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Capturing Cases in Workers' Compensation Databases: The Example of Neck Pain

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Background *There is a need to more accurately enumerate workers with musculoskeletal injuries who make lost-time claims to workers compensation boards. The objective of this study is to develop an approach to more accurately enumerate these workers.*

Methods *Lost-time claims to the Ontario Workplace Safety & Insurance Board (WSIB) were reviewed. Using neck pain as an example, nature of injury and part of body codes were identified to classify cases. Claims of a random sample of 434 claimants were reviewed. The proportion of claimants classified as having neck pain was computed.*

Results *The proportion of claimants classified with soft-tissue injuries to the neck varied from 0.88 for codes including “neck/cervical region,” 0.69 for “back region” to 0.05 for those coded as “shoulder/upper arm.”*

Conclusions *Restricting the enumeration of injuries to specific part of body codes can lead to a gross underestimation of the magnitude of soft-tissue disorders in epidemiological studies using workers' compensation data. The proposed approach leads to more accurate enumeration.* Am. J. Ind. Med. 49: 557–568, 2006. © 2006 Wiley-Liss, Inc.

KEY WORDS: *measurement; diagnosis; bias; neck injury; workers' compensation; occupational injury; administrative database*

INTRODUCTION

Workers' compensation databases offer a rich source of information for etiological and prognostic research of

musculoskeletal disorders [Johnson et al., 1999; Silverstein et al., 2002; Wasiak et al., 2003]. However, several types of measurement error can threaten the validity of these studies [Beaton, 1995; Azaroff et al., 2002]. Error can arise from the reporting of injuries by workers and employers; from the clinical diagnoses made by health care providers and from the process of coding injuries into databases such as those maintained by workers compensation systems. Overall, these errors can lead to an under-enumeration¹ of injured workers with a specific condition and may result in biased estimates of prevalence and incidence [Beaton, 1995; Azaroff et al., 2002; Zacharia et al., 2003].

One particular source of measurement error that is worrisome in epidemiologic studies is the systematic under-enumeration of injured workers with specific disorders. This problem may occur when a disorder is uncommon; when the contribution of work to its etiology is difficult to establish; when it is difficult to diagnose; or when a disorder is given a low coding priority within the compensation system.

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¹ We use the word enumeration here because the first step of estimating prevalence is one of counting the cases.

Specifically, the errors may introduce selection bias when identifying a population at risk for a cohort study, misclassification of cases and controls in a case-control study and residual confounding in most observational designs. Although measurement error is a recognized problem associated with the use of workers' compensation data, few approaches have been proposed to limit its impact.

The objective of this study is to develop an approach to reduce the under-enumeration of workers with musculoskeletal injuries who make lost-time claims to workers' compensation boards. To develop this approach, lost-time claims made to the Ontario Workplace Safety & Insurance Board (WSIB) in 1997 were reviewed with a focus on neck pain as the disorder of interest. Neck pain was selected for the following reasons. First, the prevalence of neck pain is difficult to isolate as it is reported as part of upper back pain (upper back, including cervical and thoracic regions) among lost-time WSIB claimants. Second the prevalence is reported to be low, ranging between 4.0% and 4.5% of lost-time claims over the years 1996 to 2003 [Workplace Safety & Insurance Board (WSIB), 2003]. Third, neck disorders are often difficult to diagnose because they may be associated with headache, shoulder pain, arm pain or thoracic spine pain. Fourth, the etiology of neck disorders is complex and often a function of work-related and non-work-related risk factors [Côté et al., 2006]. Finally, neck pain is given a low coding priority in the WSIB relative to other injuries such as concussions, fractures or lacerations.

METHODS

Source Population

The source population includes all injured workers who made an incident lost-time claim to the Ontario WSIB in 1997. All claimants whose claim was accepted for compensation were eligible. A total of 105,839 allowed lost-time claims were registered with the WSIB during 1997 (as of May 1, 2004).²

Context

Ontario Workplace Safety and Insurance Board

The WSIB is a public insurance system legislated by the Workplace Safety & Insurance Act to provide no-fault insurance coverage for workplace injuries and diseases to Ontario workers and workplaces. In 1997, approximately

65% of Ontario workers were covered by the WSIB [Workplace Safety & Insurance Board WSIB, 2002]. Two main types of coverage exist: mandatory coverage and non-mandatory (including "Schedule 2") coverage. Firms covered under the mandatory coverage plan are required to submit a claim to the WSIB within 3 days of a worker's injury if the injury resulted in lost time from work, wage loss or the worker receiving health care. Employers covered under the alternative schedule ("Schedule 2") are companies that do not pay premiums to the WSIB but that are required to report all workplace injuries to the WSIB [Smith et al., 2004]. Workers who are self-employed or employed by companies that are not required to have WSIB coverage are not required to report injuries to the WSIB. Reported injuries are coded and entered into the WSIB database.

Coding of Claims

Claims are coded by experienced WSIB coders according to the National Work Injuries Statistics (NWIS) coding standards [Association of Worker's Compensation Boards of Canada, 1999]. There is consistency among compensation databases as these standards were adopted by most North American workers' compensation boards and commissions by 1997. The standards are based on Canadian Standard Association, Standard Z795, which is derived from the US Bureau of Statistics coding standards [Association of Worker's Compensation Boards of Canada, 1999].

The coding is done using standard WSIB forms:

- Worker's Report of Injury/Disease (Form 6)
The completion of Form 6 by the worker is optional and is done when a worker has not signed Form 7, or when the worker wishes to provide additional information about the claim.
- Employer's Report of Injury/Disease (Form 7)
Form 7 is mandatory and completed by the employer when a work-related injury or occupational disease has led a worker to: (a) obtain health care; (b) be absent from their regular work; (c) require modified duties at less than regular pay; (d) require modified duties at regular pay for more than seven calendar days after the date of accident; or (e) earn less than regular pay at regular work.
- Health Professionals Report (Form 8)
Form 8 is mandatory and completed by a physician, chiropractor, physiotherapist, or registered nurse when: (1) the patient states that an injury/illness is related to his or her work; (2) the cause of the patient's injury/illness may be related to workplace factors; or (3) the patient states that his or her condition is a recurrence, or re-injury of a previous work-related injury/illness [Workplace Safety & Insurance Board (WSIB), 2004].

² Note this number may be different from that published in WSIB reports, as this represents all 1997 claims regardless of when they were registered by the WSIB.

Coders use the information obtained from the forms outlined above to code five distinct variables that describe the injury:

- Nature of the injury
The nature of the injury identifies the principal physical characteristic(s) of the injury or disease (e.g., “bruises and sprains,” “tendonitis, traumatic”). Nature of injury is the first variable coded by the coders.
- Part of body
The part of body is coded second. It identifies the part or parts of the injured person's body directly affected by the nature of injury or disease (e.g., “cervical region (cervical vertebrae),” “multiple back regions”).
- Source of the injury
Then the source of injury or disease is coded to identify the object, substance, exposure, or bodily motion that directly produced or inflicted the injury or disease (e.g., “assembly presses,” “pipe fittings”).
- The “event” or exposure causing injury
The event or exposure is coded fourth and describes the mechanism of injury or illness (e.g., “struck by falling object,” “overexertion in lifting”).
- The secondary source of injury (if applicable)
Finally, the secondary source of injury identifies the object, substance, or person that generated the injury is coded (e.g., “bookcase,” co-worker”) [Association of Worker's Compensation Boards of Canada, 1999].

According to WSIB procedure and quality assessment checks, the coding of injuries is reliable and consistent with the coding rules and guidelines. The coders consistently achieve 90%–95% agreement with the quality assessment across 18 fields in a random check of claims quarterly (according to L. Kacur; WSIB coder; oral communication; November, 2002).

Definition of Neck Pain

Neck pain was defined as soft tissue disorders of the cervical spine/shoulder area including disc lesions and radiculopathy that is caused or aggravated by work. The team assumed that neck pain was caused or aggravated by work when a lost-time claim was accepted by the WSIB. The clinical presentation of neck pain may include symptoms in the head, trapezius muscle, shoulder, upper back, upper arm and arm [Spitzer et al., 1995; Bogduk, 2002]. Fractures, tumors, infections, rheumatoid arthritis, myopathies, and lacerations to the neck-shoulder region, as well as dislocations and subluxations of the glenohumeral joint were excluded from the definition. With this definition of neck pain the team focussed on developing an approach to use codes from the database to more accurately enumerate cases.

A New Approach

The development of an approach to reduce the under-enumeration of workers with neck pain included the following steps. First, “part of body” and “nature of injury” codes that were clinically related to neck pain and soft-tissue disorders were selected. Second, the selected nature of injury and part of body codes were grouped into clinically relevant combinations that may capture soft-tissue disorders of the cervical spine. Third, claims with relevant code combinations were randomly selected. Fourth, data were extracted from each claim and reviewed to rule in or rule out the presence of soft-tissue disorders of the cervical spine. Finally, each code combination was reviewed and those with a low yield of neck pain cases were excluded (Fig. 1).

Code Selection and Clinical Expert Review

“Nature of injury” and “part of body” codes were used to identify soft tissue disorders of the cervical spine/shoulder area. All 610 nature of injury and 188 part of body codes listed in the WSIB coding manual were reviewed. In consultation with an experienced WSIB coder, 60 nature of injury and 27 part of body codes were selected that relate to neck pain.

Code combinations that were either not valid (e.g., some part of body codes may not be logical with certain nature of injury codes) or not present in the 1997 WSIB dataset were excluded. After considering the remaining codes, the team reached consensus on a final set of codes that classified claimants as “likely” or “possibly” having neck pain (Table I). All selected “nature of injury” and “part of body” codes were combined into 238 relevant code combinations (Table I). These combinations were grouped according to body region, including two groups for multiple body regions. This resulted in 10 groups:

- cranial region
- neck/cervical regions
- shoulder and upper arm combined with specific diagnoses (e.g., “sprains, strains”)
- shoulder and upper arm combined with non-specific diagnoses (e.g., “multiple non-specific injuries and disorders”)
- upper arm combined with nature of injury codes that could possibly capture soft tissue injuries of the cervical spine
- back region
- brain
- trunk and multiple regions
- face and head regions
- multiple body regions

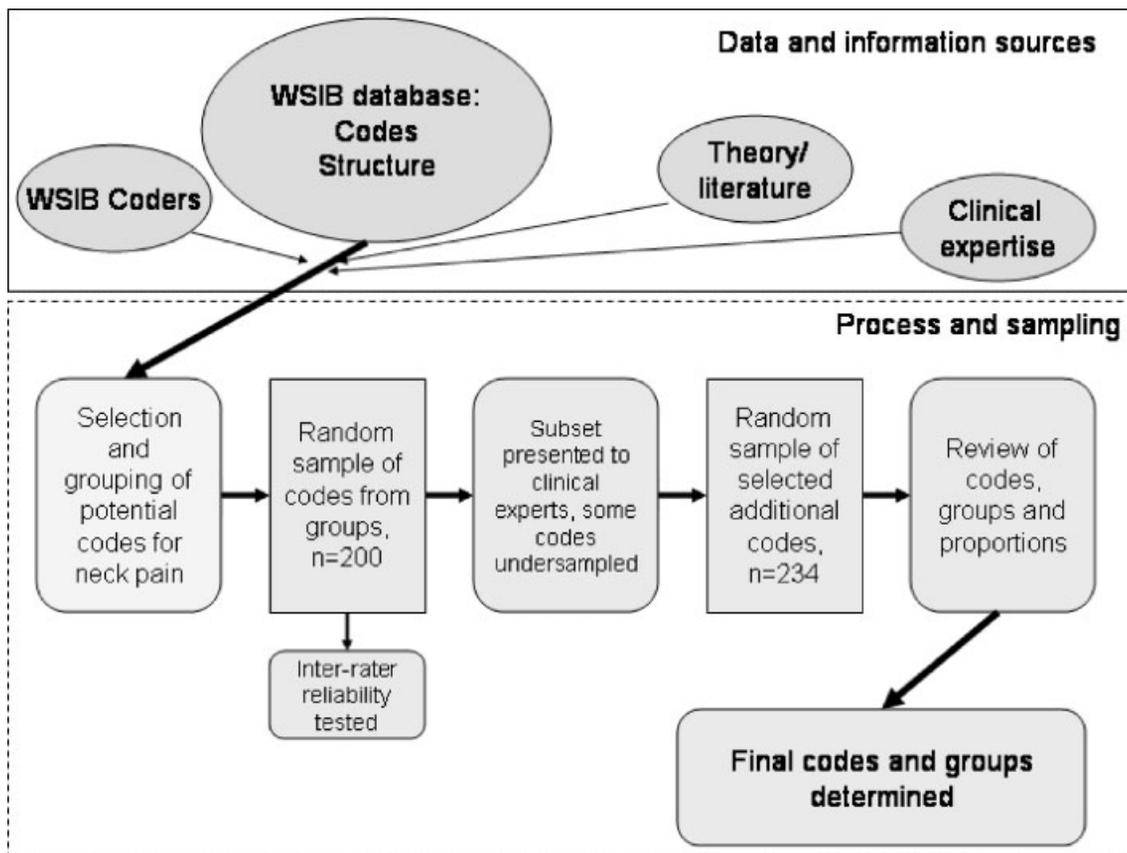


FIGURE 1. Data, information, process and sample for this project.

The codes selected were tested by presenting 14 claims to a group of five clinical experts (one rheumatologist, two chiropractors, and two physiotherapists). The selected claims represented a spectrum of neck pain cases that ranged from “not neck pain” to “likely neck pain.” The experts were presented with information that was collected from the WSIB forms and clinical reports submitted to the WSIB. The experts were asked to reach consensus on whether each claim represented a worker with neck pain. Then the team looked to the data from the WSIB database from a random sample to refine the approach.

Sampling of Claims

Data were extracted from 434 randomly selected claims. The sample was generated in two stages (Fig. 1). In the first stage, 20 claims from each of the 10 groups of codes were randomly sampled. In the second stage, an additional 234 claims (specific code combinations from the 10 groups) was randomly selected to improve the precision of the analysis and to ensure that relevant code combinations were represented in the sample.

Extraction of Data From Claims Database

The WSIB maintains scanned copies of all administrative and clinical documents related to each individual claim. These include copies of Forms 6, 7, and 8 as well as clinical documents such as clinical progress reports, assessment reports, emergency room reports, and other clinical communications submitted by health care providers. Information related to mechanism of injury, body parts injured, symptoms reported, physical examination results, test results, and diagnosis was extracted from these documents. The review of clinical documents was limited to a maximum of 10 per claim. The data extractor (DVE) was blind to nature of injury and part of body code combination. The confidentiality of claimants was protected by extracting the data at the WSIB head office and by de-identifying all information extracted from the files.

Using the data extracted from the electronic chart, the data extractor made an initial judgment about the presence of a soft tissue injury to the cervical spine. Each claim reviewed was classified as a “definite neck pain case,” a “probable

neck pain case,” or “not a neck pain case” according to the data from the forms and reports available. A claim was considered a “definite neck pain case” if there was evidence of soft tissue injury (e.g., strain/sprain) in the neck region; a “probable neck pain case” if it was clear that the neck was involved and there was a possibility that there was soft tissue involvement (e.g., whiplash mechanism of injury associated with a concussion); and “not a neck pain case” if there was no evidence that the neck was affected or if the neck was affected but it was clearly not a soft tissue injury (e.g., laceration). All claims the team felt represented definite or probable neck pain were counted as neck pain cases.

Reliability of Neck Pain Case Classification

The data extracted from the first 50 claims were used to assess the face validity and reliability of the data extractor’s judgments about whether the claim represented a neck pain case. Extracted information from the WSIB forms and clinical reports was reviewed by the team. The entire team collectively reviewed the data extracted from the first 25 claims and reached consensus on whether or not each claim represented a soft tissue injury of the cervical spine.

The second set of 25 claims was used to evaluate the inter-observer reliability (three independent members of the team) of identifying claimants with soft-tissue injuries of the cervical spine. Unweighted Kappa statistics were calculated to determine agreement between these three reviewers.

Final Selection of Code Combinations

Once the data had been extracted for the 434 claims, the proportion of neck pain cases identified within each of the defined groups was reviewed. The code groups were refined by excluding code combinations that yielded 5% or fewer neck pain cases. This was done to more accurately capture neck pain cases.

RESULTS

A total of 105,839 allowed lost-time claims were registered with the WSIB in 1997. Of those, 28,754 claims were coded using the code combinations selected in the approach proposed here. Of the randomly selected 434 claims that were reviewed, 129 were judged to be neck pain cases according to the study criteria.

Clinical Expert Findings

The clinical expert group met and reviewed 14 claim cases and came to consensus on 10 of these cases. Of these, eight were considered to be neck pain cases and two were

considered not to be neck pain cases. In the four claims where consensus could not be reached, there were distal symptoms, multiple injuries, or inconsistent findings presented in the claim documents. Consensus on the majority of the cases provides us with some evidence of face validity with respect to identifying neck pain cases.

Inter-Observer Reliability

The three raters reached perfect agreement (kappa of 1.0; SE = 0.24; lower 95% CI: 0.52) on the classification of neck pain cases (definite or probable), suggesting that the data extractor was using consistent criteria in determining whether or not a claimant was a neck pain case.

Variable and Code Selection From the WSIB Database

Of the 238 relevant code combinations, 65 were excluded because the proportion of neck pain cases was very low. One entire group with 13 code combinations (Shoulder non-specific—see Table II) was excluded because the proportion of neck pain cases was very low (0.05%). A further 52 specific code combinations from the back region and multiple body region groups were excluded because of their very low yield of neck pain cases (proportions from 0% to 0.3% were found across these code combinations) (see Appendix A). The final set of code combination includes 173 combinations.

Proportion of Soft Tissue Injuries of the Neck

The final set of body regions includes nine groups formed from 60 nature of injury codes and 22 part of body codes (see Table II). Within each code combination, a substantial proportion of claimants suffered from soft-tissue injuries of the neck. The proportion of neck pain cases in each of the nine final groups varied from 10% for the head and face region to 88% for the cervical region (Table II). It is important to note that 12% of the cervical region cases did not meet the criteria for soft-tissue injuries of the neck and could be classified as false-positive cases. The back region group included a substantial proportion of neck pain cases (69%). The team proposes that this set of code combinations should be considered when attempting to enumerate neck pain cases from claims databases such as that of the WSIB.

DISCUSSION

A new approach for estimating the proportion of lost-time claimants with musculoskeletal soft-tissue injuries is described.

TABLE I. Description of Nature of Injury and Part of Body Variables in WSIB Database

Variable	Main code divisions*	Selected "likely" codes and descriptions	Selected "possible" codes and descriptions
Nature of injury: 8 divisions (coded first)	Traumatic injuries and disorders	2000: Traumatic injuries to muscles, tendons, ligaments, joints, etc., unspecified	2101: Rotator cuff tear
		2100: Sprains, strains, tears, unspecified system, n.e.c.	2901: Bursitis, traumatic
		2190: Sprains, strains, tears, n.e.c.	2902: Tendinitis, traumatic
		2900: Other injuries to muscles, tendons, ligaments, joints, etc., unspecified	2904: Capsulitis, traumatic
		4300: Bruises, contusions	2906: Synovitis, traumatic
		6200: Concussions	2907: Tenosynovitis, traumatic
		8200: Bruises and sprains	2908: Myositis, traumatic
		8900: Other combinations of traumatic injuries and disorders, n.e.c.	2909: Other injuries to muscles, tendons, ligaments, joints, etc., n.e.c.
		8902: Multiple traumatic injuries and disorders without fractures	
		9700: Nonspecific injuries and disorders,	
		9720: Back pain, hurt back	
		9730: Soreness, pain, hurt, except the back	
		9780: Multiple nonspecific injuries and disorders	
		9790: Nonspecific injuries and disorders, n.e.c.	
		9900: Other traumatic injuries and disorders, n.e.c.	
Systemic diseases and disorders		17202: Cervicalgia	17000: Musculoskeletal system and connective tissue diseases and disorders, unspecified
		17230: Disc disorders, unspecified	17100: Arthropathies and related disorders (arthritis)
		17231: Herniated disc	17310: Bursitis, due to repetitive motions
		17232: Intervertebral disc syndrome	17320: Synovitis, due to repetitive motions
		17233: Diskarthrosis	17330: Tendinitis, due to repetitive motions
		17239: Disc disorders, n.e.c.	17340: Tenosynovitis, due to repetitive motions
		17290: Dorsopathies, n.e.c.	17360: Myositis, due to repetitive motions
		17292: Facett syndrome	17391: Rotator cuff syndrome
		17293: Radiculitis	17394: Capsulitis, due to repetitive motions
		17300: Inflammation and irritation of joints, tendons, muscles and connective tissues, unspecified	17900: Musculoskeletal system and connective tissue diseases and disorders, n.e.c.
		17390: Inflammation & irritation of joints, tendons, muscles and connective tissues, n.e.c.	
		17901: Fibro myalgia, fibrositis, myofasciitis	
Symptoms, signs and ill-defined conditions		41400: Symptoms involving head and neck, unspecified	40000: Symptoms, signs, and ill-defined conditions, unspecified
		41410: Headache, except migraine	41000: Symptoms, unspecified
		41480: Multiple symptoms involving head and neck	41100: General symptoms, unspecified
		41490: Symptoms involving head and neck, n.e.c.	41200: Symptoms involving nervous and musculoskeletal systems, unspecified

TABLE II. Groups Created by Combining Selected Part of Body and Nature of Injury Codes

Group label*	Part of body (POB)**	Nature of injury (NOI)**	Notes/rational	Proportion
Cervical region	Neck/cervical (10000, 10001, 10009, 23201, 80001)	All selected (2000, 2100, 2900, 2902, 2908, 2909, 4300, 8200, 8900, 8902, 9720, 9730, 9780, 9790, 9900, 17100, 17202, 17230, 17231, 17232, 17239, 17290, 17292, 17293, 17320, 17330, 17360, 17390, 17901, 80000)	Considered the primary group for identifying neck pain capturing those with pain localized to neck region	30/34 = 0.882
Back region**	Back regions (23000, 23200, 23800, 23900)	All selected (2100, 2902, 2908, 4300, 8200, 8900, 8902, 9720, 9780, 9790, 17100, 17230, 17231, 17290, 17292, 17293, 17330, 17360, 17390)	Possible neck pain coded as part of the back (based on coder feedback)	11/16 = 0.688
Shoulder specific	Shoulder or upper arms (21000, 31100)	Those felt to be specific diagnoses and "likely" neck (2000, 2100, 4300, 8200, 9730, 17300, 17390, 17901)	Clinical presentation of neck pain referred proximally and captured as specific shoulder diagnoses	6/61 = 0.098
Shoulder non-specific	Shoulder or upper arms (21000, 31100)	Those felt to be non-specific diagnoses and "likely" neck (2900, 2908, 2909, 8900, 8902, 9780, 9790, 9900, 17360, 17900)	Clinical presentation of neck pain referred proximally but not captured as specific shoulder diagnoses	Recommend not using due to low yield (0.05)
Upper Arms	Upper Arms (31100)	All "possibly" neck (2901, 2902, 2909, 17310, 17330, 17340, 80000)	Clinical presentation of neck pain referred proximally into upper arms	4/20 = 0.200
Head	Cranial region (1000, 1800, 1900)	All selected (4300, 6200, 9730, 9790, 9900, 41400, 41410)	Potential neck cases presenting as whiplash or headache cases	4/20 = 0.200
Multiple body***	Trunk and multiple regions (28000, 80000, 80090)	All selected (2100, 2900, 4300, 8200, 8900, 8902, 9700, 9730, 9780, 9790, 9900, 17300, 17390, 17901)	Clinical presentation of neck pain referred into trunk regions	41/96 = 0.427
Concussion	Brain (1100)	Concussion only (6200)	Neck pain may be associated with concussions due to the forces associated with these injuries	11/20 = 0.550
Head, Face	Face and head regions (0, 3000, 3800, 3900, 8000, 9000)	All selected (4300, 8900, 8902, 9700, 9730, 9780, 9790, 9900, 41410)	Neck pain may be referred or result from injuries incurred to the head or face	2/20 = 0.100
Multiple face and body	Multiple face, trunk, body parts (3800, 28000, 80000, 80090)	All designated "possibly" (2901, 2902, 2909, 17330, 17340, 17360, 17900, 41290, 48900, 80000)	These injuries by definition encompass multiple body areas which may include the neck	7/20 = 0.350

*Groups are ordered according to what we felt to be the best "face validity" in terms of likelihood of containing true neck cases.

**Refer to table I for descriptions of each part of body and nature of injury code.

***Some code combinations initially selected within the back region and multiple body groups were not used to calculate sampling proportions (see Appendix A).

The algorithm set out by this approach uses 60 nature of injury codes and 22 part of body codes to better enumerate neck pain cases from a claims database. This approach extends the work of others who have described the limitations of using workers' compensation records for epidemiological research [Roos et al., 1991; Beaton, 1995; Azaroff et al., 2002; Silverstein et al., 2002; Zacharia et al., 2003]. Workers' compensation databases are an important source of information on work-related injuries and are well designed to meet the administrative needs of Workers' Compensation Boards. These results suggest that combining clinical expertise and knowledge of workers' compensation coding practices can greatly improve capturing cases with specific types of disorders. This may have substantial impact on the understanding of specific compensated work-related injuries.

The finding suggest that strictly relying on codes that are specific to a part of body (e.g., neck) and nature of injury (e.g., sprain and strain) can lead to selection bias in epidemiological study. The selection bias introduced by measurement error is attributable, in part, to the under-enumeration of injured workers with a lost-time claim. However, simply using the cervical spine code combinations alone, may also lead to an over-estimation through the inclusion of false-positive cases. This problem is attributable to several factors related to the diagnosis, coding, and reporting of injuries.

First, the diagnosis of soft-tissue injuries is often challenging for clinicians because the clinical criteria for disorders such as neck pain are not universally accepted [Van Eerd et al., 2003]. Moreover, the variables used by WSIB coders do not always match the case criteria used by clinicians. For example, defining the neck anatomically is challenging. Where the neck ends and where the shoulder begins is a common source of debate among clinicians and may easily lead to misclassification of injuries.

Second, pain resulting from one condition may not be limited to one anatomical region. For example, neck pain is commonly associated with headache or arm pain. Failure to consider the codes associated with these anatomical regions may lead to an under-enumeration of claimants with neck pain.

Third, workers' compensation coders can only report one injury per claim. In the event that a worker has several injuries, the coder must select the "most severe" injury based on a standardized algorithm. Specifically, the coding of injuries relies on guidelines that give priority to acute injuries over sprains and strains. For example, a worker who sustains a neck injury and a laceration to the forearm would be coded as having a forearm injury.

Fourth, multiple injuries are not coded unless the injuries are deemed to be of equal severity. In a multiple injury case of equal severity, the coder enters a "multiple non-specific injuries" code, which makes the identification of anatomical location difficult for researchers. Therefore, limiting selection bias related to the enumeration of claimants with a

specific injury demands a thorough review of clinical and administrative records.

In summary, a new approach is proposed to reduce the under enumeration of claimants with a specific disorder in workers' compensation boards' databases. This approach reduces the impact of misclassification compared to the traditional enumeration of claimants with specific part of body and nature of injury codes.

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APPENDIX A

Code combinations not used in final sampling groups.

The tables below show the code combinations initially selected that were not used in the final groups.

TABLE A-I. Group E—Back Region Code Combinations not Used in Final Groups

POB (code)	POB description	NOI (code)	NOI description
23000	Back, including spine, spinal cord, unspecified	2000	Traumatic injuries to muscles, tendons, ligaments, joints, etc., unspecified
		2100	Sprains, strains, tears, unspecified system, n.e.c.
		2900	Other injuries to muscles, tendons, ligaments, joints, etc., unspecified
		2902	Tendinitis, traumatic
		4300	Bruises, contusions
		8200	Bruises and sprains
		8900	Other combinations of traumatic injuries and disorders, n.e.c.
		9720	Back pain, hurt back
		9780	Multiple nonspecific injuries and disorders
		9790	Nonspecific injuries and disorders, n.e.c.
		17230	Disc disorders, unspecified
		17231	Herniated disc
		17232	Intervertebral disc syndrome
		17290	Dorsopathies, n.e.c.
		17292	Facett syndrome
		17360	Myositis, due to repetitive motions
		17390	Inflammation & irritation of joints, tendons, muscles and connective tissues, n.e.c.

TABLE A-I. (Continued)

POB (code)	POB description	NOI (code)	NOI description
23200	Thoracic region, unspecified	2100	Sprains, strains, tears, unspecified system, n.e.c.
		4300	Bruises, contusions
		8200	Bruises and sprains
		8902	Multiple traumatic injuries and disorders without fractures
		9720	Back pain, hurt back
		9730	Soreness, pain, hurt, except the back
		9780	Multiple nonspecific injuries and disorders
		9790	Nonspecific injuries and disorders, n.e.c.
		17230	Disc disorders, unspecified
		17231	Herniated disc
		17292	Facett syndrome
		17293	Radiculitis
		17330	Tendinitis, due to repetitive motions
		17390	Inflammation & irritation of joints, tendons, muscles and connective tissues, n.e.c.
		80000	Multiple diseases, conditions, and disorders
		23290	Thoracic region, n.e.c.
23900	Back, including spine, spinal cord, n.e.c.	2100	Sprains, strains, tears, unspecified system, n.e.c.
		2902	Tendinitis, traumatic
		4300	Bruises, contusions
		8200	Bruises and sprains
		9720	Back pain, hurt back
		9790	Nonspecific injuries and disorders, n.e.c.
		17230	Disc disorders, unspecified
		17231	Herniated disc
		17239	Disc disorders, n.e.c.

TABLE A-II. Shoulder and Upper Arm Region Code Combinations Representing Non-Specific Disorders not Used in Final Groups

POB (code)	POB description	NOI (code)	NOI description
21000	Shoulder, including clavicle, scapula, and trapezius muscle if shoulder is mentioned	2900	Other injuries to muscles, tendons, ligaments, joints, etc., unspecified
		2908	Myositis, traumatic
		2909	Other injuries to muscles, tendons, ligaments, joints, etc., n.e.c.
		8900	Other combinations of traumatic injuries and disorders, n.e.c.
		8902	Multiple traumatic injuries and disorders without fractures
		9780	Multiple nonspecific injuries and disorders
		9790	Nonspecific injuries and disorders, n.e.c.
		17360	Myositis, due to repetitive motions
		17900	Musculoskeletal system and connective tissue diseases and disorders, n.e.c.
		31100	Upper arm(s)
9780	Multiple nonspecific injuries and disorders		
9790	Nonspecific injuries and disorders, n.e.c.		
9900	Other traumatic injuries and disorders, n.e.c.		

TABLE A-III. Trunk Region Code Combinations not Used in Final Groups

POB (code)	POB description	NOI (code)	NOI description
28000	Multiple trunk locations	2100	Sprains, strains, tears, unspecified system, n.e.c.
		2900	Other injuries to muscles, tendons, ligaments, joints, etc., unspecified
		4300	Bruises, contusions
		8200	Bruises and sprains
		8900	Other combinations of traumatic injuries and disorders, n.e.c.
		8902	Multiple traumatic injuries and disorders without fractures
		9730	Soreness, pain, hurt, except the back
		9780	Multiple nonspecific injuries and disorders
		9790	Nonspecific injuries and disorders, n.e.c.
		9900	Other traumatic injuries and disorders, n.e.c.