# Work-Related Injuries and Illnesses among Massachusetts State Employees, 2005: A Preliminary Report

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## Preface

In Massachusetts, more than 100,000 women and men are employed by the Commonwealth in over 1,000 state-agency establishments. These women and men make up a vital 3% of the Commonwealth's workforce, providing needed services to the 6.5 million residents of Massachusetts. Governor Patrick is committed to protecting and enhancing the health and well-being of the Commonwealth's employees. Under his leadership, worksite wellness programs have been introduced in a number of state agencies and additional programs are planned. More recently, on April 28, 2009, Governor Patrick issued an Executive Order (No. 511) directing Executive Branch agencies to identify and recommend steps to address occupational health and safety risks faced by Commonwealth employees.

In issuing this Executive Order, the governor recognized that workplace injuries and illnesses can have devastating effects, both personal and financial, on state employees who are injured or made ill, as well as their families. Workplace injuries and illnesses can also impede the ability of a state agency or department to deliver services, including the management or delivery of health care, in which many of our state employees are involved. Additionally, work-related injuries and illnesses impose preventable costs on our health care system. Therefore steps to improve the health and wellbeing of Commonwealth employees also contribute to the overall effort to reduce healthcare costs and improve the quality of care for all Massachusetts residents.

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## Executive Summary

More than 100,000 women and men are employed by the Commonwealth of Massachusetts in over 1,000 state-agency establishments, ranging from hospitals and other health care facilities, correctional facilities, universities and colleges, to public administration buildings, and community sites. These men and women make up more than 3% of the Commonwealth's workforce. A new Governor's initiative is underway to identify and reduce workplace health and safety risks faced by employees of the Commonwealth. Better information about the extent, types, and causes of work-related injuries and illnesses among state employees is needed to target, design and evaluate prevention efforts. This report provides information about serious occupational injuries and illnesses among state workers using workers' compensation claims records submitted to the Massachusetts Department of Industrial Accidents in 2005.

- **1,705** workers' compensation claims for **work-related injuries and illness resulting in five or more days of lost work-time** were filed for Massachusetts state public sector employees from all three branches of government in 2005, giving a rate of **16.9 claims per 1,000 full time workers**.

- **Healthcare** related occupations were the most common occupation reported (36%), the majority of which were specifically "community and social service workers" (predominantly mental retardation and mental health workers). **Protection service occupations** were the second most common type of occupation (21%), the majority of which were corrections officers, followed by **blue-collar-type occupations** (e.g. construction production, maintenance, agricultural occupations) (12.1%).

- The leading cause of injuries and illnesses identified from these 1,705 claims was **bodily reaction and exertion** (29%), with the sub-category of **overexertion** being most common.

    - Examples of overexertion include that from lifting, pulling or pushing, and holding, carrying, or turning. At least half of the overexertion cases were reported to be related to patient handling activities (e.g. transfer or lifting).

    - Mental retardation workers as well as building and grounds keeping and maintenance workers most commonly experienced injuries and illnesses due to overexertion.

- The second leading cause of injuries and illnesses was **assault and violence** (25%). More than half of these cases involved interaction with a patient and nearly one in three involved interaction with a prison inmate.

    - Corrections officers as well as mental health workers most commonly experienced injuries and illnesses due to assaults and violent acts.

- **Sprains and strains** (39%) were the most common type of injury followed by **contusions, crushing, and bruises** (23%), and **fractures** (5.4%).

- ***How does the rate of work-related injuries and illnesses among Commonwealth state public sector compare with that of its private sector?***

    - This is currently unknown. The rate of five-day lost work-time worker's compensation claims among private sector employees in Massachusetts is not available. In 2008, work-related injury and illness data were collected for the first time by the Bureau of Labor Statistics (BLS) from a national sample of public sector employers as part of the annual Survey of Occupational Injuries and Illnesses (SOII). In future years, state-specific data on public sector workers will be available from the BLS that can be compared to BLS SOII data that are routinely collected from private sector employers in the Commonwealth.

- ***How does the rate of work-related injuries and illnesses among Commonwealth state public sector compare with that of public sectors in other states?***

    - While there are some data on work-related injuries and illnesses among public sector workers in other states, data *on five-day lost-work time* injuries and illnesses that can be directly compared with findings in this report are not readily available.

    - Available data from New York State, however, suggest that Massachusetts state public sector workers have a lower rate of injuries and illnesses as compared to counterparts in New York. In 2007-2008, New York State Executive Branch employees experienced a *six day lost work-time* workers compensation claims rate of 26 claims per 1,000 full time workers. The Massachusetts Executive Branch *five-day lost work-time* rate was 18 claims per 1,000 full time workers.

    - It should be noted that any comparisons of rates between states or between public and private sectors within states are crude and do not account for factors which may impact the occurrence, identification, and reporting of work-related injuries and illnesses. For example, it is important to take into account the distributions of the workforce by industry and demographic characteristics in making these comparisons.

As Massachusetts takes steps to enhance the health and safety of the Commonwealth's employees, on-going review of information about where and how workers are injured or made ill on the job will be essential to guide prevention efforts. The Massachusetts Department of Public Health is currently collaborating with the Human Resources Division (HRD) within the Executive Office of Administration and Finance to make additional data available on work-related injuries and illnesses among state employees. Tracking injury and illness trends over time will enable agencies and offices to monitor their progress in meeting injury and illness reduction goals.

## Introduction

More than 100,000 women and men are employed by the Commonwealth of Massachusetts in over 1,000 state-agency establishments, ranging from hospitals and other health care facilities, correctional facilities, universities and colleges, to public administration buildings, and community sites. These men and women make up more than 3% of the Commonwealth's workforce. State employees can face health and safety hazards in the workplace, however, the occupational injury and illness experience of the Commonwealth's employees has not been well documented. A new Governor's initiative is underway to identify and reduce workplace health and safety risks faced by state employees. Better information about the extent, types, and causes of work-related injuries and illnesses among state employees is needed to target, design and evaluate prevention efforts.

To this end, the Occupational Health Surveillance Program (OHSP) of the Massachusetts Department of Public Health (MDPH) undertook an analysis of the occupational injury and illness experience of Massachusetts state government workers, including those in the Executive, Legislative, and Judicial Branches, using lost work-time workers' compensation (WC) records from 2005, provided by the Massachusetts Department of Industrial Accidents (MDIA). We used these data from MDIA as this was the best available source of information and most recent data available at the time of analysis. In Massachusetts, workers are eligible for lost work-time workers' compensation (WC) benefits when an injury or illness results in at least five days away from work, thus the findings presented in this report reflect serious work-related injuries and illnesses to state employees.

The goals of this report were to identify the causes and types of work-related injuries and illnesses experienced by Massachusetts state government employees. Specifically, we report: 1) the overall number and rate of lost work-time WC claims among Massachusetts state employees, 2) the distribution of WC claims by occupation, and 3) the leading causes of injury/illness, natures of injury/illness, and body parts affected. This report also illustrates the type of information that would be available from systematic efforts to track injury risk among the Commonwealth's workforce. While we were not able to identify hazards and injuries by industry in this preliminary report, the findings provide for the first time, needed and otherwise unavailable, aggregated information on the work-related injury and illness experience of Massachusetts state workers.

## Methods

### Data source and description of variables

MDIA records of lost-wage WC claims submitted in 2005 via employer first reports of injury, employee claims, or insurer notification were analyzed for this report. Massachusetts state law requires that all injuries or illnesses occurring at or in the course of work which result in 5 or more lost days from work,[1] be reported to the MDIA. Additional information on the MA WC system and procedures for filing a claim are available on the MDIA website[2] as well as the MDPH website.[3] All employers' first reports of injury, insurance company notifications, and employee claims are entered into a computerized database. For the purposes of this study we refer to all of these records as claims.

The MDIA provided information on the injured or ill worker, excluding the worker's name. The demographic data elements were:

- Gender
- Date of birth
- Place of residence
- Regular occupation
- Average weekly wage*
- Industry reported at the two-digit Standard Industrial Classification (SIC) level*

Information on the work-related injury or illness consisted of:

- Date of injury
- Type of injury (coded by ANSI[4] classification)
- Body part affected (coded by ANSI classification)
- Source of injury*
- A narrative accident description
- Date of death (for fatalities)
- *Employer name*
- *Insurance carrier*

Information on the employer name and insurance carrier were used to identify the eligible claims among public sector state workers in the analysis.

*Data for these variables were missing in the majority of the dataset and therefore not utilized in this analysis.

### Identification of claims among state agency employees and de-duplication of records

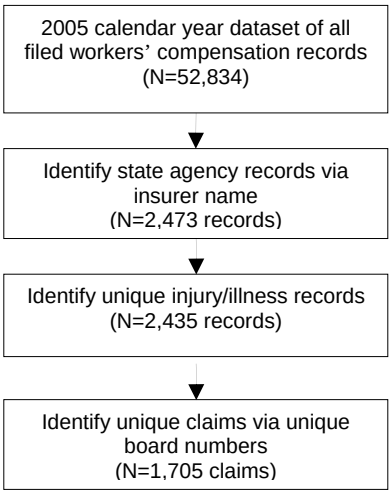
Massachusetts state employees, including contracted employees paid via the Human Resource Compensation Management System (HRCMS), receive WC coverage through the

[1] Lost workdays need not be consecutive and are calendar days, which therefore may include unscheduled workdays, such as weekends.
[2] http://www.mass.gov/?pageID=elwdsubtopic&L=5&L0=Home&L1=Government&L2=EOLWD+Publications&L3=Workers'+Compensation+Publications&L4=Injured+Worker's+Guide+To+Workers'+Compensation&sid=Elwd (last accessed April 21, 2009)
[3] http://www.mass.gov/Eeohhs2/docs/dph/occupational_health/wrkerscomp_booklet.pdf (last accessed April 21, 2009)
[4] American National Standards Institute.

Commonwealth of Massachusetts.[5] Therefore, claims among Massachusetts state employees and contracted employees were identified via the insurance carrier name in the database. This excluded part of the public or quasi public workforce – claims from individuals working for Authorities and Quasi-Public Agencies, as well as Regional Planning Agencies. To verify that the claim was from a state employee, the company name associated with the claim was manually reviewed. We identified and excluded from the analysis two claims that were judged not to be from a state employee in the manual review.

Records included for this analysis were those that were represented by a unique board number assigned by MDIA. A claim, represented by a unique board number, may have had more than one record in the database. This could occur because an injury affected more than one body part or more than one type of injury or illness was reported. Records excluded were those replicated in the database because of administrative error including those with different board numbers but determined to be duplicate reports. This determination was made based on records with the same worker's home zip code, date of birth, date of injury, nature of injury/illness code, and narrative text description of the incident regardless of whether there was identical information for weekly wage and injury source. Figure 1 illustrates the steps used to identify records eligible for analysis in this study.

**Figure 1: Identification of records from the MDIA database used for analysis**




## Data cleaning and coding

Occupation

The regular occupation of the worker, present for 82.2% of the claims, was manually coded using 2000 Standard Occupational Classification (SOC) system.

Nature of injury or illness

The nature of injury/illness in the database was reported by the individual completing the claim form; when completing the form the individual chooses from a list of codes based on ANSI Z16.2 codes. The system permits listing multiple natures of injury/illnesses on the form or use of a unique ANSI code for multiple injuries. Because we were concerned with potential data entry

[5] The Commonwealth of Massachusetts is one of many Massachusetts employers who are self-insured.

errors due to the administrative nature of the database, prior to analyzing the nature of injury/illness data, we determined 1) whether the narrative text could be useful for assigning nature of injury/illness codes, and 2) whether the self-reported nature of injury/illness codes could be validated by the narrative text.

To address the first question, we identified records with a narrative text description and only one nature of injury/illness per claim and subsequently applied an automated coding algorithm to the same records (n=1,335). We developed the coding algorithm based on keyword searches or strings of keywords. We found that only 97 of the 1,335 records (7.3%) were automatically assigned a nature of injury/illness code. To understand why so few records were assigned a nature of injury/illness code, we estimated how often a nature of injury/illness was mentioned in the narrative text in a random sample of 100 records through manual review. We found that only 8 records clearly identified a nature of injury/illness, consistent with the finding that only 7.3% of the records were coded with our algorithm. Of the remaining random sample, 21 records described an injury that could not be coded unambiguously; 62 did not mention nature of injury at all; and 9 did not have a narrative text. We therefore concluded that the narrative text field would not be useful for definitively assigning a nature of injury/illness code for this analysis.

To address the second question, we manually reviewed the 97 records that were assigned a nature of injury/illness code based on our coding algorithm and compared our automatically assigned codes with the self-reported codes in the database. We found that the majority (89%) of the records had a self-assigned nature of injury/illness code that was consistent with the code assigned from the algorithm (including self-reported non-classifiable codes). Because we found a high level of agreement between the self-assigned codes and the codes assigned from the narrative text, we were comfortable relying on the reported nature of injury/illness in the database for this analysis. Further, because of the high level of consistency, we used the narrative text to assign a code where possible for those records with a nature of injury/illness code that was self-reported as unclassifiable (n=7).

For an injury, if the same nature of injury was reported to affect different body parts within the same claim, each unique combination of injury and body part was considered a distinct injury. An illness, however, was counted only once within each claim, even if multiple affected body parts were recorded (e.g. wrist(s) and hand(s) for carpal tunnel syndrome). Claims with a “non-classifiable” nature of injury/illness were treated separately and counted as one distinct injury/illness. Note that the distinction between an injury and an illness is not necessarily clear-cut for certain conditions, particularly musculoskeletal disorders which may be acute or chronic. For the purpose of this report, sprains and strains which may include chronic musculoskeletal disorders were coded as injuries, while carpal tunnel syndrome, which was the only distinct musculoskeletal disorder that could be chosen from the available nature of injury/illness codes, was coded as an illness.[6]

Affected body parts

The affected body part(s) is also reported by the individual completing the claim form in the same manner as the nature of injury/illness. To determine whether the combination of the reported nature of injury/illness and affected body part(s) in a record was plausible, we applied a consistency check based on methods employed by the Bureau of Labor Statistics in their coding for the Census of Fatal Occupational Injuries (CFOI). The consistency check specified what the body part “should be” and “should not be” depending on certain natures of injury. In order to apply this consistency check to the dataset, the BLS Occupational Injury and Illness

[6] This follows the BLS Occupational Injury and Illness Classification System (OIICS).

Classification System (OIICS) codes were translated into the ANSI codes used in the MDIA dataset. The translation was only partially successful due to different levels of detail and discrepancies between the BLS OIICS and MDIA ANSI classification systems. We found that for the list of body parts that "should not be", those associated with traumatic injuries were largely untranslatable from the OIICS codes to the ANSI codes, while those associated with sprains and strains were fully translatable. For cases where there was an implausible combination of injury/illness and body part, both were reclassified to "non-classifiable". Based on this method, thirteen records out of the entire dataset were reclassified. As with the report of nature of injury/illness, if the body part was coded as unclassifiable, the narrative text was reviewed for the body part. Body parts were then grouped into six larger body regions: head (including neck), shoulders, upper extremities, trunk (includes "trunk, unspecified", "abdomen, internal organs, inguinal hernia", "chest, ribs, breastbone, internal organs", "hips, pelvis, organs, and buttocks", and "trunk multiple"), back, and lower extremities.

Cause of injury or illness

The MDIA database does not have a variable that specifies the cause of the injury/illness, therefore we developed an algorithm to automatically code the cause of the injury/illness based on the narrative text description of the incident. We classified the cause based on the 2007 BLS OIICS. The algorithm searched for key words or strings of text, allowing for more than one cause to be assigned to a claim. For the 1,588 claims with a narrative description, the claims were then sorted by the assigned cause codes and the narratives were manually reviewed to verify the accuracy of the assigned codes. During the manual review, any discrepancies were corrected and only one cause code was ultimately assigned. Claims that were not automatically assigned a cause code based on the algorithm were manually assigned codes where possible.

While reviewing of the narratives, we became aware that certain terms were commonly used to describe the incident. These terms were "transfer" (in relation to a patient or long-term healthcare facility resident), "use of force" (in relation to a patient or prison inmate), and "restraint" (also in relation to a patient or inmate). These descriptors are not explicitly used in the BLS OIICS, but could arguably be classified into certain categories. Therefore in instances where the text referred to the injury or illness as having resulted from the "transfer" of a patient, the cause was coded as "overexertion, not elsewhere classified" and the term "transfer" was noted. In instances where "use of force" was mentioned in the text and the workplace was a correctional facility the cause was coded as "assaults and violent acts by person(s), not elsewhere specified" and "use of force" was noted. If an injury occurred during the "restraint" of a patient or an inmate, this was also coded as "assaults and violent acts by person(s)" and the term restraint was noted.

In some cases, the narrative text simply stated that the incident occurred while "assisting a patient". This was coded as "unclassifiable"; however the term "assisting" was noted. Further, because of the frequency of the term patient, resident, or inmate in the narrative, we chose to note these as well.

**Statistical Analysis**

The distribution of claims by gender, age, occupation, nature of injury or illness, and cause of injury/illness were tabulated. To compute the overall rate of claims, the number of employees for all state employees, including HRCMS contracted employees, in 2005 was obtained from the Office of the State Comptroller. The rates are presented as the number of claims per 1,000 employees (full-time equivalent employees, or FTEs) and were calculated as the number of claims divided by the number of FTEs multiplied by 1,000. An exact Poisson 95% confidence

interval (CI) was computed for the overall rate. Counts and percents were not presented in instances where the table's cell size was less than five. While we would liked to have presented rates by gender, age, and occupation, employment figures including HRCMS contracted employees were not available by these characteristics.

## Findings

A total of 1,705 workers' compensation lost work-time claims were filed for Massachusetts state employees in the 2005 calendar year – giving a rate of 16.9 claims per 1,000 FTEs (95% CI: 16.1 to 17.8). A small majority of the claims were among males (53%) (Table 1), although males were estimated to comprised less than a majority (47%) of the 2005 Massachusetts state workforce.[7] The average age of workers filings claims was 44 years, with a range of 17 to 85 years, and the majority were between 35 and 54 years old (63%). Healthcare-related occupations were the most common occupation reported (36%), the bulk of which were specifically "community and social service workers" (predominantly mental retardation and mental health workers) (Table 2). Protective services occupations were the second most common type of occupation (21%), the majority of which were corrections officers, followed by blue-collar-type occupations (e.g. construction, production, maintenance, agricultural jobs) (12.1%). Occupation was not available or could not be classified for 20% of the claims.

### Causes of injuries and illnesses

"Bodily reaction and exertion" was the leading cause of injuries and illnesses (29%), followed by "assaults and violent acts" (25%), and falls (14%) (Table 3).

**Bodily reaction and exertion** events are typically characterized by free bodily motion, excessive physical effort, or repetition of a bodily motion, and are usually non-impact. Examples include a slip or trip without a fall, overexertion in pulling or pushing objects, repetitive motion, sustained viewing leading to eye strain.

Among the 495 "bodily reaction and exertion" cases, 241 (49%) were due to overexertion, of which at least 188 (52%) were due to transfer or lifting. In addition, we were able to identify specifically the mention of a *patient, client, or resident* as the source of injury in 26% (76) of the 241 overexertion cases. Overexertion cases occurred most commonly among mental retardation workers (29.0%) followed by building and grounds keeping and maintenance workers (16.6%) (data not presented).

Among the 432 "assaults and violent act" cases, 56% (243) reported a patient, client, or resident as the source of the injury/illness and 29% (123) reported an inmate as the source of the injury/illness. "Assaults and violent act" cases occurred most commonly among corrections officers (32%) followed by mental health workers (28.0%) (data not presented).

Among the 235 falls, most occurred on the same level (71% of falls) while falls to a lower level accounted for 24% of falls. The remainder of the falls included unspecified types of falls, jumps to a lower level, and falls that were not elsewhere classified. The 167 falls that were on the same level occurred most commonly among community and social services occupations (31%), followed by an even distribution among protective services workers (10%), building and grounds keeping workers (10%), and office and administrative support workers (10%) (data not presented).

[7] Source: Current Population Survey.

## Causes of injuries and illnesses by occupation

The two leading causes of injuries and illnesses were identified for occupations in which at least 75 claims were filed. Among health-care related occupations, assaults and violent acts as well as bodily reaction and exertion were consistently among the top causes of injuries and illnesses, however their distributions varied greatly within this broad occupational group (Table 4). For example, the vast majority of injuries and illnesses among mental health workers were caused by assaults and violent acts (70%), while for mental retardation workers assaults and violent acts accounted for 21% of the injury and illness claims, and were second to bodily reaction and exertion which accounted for 36% of the injury and illness claims.

Not surprisingly, assaults and violent acts were also the leading cause among corrections officers, accounting for 46% of the injury and illness claims, followed by bodily reaction and exertion (27%).

For buildings and grounds keeping and maintenance workers, bodily reaction and exertion was the leading cause of injury and illness (45%), followed by falls (19%).

## Natures of injuries and illnesses

The majority of the claims were for injuries (84.3%) as opposed to illnesses (3.5%) and 17.2% of the claims had at least one nature of injury/illness that was not classifiable. The small proportion of reported work-related illnesses is not unique to this population and was to be expected in workers' compensation claims data (see box).

**Occupational illnesses** are particularly difficult to identify as work-related and consequently are very poorly captured in workers' compensation claims. One reason is that many work-related illnesses have a long latency between initial exposures to a job hazard and the appearance of symptoms. In addition, many illnesses such as asthma can be caused by both occupational and non-occupational factors and therefore identifying the work-relatedness of the condition can be difficult.

The three most common natures of injuries/illnesses among the 1,705 claims were sprains and strains (56%), contusions, crushing, and bruises (23%), followed by fractures (5.4%) (Table 5).

Overall, sprains and strains were most commonly caused by bodily reaction and exertion (39%); contusion, crushing and bruise was most commonly caused by assaults and violent acts (40%); and fractures were most commonly caused by falls (45%) (Table 6).

## Body parts affected by injuries

For all injury claims, the most common body parts affected were roughly equally distributed among the upper extremities (39%), lower extremities (32%), and back (30%). A similar distribution was seen for sprains and strains although back was the most commonly affected body part (38%) while among claims for contusions, crushing and bruises, head and neck (31%) replaced back as the lead among the three common body parts. Fractures most commonly affected the lower extremities (52%), upper extremities (33%), and trunk (11%) (Table 7)

## Discussion

In this analysis of 1,705 WC claims reports submitted to the MDIA in 2005, Massachusetts state government employees were shown to experience work-related injuries and illnesses serious enough to result in at least five days away from work at a rate of 16.9 claims per 1,000 FTEs. Though based on data from only one year, the findings of this analysis emphasize the importance of addressing hazards related to "bodily reaction and exertion" as this was a frequent cause of injuries and illnesses. A general assessment of these "bodily reaction and exertion" cases indicated patient handling should be an important target for intervention. A second priority would likely be workplace violence prevention programs to address the number of claims for "assaults and violent acts" primarily among those responsible for patient/client/resident care or with corrections.

The findings presented here related to hazards faced by health care workers are not surprising given that there are more than 140 healthcare and social assistance establishments that account for 13.4% of Massachusetts state-agency establishments (Table A1). Further, 11.6% of the Massachusetts state government workforce is employed in healthcare and social assistance.[8] While published data on rates of occupational injuries and illnesses in publicly-owned health care facilities are limited, higher rates of non-fatal occupational injuries and illnesses involving one or more days away from work in the private healthcare industry have been consistently documented in the BLS Survey of Occupational Injuries and Illnesses (SOII). According to the 2006 BLS SOII, within Massachusetts' private sector,[9] the healthcare and social assistance industry had the 3rd highest estimated rate of non-fatal occupational injuries and illnesses involving days away from work (26 per 1,000 FTEs) of any major industry sector (3rd only to transportation/warehousing and construction). The nursing and residential care facilities sub-sector had a particularly high rate of 41 per 1,000 FTEs. Nationwide, there was a similar pattern, with healthcare and social assistance having the 4th highest rates of cases involving days away from work (15 per 1,000 FTEs). Nationwide data on occupations presented by the BLS SOII in 2006 also highlight increased risks of work-related injury and illness in healthcare settings - healthcare support workers had the 2nd highest rate of non-fatal occupational injuries and illnesses involving days away from work (27.9 per 1,000 FTEs) (2nd only to transportation and material moving occupations). In support of these surveillance data, increased risk of work-related injuries and illnesses in the healthcare and social assistance industry in the U.S. are well documented in the published scientific literature, including risk associated with overexertion-related events[10,11,12,13] and workplace violence.[14,15]

In addition to healthcare, a large number of Massachusetts state-agency establishments are engaged in justice, public order, and safety activities, accounting for 26% of state-agency establishments (Table A1). A substantial number of these establishments are corrections

[8] Source: BLS Quarterly Census of Employment and Wages, 2005.
[9] To date, nationwide BLS SOII data are only available for the private sector.
[10] Trinkoff AM, Lipscomb JA, Geiger-brown J, Brady B. Musculoskeletal problems of the neck, shoulder, and back and functional consequences in nurses. Amer J Industrial Med. 2002 Feb;41(3):170-178.
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[14] Privetera M, Weisman R, Cerulli C, Tu X, Groman A. Violence toward mental health staff and safety in the work environment. Occup Med. 2005 May;55:480-486.
[15] Gerberich SG, Church TR, McGovern PM, Hansen HE, Nachreiner NM, Geisser MS, Ryan AD, Mongin SJ, Watt GD. An epidemiological study of the magnitude and consequences of work related violence: the Minnesota Nurses' Study. Occup Environ Med. 2004;61:495-503.

facilities. A nationwide study conducted by the Bureau of Justice Statistics between 1993 and 1999 reported that correction officers had among the highest rates of assaults among selected occupations, at an average annual rate of 155.7 per 1,000 workers.[16]

**Public sector work-related injury and illness rates from other states**

There are few sources of data that can be used to compare the rate of injuries and illnesses among Massachusetts state workers to other state workers, and currently there are no sources of data that are directly comparable in terms of the types of data collected and method of collection. However, probably the most comparable data are from a recent report issued by New York State which was based on WC records for NY Executive Branch employees during the period April 1, 2007 through March 31, 2008.[17] In NY, workers are eligible for lost-wage WC benefits after six or more days of lost work time, similar to Massachusetts' lost-wage WC eligibility rule of five or more days. NY Executive Branch employees experienced a higher claim rate as compared to Massachusetts state workers (26 per 1,000 FTEs verses 17 per 1,000 FTEs), with little difference if the Massachusetts results were restricted to the Executive Branch (18 per 1,000 FTEs). Some data are also available from Washington State which evaluated WC claims for their state agency employees between 2002 and 2007 and found a compensable lost work-time claim rate of 24.7 per 1,000 FTEs.[18] This compensable rate reflected claims where the injury prevented the worker from performing their normal job or duties for more than three days, or resulted in permanent disability or death.

There are also limited data on public sector workers from the BLS SOII among states that have extended OSHA protections to public sector workers (see box).[19] The BLS SOII is currently the most commonly cited and comprehensive source of data on work-related injuries and illnesses among *private sector employees* in the US. BLS collects comparable data on public sector employees from the 26 states with OSHA state plans, although these data are not included in the national occupational injury and illness estimates. For the first time in 2008, data from a national sample of public sector employers (regardless of whether a state OSHA plan was in place) was conducted, and as continued collection takes place, MA-specific data will become available.

> While federal OSHA has jurisdiction over private sector workplaces, states have the option of implementing OSHA-approved state programs that set and enforce job safety and health standards that are "at least as effective as "comparable federal standards and have the option to promulgate standards covering hazards not addressed by federal standards. To be approved, state programs must extend protections to state and local government employees. Massachusetts is one of twenty-four U.S. states in which public sector workers are not protected under the provisions of the federal Occupational Health and Safety Act.

Connecticut, New York, Vermont, and Maine are neighboring states of Massachusetts that have either full state OSHA plans or OSHA plans that cover their public sector workers. According to their BLS SOII data, rates of *total recordable cases* (i.e. regardless of time away from work) of non-fatal occupational injuries and illnesses among state government workers ranged from 37 per 1,000 FTEs to 90 per 1,000 FTEs between 2004 and 2006 among these states. These rates

[16] http://www.ojp.usdoj.gov/bjs/pub/press/vw99pr.htm. Last accessed October 21, 2008.
[17] New York State Government Employees' Workers' Compensation Claims Annual Report Fiscal Year 2007/2008. Prepared by the New York State Department of Civil Service. Available at: http://www.cs.state.ny.us/pio/publications/Workers_Compensation_Annual_Report_09-30-08.pdf, last accessed February 4, 2009.
[18] Unpublished data made available from Washington State Department of Labor and Industries.
[19] Currently, twenty-two states and jurisdictions operate complete State OSHA programs which cover both the private sector and state and local government employees, and four states and jurisdictions (Connecticut, New Jersey, New York and the Virgin Islands) cover public employees only (state and local government).

from other states are higher than the rate presented for MA in this report in part because the BLS SOII rates included cases of all severities, not just the most serious resulting in five or more lost work days. Differences in the industry distributions of the states' workforces would also contribute to differences in rates among states.

**Comparing public and private sector rates**

Given current data limitations, it is not possible to compare occupational injury/illness rates for the public and private sectors in Massachusetts. The analysis of state worker injuries in this report provides a rate based on WC claims for injuries/illnesses resulting in five or more lost workdays. A comparable rate for our private sector workers is not available. Conversely, BLS SOII data that is available for the private sector in Massachusetts (total recordable cases and injuries/illnesses resulting in one or more days away from work) is not currently available for the public sector in Massachusetts, but, as noted above, will be available in the future.

Several neighboring states that have state OSHA plans, however, have BLS SOII data for both their public and private sectors. In CT and NY, rates of total recordable cases of non-fatal occupational injuries and illnesses were 1.3 to 3 times higher among public state employees than among private sector workers, while rates among public state employees in VT and ME were comparable or lower than among private sector workers between 2004 and 2006. It should be noted that these are crude comparisons and do not account for factors which may impact the occurrence, identification, and reporting of work-related injuries and illnesses. For example, it is important to take into account the distributions of industries and demographic characteristics of the workforce within the public and private sectors in order to make proper comparisons.

**Limitations**

While analysis of data from the MDIA were able to provide valuable and otherwise unavailable information on the occupational injury and illness experiences of a segment of the public sector workforce in Massachusetts, there are a number of limitations to this study that should be noted. One limitation is that it was not possible to distinguish claims filed from awarded claims in the MDIA database, which may result in an overestimate of the number of lost-wage WC claims awarded to state workers in Massachusetts. However, it is more likely that the findings in this report actually underestimate the full extent of work-related injuries and illnesses among the Commonwealth's workers. One reason is that only workers claiming five or more lost workday injuries or illnesses are eligible for lost-wage WC benefits, and therefore, injuries and illnesses that did not result in such lost work-time could not be captured in this analysis. Another reason is that under-reporting of work-related conditions[20] and nation-wide under-utilization of WC benefits[21,22,23] for work-related conditions has been well documented in the literature, which again makes it likely that the estimates from this study underestimate the true extent of occupational injuries and illnesses among state workers in Massachusetts. Further, while the surveillance period for this report was January 1, 2005 through December 31st, 2005 not all of the injuries and illnesses described here occurred in 2005. Because of varying times between

[20] Pransky G, Snyder T, Dembe A, Himmelstein J. Under-reporting of work-related disorders in the workplace: a case study and review of the literature. Ergonomics. 1999 Jan;42(1):171-82.
[21] Morse TF, Dillon C, Warren N, Levenstein C, Warren A. The economic and social consequences of work-related musculoskeletal disorders: the Connecticut Upper-Extremity Surveillance Project (CUSP). Int J Occup Environ Health. 1998 Oct-Dec;4(4):209-16.
[22] Rosenman KD, Gardiner JC, Wang J, Biddle J, Hogan A, Reilly MJ, Roberts K, Welch E. Why most workers with occupational repetitive trauma do not file for workers' compensation. J Occup Environ Med. 2000 Jan;42(1):25-34.
[23] Biddle J, Roberts K, Rosenman KD, Welch EM. What percentage of workers with work-related illnesses receive workers' compensation benefits? J Occup Environ Med. 1998 Apr;40(4):325-31.

the occurrence of an event and the submission of a claim, the counts and rates in this analysis are based on records that were submitted to the MDIA in 2005, some of which may have occurred before 2005. In turn, claims for some injuries that occurred in 2005 will not have entered the MDIA system until after December 31st, 2005.

Also notable was the large number of claims for which detailed information was missing in the MDIA database. Information about the cause of injury/illness was not included in the record for approximately 19% of the claims and approximately 17% of the claims had an unclassifiable nature of injury/illness. We were also limited in characterizing other dimensions of the occupational injury and illness experience of these workers, as we lacked information on the severity of the injuries and illnesses (i.e. number of days away from work), though the criteria of at least 5 lost workdays already indicates that these are the more severe injuries and illnesses. Finally we lacked information on the amount of lost wages and any medical claims data which prevented us from estimating the economic impact of work-related injuries and illnesses among state employees.

## Conclusions and Future Directions

We conducted this preliminary study to identify the causes and types of work-related injuries and illnesses experienced by Massachusetts state government employees and to illustrate the type of information that would be available from systematic efforts to track injury risk among the Commonwealth's workforce. This study also suggested areas where additional data collection could improve the guidance offered by such analyses to those responsible for protecting the health of the workforce. For example, more detailed information on the causes and sources of events are needed to better characterize the experience of work-related injuries and illnesses among this population. Despite this, these findings begin to provide otherwise unavailable insight into the types of hazards that Massachusetts state government workers face on the job.

MPDH is currently collaborating with the Human Resources Division (HRD) within the Executive Office of Administration and Finance to make additional data available on work-related injuries and illnesses among state employees. This information is collected through HRD's electronic Workers' Compensation Services system, which HRD has recently revised to allow state agencies to maintain occupational injury and illnesses logs comparable to those required under the federal Occupational Safety and Health Act (29 CFR Part 1904). This revised system will provide information on work-related injuries and illnesses of all severities. The new system should also provide more complete information about the nature, cause and source of these injuries and illnesses. The availability of data from this new electronic reporting system will enable future reports to provide more detailed information that can be used more specifically for developing targeted occupational health and safety initiatives. As Massachusetts takes steps to enhance the health and safety of the Commonwealth's employees, on-going review of information about where and how workers are injured or made ill on the job will be essential to guide prevention efforts. This information can help agencies and offices to set priorities for allocating prevention resources and to design effective interventions. Tracking injury and illness trends over time will enable agencies and offices to monitor their progress in meeting injury and illness reduction goals.

**Table 1: Distribution of lost-wage WC claims* by gender and age among Massachusetts state workers, 2005**

| | Claims | Percent |
|---|---|---|
| Total | 1,705 | 100.0 |
| Gender | | |
| Male | 904 | 53.0 |
| Female | 732 | 42.9 |
| Missing | 69 | 4.0 |
| Age group (years) | | |
| 16-24 | 71 | 4.2 |
| 25-34 | 276 | 16.2 |
| 35-44 | 534 | 31.3 |
| 45-54 | 538 | 31.6 |
| 55-64 | 250 | 14.7 |
| 65+ | 28 | 1.6 |
| Missing | 8 | 0.5 |
| Mean age (range) | 43.7 | (17 – 85) |

WC=workers' compensation.
*Claims are for work-related injuries or illnesses resulting in at least five days of lost work-time.

**Table 2: Distribution of lost-wage WC claims* by occupation among Massachusetts state workers, 2005**

| Occupation | No. | Percent |
|---|---|---|
| **All occupations** | **1,705** | **100.0** |
| **Healthcare-related occupations** | **612** | **35.9** |
| Community and social services occupations | 473 | 27.7 |
| *Mental retardation workers* | *273* | |
| *Mental health workers* | *167* | |
| Healthcare practitioner and technical occupations | 99 | 5.8 |
| Healthcare support occupations | 40 | 2.3 |
| **Protective services occupations** | **358** | **21.0** |
| Law enforcement workers | 327 | *19.2* |
| *Corrections officers* | *300* | |
| **Construction, production, maintenance, agricultural** | **206** | **12.1** |
| Building and grounds keeping and maintenance occupations | 113 | 6.6 |
| Construction and extraction occupations | 52 | 3.0 |
| Installation, maintenance, and repair occupations | 22 | 1.3 |
| Transportation and material moving occupations | 12 | <1 |
| Production occupations | 6 | <1 |
| Farming, fishing, and forestry occupations | -- | -- |
| **Management, office and professional services occupations** | **153** | **9.0** |
| Office and administrative support occupations | 67 | 3.9 |
| Education, training, and library occupations | 32 | 1.9 |
| Business operations specialists | 22 | 1.3 |
| Management occupations | 14 | <1 |
| Architecture and engineering occupations | 5 | <1 |
| Sales and related occupations | -- | -- |
| Computer and mathematical science occupations | -- | -- |
| Life, physical, and social science occupations | -- | -- |
| Legal occupations | -- | -- |
| **Other services** | **27** | **1.6** |
| Personal care and service occupations | 16 | <1 |
| Food preparation and serving related occupations | 11 | <1 |
| **Arts and entertainment** | | |
| Arts, design, entertainment, sports, and media occupations | -- | -- |
| **Not classifiable** | **42** | **2.5** |
| **Missing** | **304** | **17.8** |

WC=workers' compensation.
*Claims are for work-related injuries or illnesses resulting in at least five days of lost work-time.
**Categorization of "regular occupation" in the MDIA dataset was based on the 2000 Standard Occupational Classification (SOC) System.
Dashed lines (--) indicates cell count < 5.

**Table 3: Distribution of lost-wage WC claims* by cause of injury or illness among Massachusetts state workers, 2005**

| | Claims | Percent* |
|---|---|---|
| **All causes** | **1,705** | **100.0** |
| **Bodily reaction and exertion**** | **495** | **29.0** |
| *Bodily reaction* | *194* | *11.4* |
| *Slip, trip, loss of balance - without fall* | *88* | |
| *Bodily reaction, unspecified* | *49* | |
| *Overexertion* | *241* | *14.1* |
| *Lifting* | *104* | |
| *Unspecified* | *56* | |
| *Not elsewhere classified (NEC)* | *36* | |
| *"Transfer"**** | *21* | |
| *Repetitive motion* | *24* | *1.4* |
| *Bodily condition, NEC* | *6* | *0.4* |
| *Bodily reaction and exertion, NEC* | *11* | *0.6* |
| *Bodily reaction and exertion, unspecified* | *19* | *1.1* |
| **Assaults and violent acts**** | **432** | **25.3** |
| *Assaults and violent acts by persons* | *429* | *25.2* |
| *"Restraint"* | *124* | *7.3* |
| *"Use of force"* | *18* | *1.1* |
| **Falls** | **235** | **13.8** |
| *Same level* | *167* | *9.8* |
| *Lower level* | *56* | *3.3* |
| **Contact with objects and equipment** | **101** | **5.9** |
| **Transportation accidents** | **68** | **4.0** |
| **Exposure to harmful substances or environments, and fires and explosions** | **53** | **3.1** |
| **Unclassifiable**† | **321** | **18.8** |
| *Involved "assisting" other workers or a patient, etc.* | *29* | *1.7* |

WC=workers' compensation; NEC=not elsewhere classified.

*Claims are for work-related injuries or illnesses resulting in at least five days of lost work-time.

**These events are typically characterized by free bodily motion, excessive physical effort, or repetition of a bodily motion. They are usually non-impact and include slips/trips without a fall. Bodily reaction refers to injuries or illnesses that result from a single incident of free bodily motion which impose stress or strain upon some part of the body whereas overexertion applies to cases in which the injury or illness results from excessive physical effort directed at an outside source of injury or illness.

*** Included within "Overexertion, Not elsewhere classified (NEC)"

****Assaults and violent acts by persons include harmful actions of unknown intent such as "nurse struck by patient". BLS also considers "injuries received from the suspect resisting capture or restraint" to be included in this category. For the purposes of this report, restraint of an inmate or patient or resident of a care facility were also included in this category, however the resulting injury may or may not have been intentional. "Use of force" was included as a subcategory as it was frequently mentioned in the narrative descriptions.

†Causes were unclassifiable due to either a blank narrative description of the event or insufficient information contained in the narrative description to assign a cause of injury/illness. Categorization of cause of injury/illness was based on the 2007 BLS Occupational Injury and Illness Classification System.

**Table 4: Leading causes of injury/illness by select occupations***

| Occupation | Cause of injury/illness | |
|---|---|---|
| Mental retardation worker (n=273) | Bodily reaction and exertion (36%) | Assaults and violent acts (21%) |
| Mental health worker (n=167) | Assaults and violent acts (70%) | Bodily reaction and exertion (10%) |
| Healthcare practitioner & technical occupations (n=99) | Assaults and violent acts (33%) | Bodily reaction and exertion (27%) |
| Corrections officer (n=296) | Assaults and violent acts (46%) | Bodily reaction and exertion (26%) |
| Building and grounds keeping and maintenance occupations (n=113) | Bodily reaction and exertion (45%) | Falls (19%) |

*Cause of injury/illness presented where there were at least 75 claims for an occupation.

**Table 5: Distribution of lost-wage WC claims* by nature of injury/illness among Massachusetts state workers, 2005**

| | Claims** | Percent*** |
|---|---|---|
| **All natures of injury/illness** | **1,705** | **100.0** |
| **Injuries** | **1,437** | **84.3** |
| Sprains, Strains | 954 | 56.0 |
| Contusion, Crushing, Bruise | 396 | 23.2 |
| Fracture | 92 | 5.4 |
| Cut, Laceration, Puncture | 75 | 4.4 |
| Scratches, Abrasions | 32 | 1.9 |
| Multiple Injuries | 33 | 1.9 |
| Concussion | 20 | 1.2 |
| Hernia, Rupture | 15 | <1 |
| Dislocation | 13 | <1 |
| Other Injury, NEC | 5 | <1 |
| Burns | -- | -- |
| Electric Shock, Electrocution | -- | -- |
| Amputation or Enucleation | -- | -- |
| **Illnesses** | **60** | **3.5** |
| Carpal tunnel syndrome | 14 | <1 |
| Dermatitis | 7 | <1 |
| Mental disorders | 6 | <1 |
| Systemic poisoning | 5 | <1 |
| Eye diseases | -- | -- |
| Respiratory conditions | -- | -- |
| Symptoms and ill-defined conditions | -- | -- |
| Cardiovascular and other conditions of the circulatory system | -- | -- |
| Hearing loss | -- | -- |
| Heart conditions, excluding heart attack | -- | -- |
| Infective or parasitic diseases | -- | -- |
| Pneumoconiosis | -- | -- |
| Inflammation of joints, etc. | -- | -- |
| Conditions of the nervous system | -- | -- |
| **Non-classifiable****** | **293** | **17.2** |

WC=workers' compensation.
*Claims are for work-related injuries or illnesses resulting in at least five days of lost work-time.
**Numbers do not total to 1,705 because a single claim may result in one or more injury or illness, including a non-classifiable nature of injury/illness. Similarly, numbers do not total to 1,437 injuries or 60 illnesses because of multiple natures of injuries/illness within each category.
***Percents do not total 100 because of multiple injuries/illnesses reported per claim.
****Non-classifiable is a selectable injury/illness code ("999") on MDIA claims forms.
Dashed lines (--) indicates cell count < 5.

**Table 6: Distribution of lost-wage WC claims* by nature of injury and cause of event of among Massachusetts state employees, 2005**

| | Cause of event | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Nature of injury | All causes | Contact w/ objects and equipment | Falls | Bodily Reaction and Exertion | Exposure to harmful substances or environments | Transportation accidents | Fires and explosions | Assaults and violent acts | Unclassifiable |
| | No. | % | % | % | % | % | % | % | % |
| Sprains, Strains | 954 | 2 | 12 | 39 | <1 | 4 | | 24 | 18 |
| Contusion, Crushing, Bruise | 396 | 13 | 21 | 9 | | 4 | | 40 | 13 |
| Fracture | 92 | 9 | 42 | 15 | | 5 | | 13 | 15 |
| Cut, Laceration, Puncture | 75 | 27 | 13 | 4 | -- | -- | -- | 31 | 20 |
| Scratches, Abrasions | 32 | -- | 25 | 22 | | | | 41 | 9 |
| Multiple Injuries | 33 | -- | 15 | 18 | -- | 21 | | 24 | 15 |
| Concussion | 20 | -- | 25 | | | -- | | 30 | 25 |
| Hernia, Rupture | 15 | | -- | 67 | | -- | | -- | -- |
| Dislocation | 13 | -- | -- | 54 | | -- | | -- | -- |
| Other injury, NEC | 5 | | | -- | | | | -- | |
| Burns | -- | | | | -- | | | | -- |
| Electric shock, Electrocution | -- | | | | | | | -- | |
| Amputation or Enucleation | -- | | | | | | | | -- |
| Any injury | 1,437 | 7 | 15 | 30 | <1 | 4 | -- | 27 | 17 |

WC=workers' compensation.
*Claims are for work-related injuries or illnesses resulting in at least five days of lost work-time.
NEC = not elsewhere classified; Dashed lines (--) indicates cell count < 5.

**Table 7: Distribution of lost-wage WC claims* by nature of injury and affected body part(s) among Massachusetts state employees, 2005****

| | Body Part | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Nature of injury | All Body parts | Head and Neck | Trunk | Back | Upper Extremities | Lower Extremities | Multiple parts | Non-classifiable |
| | No. | % | % | % | % | % | % | % |
| Sprains, Strains | 954 | 13 | 6 | 38 | 33 | 27 | 1 | 1 |
| Contusion, Crushing, Bruise | 396 | 31 | 16 | 13 | 37 | 30 | 2 | 2 |
| Fracture | 92 | 9 | 11 | -- | 33 | 52 | -- | |
| Cut, Laceration, Puncture | 75 | 35 | -- | -- | 52 | 15 | -- | -- |
| Scratches, Abrasions | 32 | 47 | -- | -- | 25 | 25 | -- | -- |
| Multiple Injuries | 33 | 15 | -- | -- | -- | -- | 55 | -- |
| Concussion | 20 | 100 | | | | | | |
| Hernia, Rupture | 15 | | 100 | | | | | |
| Dislocation | 13 | | | -- | 39 | 46 | | |
| Other Injury, NEC | 5 | -- | | -- | | -- | | |
| Burns | -- | | | | -- | | | |
| Electric Shock, Electrocution | -- | -- | | | -- | | | |
| Amputation or Enucleation | -- | -- | | | | -- | | |
| Any injury | 1,437 | 22 | 11 | 30 | 39 | 32 | 3 | 2 |

WC=workers' compensation.
*Claims are for work-related injuries or illnesses resulting in at least five days of lost work-time.
**Row percents do not total 100 because an injury may have affected more than one body part.
Dashed lines (--) indicates cell count < 5.

# APPENDIX

**Table A1: Number and distribution of MA state-owned establishments by industry*, 2006**

| Industry | No. | Percent |
|---|---|---|
| Public administration | 775 | 72.4 |
| Justice, public order, and safety activities | 275 | 25.7 |
| Administration of human resource programs | 240 | 22.4 |
| Executive, legislative and general government | 112 | 10.5 |
| Administration of economic programs | 66 | 6.2 |
| National security and international affairs | 42 | 3.9 |
| Administration of environmental programs | 38 | 3.6 |
| Community and housing program administration | 2 | 0.2 |
| Health care and social assistance | 143 | 13.4 |
| Ambulatory health care services | 43 | 4.0 |
| Nursing and residential care facilities | 42 | 3.9 |
| Social assistance | 34 | 3.2 |
| Hospitals | 24 | 2.2 |
| Educational services | 80 | 7.5 |
| Administrative and support services | 37 | 3.5 |
| Transportation | 12 | 1.1 |
| Scenic and sightseeing transportation | 10 | 0.9 |
| Transit and ground passenger transportation | 1 | 0.1 |
| Support activities for transportation | 1 | 0.1 |
| Heavy and civil engineering construction | 7 | 0.7 |
| Finance and Insurance | 5 | 0.5 |
| Credit intermediation and related activities | 3 | 0.3 |
| Insurance carriers and related activities | 1 | 0.1 |
| Funds, trusts, and other financial services | 1 | 0.1 |
| Amusements, gambling and recreation | 4 | 0.4 |
| Utilities | 3 | 0.3 |
| Professional, scientific and technical services | 2 | 0.2 |
| Information | 1 | 0.1 |
| Real Estate | 1 | 0.1 |
| **Total** | **1,070** | **100.0** |

Data Source: Quarterly Census of Employment and Wages, 2006.
*Industry groupings based on 2002 3-digit North American Industrial Classification System (NAICS) codes.