ORIGINAL ARTICLE

Comparison of data sources for the surveillance of work injury

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ABSTRACT

Objective The objective of this study was to compare the incidence of work-related injury and illness presenting to Ontario emergency departments to the incidence of worker's compensation claims reported to the Ontario Workplace Safety & Insurance Board over the period 2004–2008.

Methods Records of work-related injury were obtained from two administrative data sources in Ontario for the period 2004–2008: workers' compensation lost-time claims (N=435 336) and records of non-scheduled emergency department visits where the main problem was attributed to a work-related exposure (N=707 963). Denominator information required to compute the risk of work injury per 2 000 000 work hours, stratified by age and gender was estimated from labour force surveys conducted by Statistics Canada.

Results The frequency of emergency department visits for all work-related conditions was approximately 60% greater than the incidence of accepted lost-time compensation claims. When restricted to injuries resulting in fracture or concussion, gender-specific age differences in injury incidence were similar in the two data sources. Between 2004 and 2008, there was a 14.5% reduction in emergency department visits attributed to work-related causes and a 17.8% reduction in lost-time compensation claims. There was evidence that younger workers were more likely than older workers to seek treatment in an emergency department for work-related injury.

Conclusions In this setting, emergency department records available for the complete population of Ontario residents are a valid source of surveillance information on the incidence of work-related disorders. Occupational health and safety authorities should give priority to incorporating emergency department records in the routine surveillance of the health of workers.

What is already known on this subject

- Many occupational health surveillance systems rely on the monitoring of routinely collected administrative data.
- In many settings, there are concerns about the reliability of workers' compensation records as a source of surveillance information on the incidence of work-related injury.

What this paper adds

- This study has described the concordance of two independent administrative data sources providing information on the incidence of work-related injury for the population of working age adults in Ontario, Canada.
- In this setting, emergency department records appear to be a valid source of surveillance information on the incidence of work-related injury.

INTRODUCTION

More than 80% of the increase in life expectancy over the past 100 years in North America is attributed to advances in public health.[1] Among the 10 most important public health contributions to the improvement in population health are achievements in reducing hazardous exposures arising from work. Despite these contributions, work exposures continue to cause a large preventable burden of injury and illness in working-age adults. For example, approximately one-quarter of injuries resulting in activity limitation among US adults are work related.[2]

This paper describes the incidence of work injury over a 5-year period 2004–2008 and has the specific objective to compare the incidence of work-related injury and illness presenting to emergency departments to the incidence of worker's compensation claims in the province of Ontario. 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 centre 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.[3–16] In describing the concordance between two population sources of surveillance information, the objectives of this study will speak to these concerns.

The objective of surveillance in public health and occupational health is the systematic and ongoing assessment of population health status, based on the timely collection, analysis and dissemination of information on health status and health risks.[17]

Optimal characteristics of surveillance systems include continuity of measurement over time, consistency of measurement over time, population-based sampling and reliability in the measurement of health status and health risks. Many occupational health surveillance systems rely on the monitoring of routinely collected administrative data. Routine assessment of the reliability of reporting in administrative information systems is essential to understand the validity of these data for surveillance purposes.[3–14]

Both sources of information in this study are population based. In the province of Ontario, citizens are universally insured for medically necessary healthcare, including services provided in hospital emergency departments. Similarly, a single publicly administered insurance agency administers wage replacement benefits and purchases healthcare services in circumstances of work-related disability. Approximately 30% of the Ontario labour force is in employment relationships that are excluded from coverage by the workers' compensation insurance agency, the Workplace Safety & Insurance Board (WSIB). Figure 1 illustrates the conceptual concordance between the two sources of information. The WSIB administers work disability claims that result in time off work (lost-time claims) and claims that only require healthcare services (no lost-time claims). A proportion of both lost-time and no lost-time claimants will seek treatment in a hospital emergency department. In addition, there will be work-related injury or illness episodes presenting to an emergency department that are not reported to, or accepted by, or eligible for coverage from the WSIB (column labelled 'C' in figure 1).

In designing this study, we did not have access to a validated source of accurate information on the incidence of work-related injury. As a substitute for a standard of criterion validity, we evaluated four hypotheses concerning the concordance of the two data sources that, if supported, would provide evidence supporting the use of these information sources for surveillance purposes:

1. over the 5-year observation period, the annual rate of change in the frequency of compensation claims and emergency department visits will be equivalent.
2. while the incidence of emergency department visits for work-related conditions is expected to be higher than the incidence of workers' compensation lost-time claims, across age groups and gender, the ratio of rates of compensation claims and emergency department visits will be equivalent.
3. the distribution of records relative to the external cause of injury will be equivalent between compensation claims and emergency department visits and
4. the incidence of emergency department visits and lost-time compensation claims for serious injuries (defined as those resulting in fracture or concussion) will be equivalent between the two administrative data sources.

METHODS

The study objective was to compare the incidence of work-related injury and illness presenting to Ontario emergency departments to the incidence of worker's compensation claims filed with the Ontario WSIB over the period 2004–2008. Estimates of annual hours worked for the Ontario labour force by age and gender, derived from labour force surveys, are used to compute rates of work injuries per 2 000 000 h worked.

Study design

A cross-sectional observational study of work-related injuries, obtained from two independent sources, for a complete population of occupationally active adults aged 15–64 in the province of Ontario over the period 2004–2008.

Data sources

Administrative records of workers' compensation claims

Administrative records maintained by the Ontario WSIB contain information describing registered employers and the course and outcome of individual compensation claims. Electronic records of compensation claims resulting in the payment of wage replacement benefits (referred to as lost-time claims in this study) contain information on the date and time of injury, the employer's economic sector and the gender, birth date and occupation of the injured worker. In addition, a national coding standard (CSA Z-795) is used to classify information describing the injury event characteristics and the injury characteristics: (1) the nature of injury, (2) the part of body involved, (3) the source of injury or disease and (4) the event or exposure.[18] Over the period 2004–2008, there were 435 336 lost-time compensation claims.

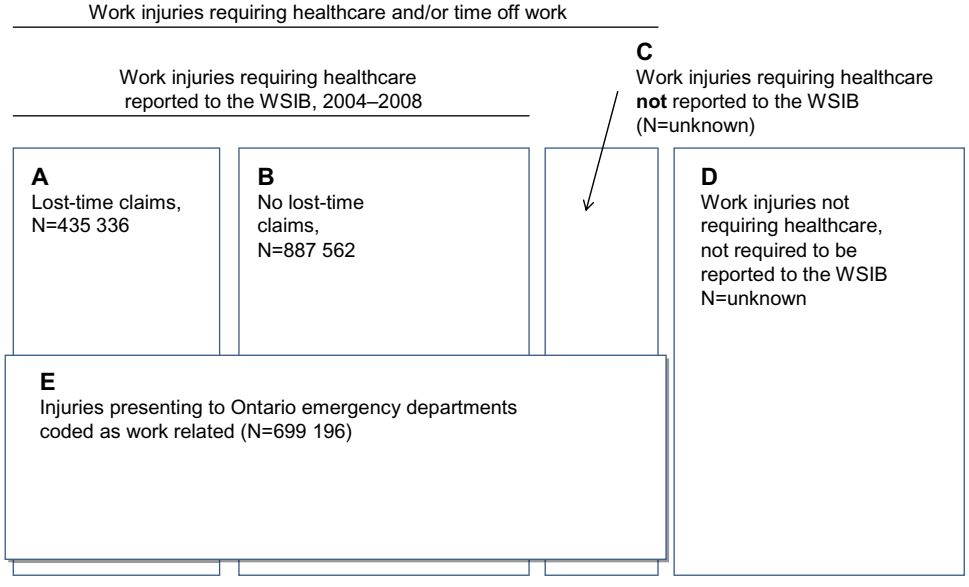

Figure 1 Work injuries requiring healthcare and/or time off work. WSIB, Workplace Safety & Insurance Board Ontario.

National Ambulatory Care Reporting System

The National Ambulatory Care Reporting System (NACRS) was established by the Canadian Institute for Health Information in 1997, providing data on individual client visits to facility-based ambulatory care services, primarily emergency departments in acute care hospitals.[19] In July 2000, the province of Ontario mandated the reporting of all emergency department visits to NACRS. There are >5 million annual emergency department visits in the province of Ontario recorded in the NACRS. For the purposes of this study, we obtained extracts for 707 963 NACRS records reported in the province of Ontario over the period April 2004 to December 2008 with a 'responsibility for payment' code indicating the WSIB. This coding indicates the clinical determination of a work-related cause of the injury or illness presenting for emergency department treatment and is independent of the registration or acceptance of a workers' compensation claim (J Tyas, personal communication, 2008). Variables included in extracted records were gender, birth date, visit type, triage date, triage time and a series of up to 10 fields documenting the main problem and the external cause of injury. Of the 707 963 emergency department records, 588 186 (84%) had an accompanying code for an external cause of injury, indicating a traumatic cause.

Measures

Characteristics of the injury

Two measures were obtained from compensation claim records: (1) nature of injury: the nature of injury is defined as the principal physical characteristic(s) of the injury or disease (eg, heat burns, amputations, bruises or contusions, fractures) and (2) part of body injured: the part of body classification identifies the part or parts of the injured person's body directly affected by the nature of injury or disease classification code previously selected (eg, ears, face, abdomen, fingers). Characteristics of the nature of injury reported on emergency department records were recorded in the 'Main Problem' field, classified to ICD-10-CA.[20]

Characteristics of the injury event

Two measures were obtained from compensation claim records: (1) source of injury: the source of injury or disease classification identifies the object, substance, exposure or bodily motion that directly produced or inflicted the injury or disease identified under the nature of injury classification (eg, ladders, building systems, floor, machinery) and (2) event leading to injury: the event or exposure identifies the manner in which the injury or disease was produced or inflicted by the identified source (eg, bending, contact with fire, fall from roof, struck by object). In emergency department records, information on the injury event was obtained from ICD-10-CA codes describing the external cause of the injury. For the purposes of this study, we defined eight categories of injury event that were concordant in the Z-795 and ICD-10-CA classification schemes.

Estimates of annual hours worked

We used information from custom tabulations of the Labour Force Survey to estimate annual hours worked, tabulated in 10-year age bands (15–24, 25–34, 35–44, 45–54, 55–64) for men and women separately. Denominator estimates were adjusted for differences in the coverage of the Ontario labour force between the WSIB and the Ontario Health Insurance Plan in the calculation of age- and sex-specific injury rates.[21]

Analysis

The frequency distribution of records was tabulated for data obtained from workers' compensation records and from emergency department records. Rates were calculated by dividing the total number of injuries occurring by the estimated person-hours of employment and expressed per 2 000 000 h worked. Rate ratios were computed by dividing the incidence rate estimates for emergency department visits by the incidence rate estimates for workers' compensation lost-time claims.

RESULTS

Table 1 reports the distribution of emergency department records attributed to work-related causes and the distribution of accepted lost-time compensation claims for each of the 5 years in the observation period. Over the 5-year observation period, the frequency of emergency department visits for work-related causes was approximately 60% greater than the annual incidence of accepted lost-time compensation claims. This ratio was constant over the 5-year observation period. Between 2004 and 2008, there was a 14.5% reduction in emergency department records attributed to work-related causes and a 17.8% reduction in lost-time compensation claims.

Table 2 reports the frequency of emergency department visits and accepted lost-time compensation claims by age group separately for men and women. Table 2 also includes incidence rates per 2 000 000 h worked. Consistent with the results reported in table 1, the incidence rate for emergency department visits (109.9 per 2 000 000 h of work) for all men is approximately 40% greater than that for lost-time compensation claims (80.5 per 2 000 000 h). In contrast, among women, the incidence rates for emergency department visits were lower than that of lost-time compensation claims (with the exception of the youngest age group).

For men, age-specific incidence rates are highest at younger ages for both emergency department visits and lost-time claims. In addition, among men, the age-specific ratio of the emergency department incidence rate to the workers' compensation incidence rate is highest at younger ages. Among women, the age-specific incidence of emergency department visits declines with age, while the incidence of workers' compensation claims rises with age.

Table 3 reports the distribution of emergency department visits and lost-time claims relative to an eight-category classification of the injury event (see also figure 2). The emergency department records reported in this table include the 588 186 records with a valid external cause of injury code and 53 505 records coded to a musculoskeletal condition as the main problem without a valid external cause of injury code. For both men and women, the largest proportion of lost-time compensation claims are attributed to injuries arising from 'bodily

Table 1 Comparison of emergency department records for work-related conditions and lost-time claims, Workplace Safety & Insurance Board Ontario (WSIB), 2004–2008

	Emergency department visits for work-related conditions	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
Total	707 933	435 336	1.61
Per cent change: 2004–2008	−14.5	−17.8	

A total of 116 emergency department records were missing information on injury year.

Table 2 Comparison of emergency department records for work-related conditions and lost-time claims by age and gender, Ontario, 2004–2008

	Age					
	15–24	25–34	35–44	45–54	55–64	Total
Men						
Emergency department records (N)	103 065	123 703	119 513	89 748	36 070	472 099
Annual hours of work (000)	203 197.5	385 844.6	456 725.3	443 150.7	229 300.2	1 718 218.3
Per cent of records (row %)	21.8	26.2	25.3	19.0	7.6	100.0
Annual incidence per 2 000 000 h of work	202.9	128.2	104.7	81.0	62.9	109.9
Lost-time claims (N)	40 240	60 275	74 918	64 641	29 496	269 570
Annual hours of work (000)*	159 306.8	288 225.9	355 789.0	355 850.0	180 917.9	1 340 089.6
Per cent of records (row %)	14.9	22.4	27.8	24.0	10.9	100.0
Annual incidence per 2 000 000 h of work	101.0	83.6	84.2	72.7	65.2	80.5
Ratio of emergency department visits to lost-time claims	2.01	1.53	1.24	1.11	0.96	1.37
Women						
Emergency department records (N)	34 337	37 299	43 017	39 248	15 691	169 592
Annual hours of work (000)	169 914.3	297 691.1	339 663.9	341 523.5	150 083.4	1 298 876.3
Per cent of records (row %)	20.2	22.0	25.4	23.1	9.3	100.0
Annual incidence per 2 000 000 h of work	80.8	50.1	50.7	46.0	41.8	52.2
Lost-time claims (N)	18 063	30 902	46 045	48 541	21 431	164 982
Annual hours of work (000)*	121 828.6	182 187.0	211 950.3	213 110.7	92 001.1	821 077.6
Per cent of records (row %)	10.9	18.7	27.9	29.4	13.0	100.0
Annual incidence per 2 000 000 h of work	59.3	67.8	86.9	91.1	93.2	80.4
Ratio of emergency department visits to lost-time claims	1.36	0.74	0.58	0.50	0.45	0.65

*Annual hours of work are adjusted for age- and sex-specific worker's compensation coverage estimates.

reaction and exertion (with the single exception of men aged 15–24 years, for whom the highest proportion of claims are attributed to 'contact with objects or equipment). In contrast, the largest proportion of emergency department visits for both men and women are attributed to injuries arising from contact with objects or equipment (with the single exception of women aged 55–64 years, for whom the highest proportion of emergency department visits are attributed to falls). For both men and women, falls are responsible for an increasing proportion of both emergency department visits and lost-time claims with increasing worker age.

Table 4 reports the frequency of emergency department visits and lost-time claims attributed to injuries associated with fractures or concussion. Approximately 6.5% of emergency department visits for men and 5.5% for women were attributed to fracture or concussion, and for both men and women, this proportion rises with age. The incidence rates for work-related fracture or concussion injuries were very similar in the two data sources with the incidence rate for men approximately double the incidence rate for women. In both data sources, the incidence rate for fracture or concussion per 2 000 000 h of work for men is highest at the youngest ages. In contrast, among women, the incidence rate rises with age in both data sources.

DISCUSSION

This study found an important degree of concordance between two potential sources of information for the surveillance of work-related injury and illness. There was strong concordance in temporal trends: between 2004 and 2008, there was a 14.5% reduction in emergency department visits attributed to work-related causes and a 17.8% reduction in lost-time compensation claims. In addition, when restricted to injuries resulting in fracture or concussion, injury incidence per 2 000 000 h of work by age group and gender was generally similar in the two data sources.

The study also found some important discordant patterns in the two sources of information on work-related injury and illness. Young men especially and young women to a lesser degree have a higher incidence of emergency department visits for all conditions than would be expected based on the incidence of workers' compensation claims. This higher incidence of emergency department visits may arise for three reasons. First, younger workers may be more likely than older workers to seek care for work-related injuries in emergency department settings. Second, younger workers may be more able or willing to return to accommodated work following a work-related injury with the result that the incidence of workers' compensation claims for lost time is lower for younger workers. Third, younger workers may be less likely than older workers to report work-related injuries and illness to the provincial workers' compensation agency.

In considering the weight of evidence concerning these three explanations, we note the following. The Canadian Community Health Survey is a source of information on working conditions and the health status of labour force participants.[22] Over three waves of survey administration (2000–2001, 2003–2004 and 2005–2006), approximately 40% of male workers aged 15–34 years reporting a work injury in the previous 12 months reported seeking treatment in an emergency department in comparison to approximately 30% of male workers aged 45–64 years (unpublished data available from the authors). Similar age-specific differences in emergency department use for the treatment of work-related injury have been reported in the USA.[23 24] These findings support the premise that age-specific differences in care seeking may be responsible for some of the age differences in incidence we observed between emergency department encounter records and workers' compensation claims. Additionally, recent work completed by a number of members of this author group has documented a consistent age difference in the distribution of lost-time and no lost-time compensation claims. Among younger workers, a higher proportion of all claims are due to injuries that do not require time away from work than is observed among older workers.[25] These findings support the premise that work injuries requiring medical care among younger workers may be less likely to also require time away from work than among older workers. Finally,

Table 3 Comparison of emergency department records for work-related conditions and lost-time claims relative to the injury event by age and gender, Ontario, 2004–2008

	15–24				25–34				35–44				45–54				55–64			
	NACRS		WSIB		NACRS		WSIB		NACRS		WSIB		NACRS		WSIB		NACRS		WSIB	
	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N
Men																				
A. Bodily reaction and exertion	16.7	17 215	34.1	13 715	23.0	28 411	44.5	26 796	25.5	30 523	48.2	36 141	25.2	22 642	48.8	31 535	22.3	8036	44.9	13 251
B. Contact with objects or equipment	61.7	63 617	42.8	17 218	53.2	65 795	30.1	18 163	48.9	58 463	25.0	18 732	47.1	42 280	22.5	14 532	46.4	16 735	21.8	6438
C. Falls	8.0	8201	11.8	4763	9.5	11 770	13.4	8057	11.5	13 727	15.1	11 332	14.2	12 738	18.1	11 690	18.4	6625	22.9	6743
D. Exposure to harmful substances or environments	10.0	10 322	6.3	2543	9.2	11 374	4.4	2679	8.8	10 530	3.9	2922	8.3	7479	3.3	2153	7.6	2746	3.5	1028
E. Transportation accidents	1.9	1922	3.2	1284	2.7	3287	4.1	2453	3.0	3549	4.1	3052	3.1	2773	4.0	2557	3.5	1255	4.0	1169
F. Assaults and violence	1.0	1022	1.0	421	1.5	1811	2.4	1423	1.2	1379	2.1	1542	0.9	810	1.6	1017	0.7	268	1.2	347
G. Fires and explosions	0.5	507	0.3	137	0.6	760	0.6	347	0.6	756	0.8	562	0.5	465	0.7	481	0.4	160	0.5	154
H. Other events or exposure unknown	0.3	259	0.4	159	0.4	495	0.6	357	0.5	586	0.8	635	0.6	561	1.0	676	0.7	245	1.2	366
Total		103 065		40 240		123 703		60 275		119 513		74 918		89 748		64 641		36 070		29 496
Women																				
A. Bodily reaction and exertion	19.7	6749	36.6	6609	30.0	11 185	49.2	15 208	33.2	14 267	53.0	24 388	31.0	12 186	50.8	24 648	25.1	3931	43.6	9343
B. Contact with objects or equipment	49.3	16 938	29.4	5309	40.4	15 069	18.6	5740	37.2	15 992	16.5	7605	34.3	13 449	14.7	7137	31.5	4935	13.8	2950
C. Falls	12.2	4196	17.3	3132	14.1	5276	17.5	5417	16.0	6874	18.3	8410	22.4	8811	23.3	11 323	33.2	5203	32.7	7011
D. Exposure to harmful substances or environments	15.4	5273	10.6	1907	10.5	3917	5.9	1835	9.3	4016	5.2	2389	8.6	3380	5.0	2444	6.8	1070	4.6	978
E. Transportation accidents	1.3	454	2.1	377	1.9	709	2.9	910	1.8	782	2.4	1088	1.4	566	1.9	912	1.3	205	1.5	320
F. Assaults and violence	1.5	499	3.5	632	2.2	813	5.1	1576	1.7	729	3.7	1723	1.4	557	3.2	1538	1.3	210	2.8	598
G. Fires and explosions	0.3	102	0.1	26	0.3	110	0.1	34	0.2	92	0.1	49	0.1	58	0.1	27	0.1	23	0.0	6
H. Other events or exposure unknown	0.4	126	0.4	71	0.6	220	0.6	182	0.6	265	0.9	393	0.6	241	1.1	512	0.7	114	1.0	225
Total		34 337		18 063		37 299		30 902		43 017		46 045		39 248		48 541		15 691		21 431

NACRS, National Ambulatory Care Reporting System; WSIB, Workplace Safety & Insurance Board Ontario.

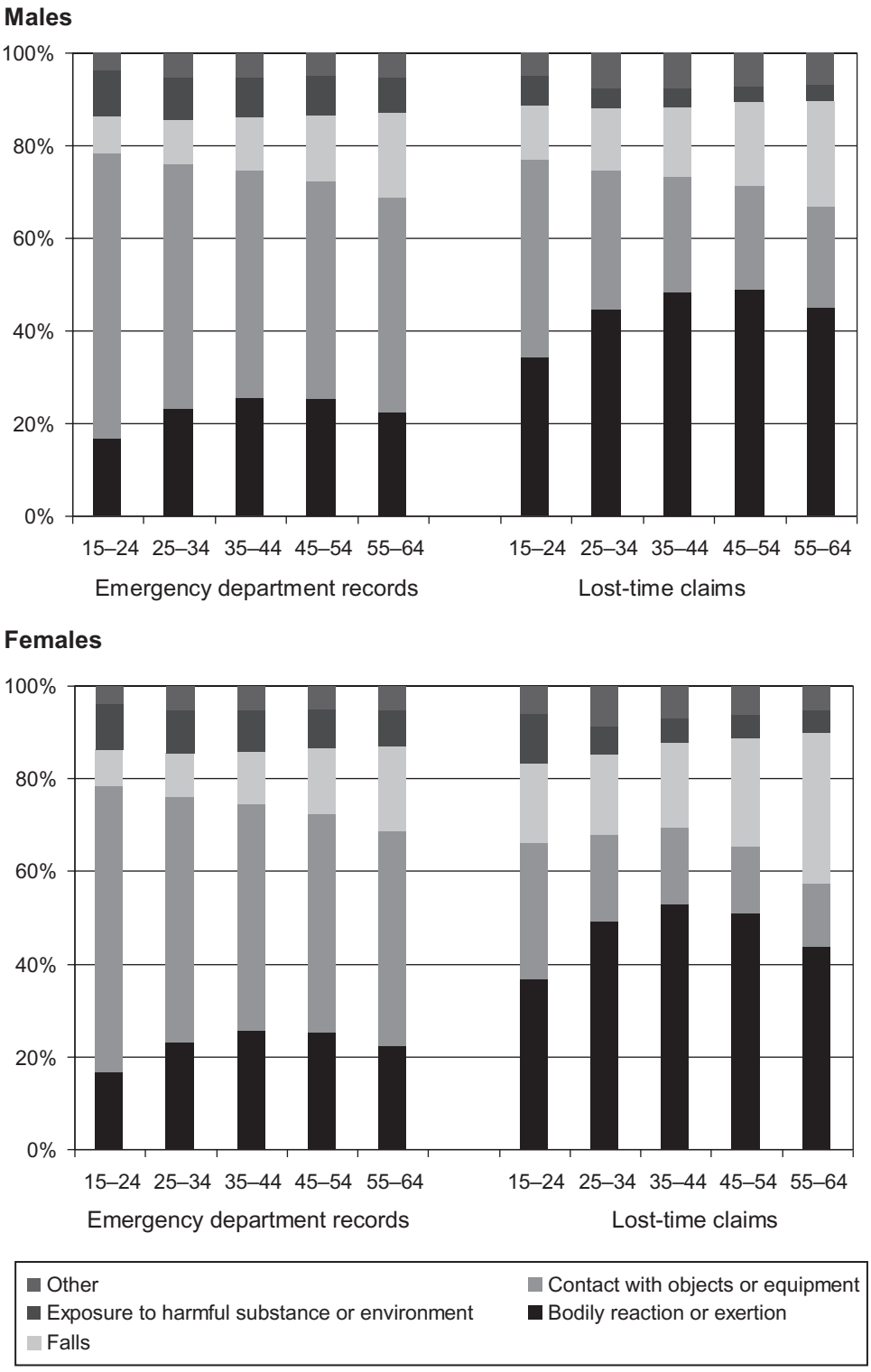

Figure 2 Comparison of emergency department records for work-related conditions and lost-time claims relative to the injury event by age and gender, Ontario, 2004—2008.

we note that a pattern of concordant incidence rates by age and gender was observed between the two data sources when we restricted analyses to injuries resulting in fractures or concussions. Overall, there are indications that age differences in treatment preferences and in the disabling consequences of work injuries may account for the higher emergency department incidence rates observed for younger adults.

A higher proportion of lost-time claims were attributable to non-traumatic musculoskeletal injuries than were observed in emergency department records. Despite the recognised challenges in distinguishing between injuries arising from acute trauma and injuries arising from cumulative trauma in administrative data, it is generally well understood that an important share of work disability arises from musculoskeletal injuries that do not arise from acute traumatic causes.[26–28] It is plausible that work-related disability arising from gradual onset impairment rather than from traumatic causes will be less likely to present for diagnosis and treatment in emergent or urgent care settings, such as hospital emergency departments. When a comparison was restricted to injuries resulting in fracture or concussion,

Table 4 Incidence of fracture of concussion injuries, a comparison of emergency department records for work-related conditions and lost-time claims, Workplace Safety & Insurance Board Ontario, 2004–2008

	Emergency department records				Lost-time claims			
	Fracture or concussion (N)	All visits (N)	Fracture or concussion as a per cent of all visits (%)	Fracture or concussion incidence per 2 000 000 h of work	Fracture or concussion (N)	All claims (N)	Fracture or concussion as a per cent of all claims (%)	Fracture or concussion incidence per 2 000 000 h of work*
Men								
15–24	4845	103 065	4.7	9.54	4447	40 240	11.1	11.17
25–34	6959	123 703	5.6	7.21	6558	60 275	10.9	9.10
35–44	8018	119 513	6.7	7.02	8779	74 918	11.7	9.87
45–54	7276	89 748	8.1	6.57	6160	64 641	9.5	6.92
55–64	3661	36 070	10.1	6.39	3351	29 496	11.4	7.41
Total	30 759	472 099	6.5	7.16	29 295	269 570	10.9	8.74
Women								
15–24	1098	34 337	3.2	2.58	998	18 063	5.5	3.28
25–34	1464	37 299	3.9	1.97	1475	30 902	4.8	3.24
35–44	1997	43 017	4.6	2.35	2352	46 045	5.1	4.44
45–54	2836	39 248	7.2	3.32	3416	48 541	7.0	6.41
55–64	1901	15 691	12.1	5.07	2435	21 431	11.4	10.59
Total	9296	169 592	5.5	2.86	10 676	164 982	6.5	5.20

*Annual hours of work are adjusted for age- and sex-specific worker's compensation coverage estimates.

where we would expect urgent care, the study found a strong concordance between incidence rates estimated from emergency department records and incidence rates estimated from workers' compensation lost-time claims.

Estimating concordance between the two data sources in this study is complicated by the fact that only a portion of work injuries requiring medical care present to a hospital emergency department. Over three waves of the Canadian Community Health Survey, among persons reporting at least one activity-limiting occupational injury in the previous 12 months, approximately 65% were reported to require medical attention and 50% of the injuries requiring medical attention presented to a hospital emergency department. If we assume that all of the approximately 300 000 lost-time and no lost-time claims reported annually to the Ontario WSIB required medical attention and that 50% of these episodes presented to a hospital emergency department, we would expect, as reported in table 1, 150 000 visits in Ontario emergency departments annually to be attributed to a workplace exposure.

We identify four principal strengths of this study. The first strength is reliance upon two independent sources of information that can be used to identify the occurrence of a work-related injury. Second, both sources of administrative data are population based, each providing high coverage of the Ontario labour force. The third strength is the 5-year period of observation providing descriptions of temporal trends in the incidence of work-related disorder. We note a fourth strength. The emergency department records described in this study are cost-efficient relative to available alternatives such as cross-sectional or longitudinal surveys. In gaining this efficiency, the potential source of surveillance information trades off the opportunity to have access to detailed information on work environments and worker characteristics. We discuss these limitations below.

There are limitations to the methods of this study. Emergency department records do not contain information describing the industry or occupation that could be used to estimate differences in work exposures arising from occupation injuries. Short employment tenure is an important risk factor for the risk of work injury.[29–31] While information on employment tenure is provided by employers in the filing of lost-time claims, this information is not available in emergency department records. Finally, differences in coding standards used to document the nature of injury and the injury event between the two data sources may be responsible for differences in the descriptive epidemiology of work-related injuries reported in this paper.

In future research, we will focus on examining the feasibility of individual-level record linkage between the two data sources, to estimate the proportion of emergency department records that are not reported to or accepted by the provincial workers' compensation agency and to examine, in detail, the degree of concordance between the two data sources in the classification of injury information.

In conclusion, in this setting, emergency department records available for the complete population of Ontario residents are an important source of surveillance information on the incidence of work-related disorders. Occupational health and safety authorities should give priority to incorporating emergency department records in the routine surveillance of the health of workers.

Competing interests None.

Ethics approval Health Sciences Research Ethics Board, University of Toronto Faculty of Medicine.

Contributors CAM, PMS and CM conceived the study. CAM, PMS, AC and AB contributed to the design of the study methods and to the specification of data analysis. CAM drafted the initial manuscript, and all authors made editorial contributions to the final paper.

Provenance and peer review Not commissioned; externally peer reviewed.

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