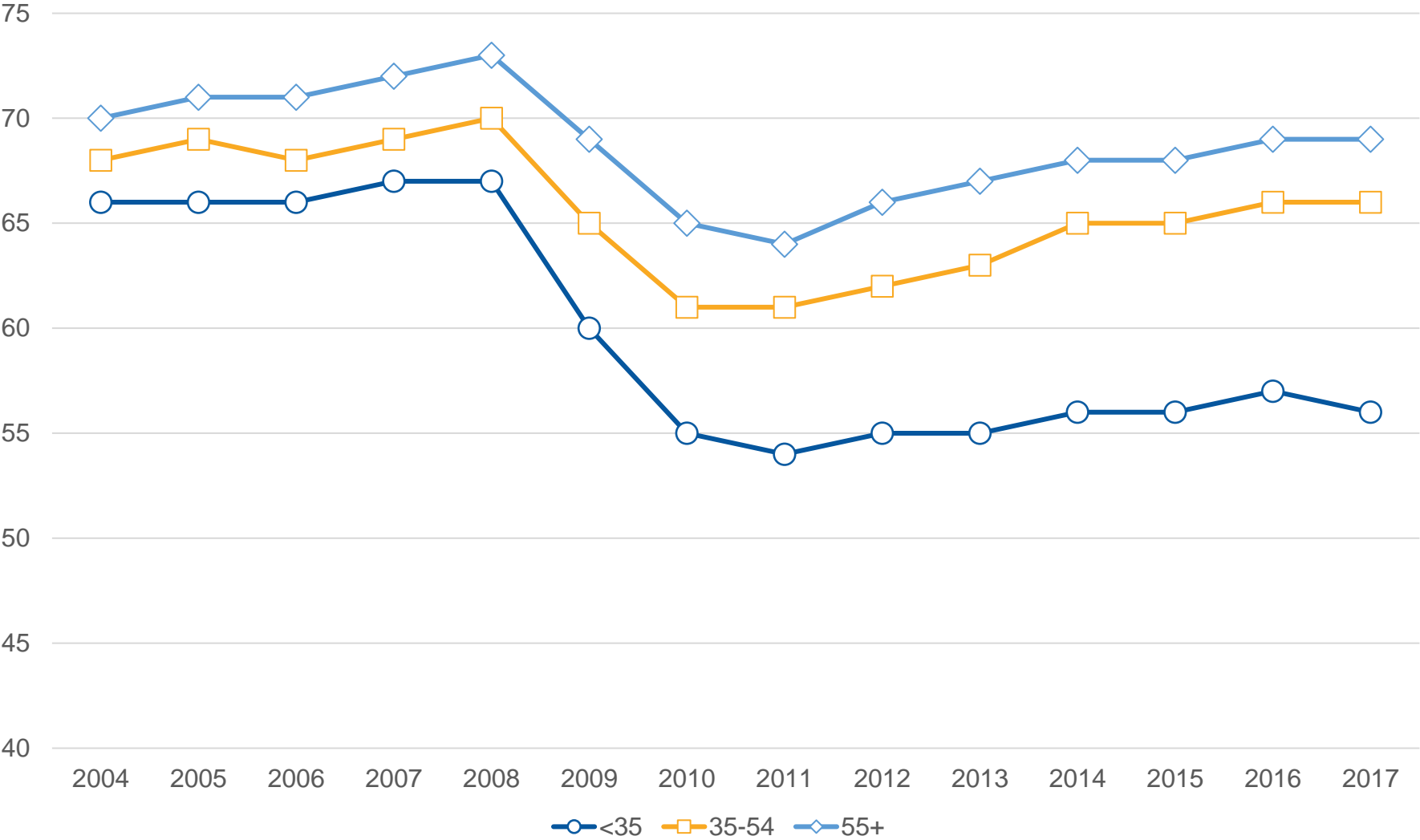
Minor variation by age (Men: 61% <25 vs 69% >55, Women: 58% <25 vs 69% > 55)

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Male	Linked ED Episodes	Unlinked ED Episodes	Proportion Linked ED Episodes
<b>Total, episodes</b>	<b>763,793</b>	<b>430,515</b>	<b>0.66</b>
<25	147,847	96,173	0.61
25-34	191,499	119,883	0.61
35-44	179,045	96,479	0.65
45-54	162,654	79,928	0.67
55+	82,748	38,052	0.69

# Percent of linked records, by age and year, 2004 to 2017

Percent of ED records linked to a WSIB claim



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How might Emergency Department visit records improve information on the incidence of work-related injury/illness in Ontario?

Enhanced information on the Nature of Injury and Injury Event for WSIB No Lost-Time claims

# 'Nature of Injury' (ICD10) by claim status (lost-time vs no lost-time)

10 most frequent 'Nature of Injury'.

Rows ordered from highest to lowest frequency, lost-time claims, 2004 to 2017

	Lost-time		No lost-time		Unlinked L / U+L	
	N	Row %	N	Row %		
<b>Total Emergency Department Visits (Traumatic Injury)</b>	<b>293,716</b>	<b>30.9</b>	<b>653,418</b>	<b>69.1</b>	<b>482,853</b>	<b>66.2</b>
01_Superficial	44,400	0.29	108,584	0.71	78,393	66.1
02_Open wound	38,611	0.15	219,144	0.85	140,801	64.7
03_Wrist: Fracture, dislocation, int. injury	33,382	0.34	65,383	0.66	44,862	68.8
03_Foot: Fracture, dislocation, int. injury	27,347	0.46	31,817	0.54	28,210	67.7
03_Knee: Fracture, dislocation, int. injury	26,838	0.58	19,359	0.42	19,638	70.2
03_Abdomen: Fracture, dislocation, int. injury	25,494	0.50	25,656	0.50	23,291	68.7
03_Head: Fracture, dislocation, int. injury	23,944	0.36	41,824	0.64	36,230	64.5
03_Shoulder: Fracture, dislocation, int. injury	18,637	0.44	23,614	0.56	18,592	69.4
03_Elbow: Fracture, dislocation, int. injury	11,270	0.53	10,008	0.47	8,583	71.3
04_Burns	9,192	0.29	22,977	0.71	17,241	65.1



## 'Injury Event' (ICD10) by claim status (lost-time vs no lost-time)

10 most frequent 'injury events'.

Rows ordered from highest to lowest frequency, lost-time claims, 2004 to 2017

	Lost-time N	Row %	No lost-time N	Row %	Unlinked	L / U+L
<b>Total Emergency Department Visits (Traumatic Injury)</b>	<b>293,716</b>	<b>30.9</b>	<b>653,418</b>	<b>69.1</b>	<b>479,790</b>	<b>66.4</b>
Contact with inanimate mechanical force	103,285	0.21	380,528	0.79	254,162	65.6
Falls	76,772	0.49	81,288	0.51	70,685	69.1
Overexertion	58,078	0.41	82,526	0.59	62,833	69.1
Other exposures	17,599	0.34	34,636	0.66	29,695	63.8
<b>Transport accident</b>	<b>12,530</b>	<b>0.51</b>	<b>12,124</b>	<b>0.49</b>	<b>12,001</b>	<b>67.3</b>
Contact with animate mechanical force	5,199	0.30	12,253	0.70	11,456	60.4
Assault	4,327	0.38	6,995	0.62	6,467	63.6
Contact with heat, hot substances	3,559	0.28	9,077	0.72	6,554	65.8
Accidental poisoning	3,530	0.20	14,130	0.80	8,604	67.2
Exposure to smoke, fire	3,215	0.31	7,195	0.69	5,826	64.1

# Conclusions / Discussion

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Four factors that may account for a portion emergency department records that do not match to a parallel WSIB compensation claim

1. 25% of Ontario workers do not work for a WSIB-insured employer
2. 15% of WSIB claim registrations are 'abandoned'. The most common reason is the absence of a Workers' Report (Form 6), responsible for 45% of abandoned claims
3. Errors in ED recording of clinical history: 'false positive' attributions to work exposures
4. Record linkage error on residential postal code

*#3 and #4 would not plausibly explain the abrupt decline in record linkage during the 2008-2010 period*

# Conclusions / Discussion

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Approximately 50,000 annual emergency department visits do not match to a parallel record in the provincial workers' compensation administrative data

That approximately 35-40% of emergency department visits may not be reported to the provincial workers compensation authority is generally consistent with evidence reported in many jurisdictions in North America.

Additional research is recommended to more completely understand the factors associated with unreported incidents of work-related injury or illness presenting for treatment in Ontario emergency departments.

One study design to be considered would be to interview workers identified in a Health Professional's Report (Form 8) where a workers' compensation claim was not registered and accepted by the WSIB.

# Thank you

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