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The impact of emergency responder musculoskeletal injuries in the State of Ohio

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Abstract.
BACKGROUND: Emergency personnel operate in environments that put them at higher risk of injury to the musculoskeletal system. These injuries result in lost workdays, medical costs, and decreased productivity, all which impact emergency response systems.
OBJECTIVE: This study serves to assess the causes, costs, and disability of common work-related musculoskeletal injuries within the police, emergency medical service (EMS) workers, and firefighters of Ohio based on data from the OBWC (Ohio Bureau of Workers' Compensation).
METHODS: Our dataset included all OBWC injury claims involving a shoulder, low back, or knee from 2010 through 2014. Police and Firefighter leaders were analyzed separately from those not in a leadership role, and workers with combined Firefighter/EMS roles were analyzed separately from "pure" Firefighters and EMS personnel. Data were organized through univariate analysis of variance with *post-hoc* Tukey tests and analyzed based on the job of the individual and whether the individual was in a leadership role.
RESULTS: Police Officers had the highest number of total injuries in the dataset, followed by Firefighters and Firefighters/EMS workers. Police Officers and Firefighters injured their back and knees more often than their shoulders, while EMS workers injured their backs and shoulders more often than their knees.
CONCLUSIONS: The mechanisms through which injuries occur are also dependent on the job. Police officers experienced a higher percentage of motor vehicle related back problems, while firefighters had a higher percentage of injuries from overexertion. Musculoskeletal injury claims in these emergency personnel resulted in opioid prescriptions approximately 10% of the time.

Keywords: Police, emergency medical services, firefighters, ergonomics, opioids

1. Introduction

Emergency responders, including police officers, firefighters, and emergency medical services (EMS) personnel, are all subject to higher rates of fatal and non-fatal injuries on the job than the majority of workers [1]. Each of these professions has unique elements that predispose these workers to different types of injuries.

Between 2006 and 2014, police officers suffered non-fatal work injuries involving lost time at a rate of about 500 per 10,000 full-time workers (more than 4 times the rate of general industry jobs), and 34.4% of

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their days off work were a result of sprains, strains, and tears, while 18.6% of days off work were from soreness and pain [1]. These percentages indicate police officers were impacted often by musculoskeletal injuries. Police officers were more likely than other occupations to experience low back pain, a finding which appears to be associated with driving a motor vehicle [2] or operating a motorcycle [3]. Also, the strenuous activities in which police officers participate regularly were found to be linked to higher rates of musculoskeletal injuries [4]. Physical characteristics like aerobic fitness [5] and age [6] are also a determinant for musculoskeletal injury in police officers.

Firefighters also have physically demanding job duties, including wearing heavy personal protective equipment [7]. The rate of firefighter non-fatal occupational injuries and illnesses in 2011 was 475.2 per 10,000 full-time workers [8]. In 2011, 45% of the firefighters' non-fatal injuries and illnesses were due to overexertion and bodily reaction, 23% from contact with objects and equipment, and 14% from falls, slips, and trips [8]. Impaired body imbalance and mobility restriction from wearing the heavy self-turnout gear and self-contained breathing apparatus are contributors to injuries from falls, slips, and trips [7, 9].

In the years between 2003 and 2014, the annual rate of firefighter non-fatal injuries (excluding illnesses from the figure cited above) was 266 per 10,000. The career firefighter injury rate was higher than that for volunteer firefighters, with 38% of these non-fatal injuries having occurred during firefighting duties, 7% occurred during training, 7% occurred during patient care, 2% physical activity (not training), and 46% unknown/other activity [10]. Marsh and associates [10] found that the largest portion of firefighter non-fatal injuries were sprains and strains. They concluded that due to the high prevalence of firefighter musculoskeletal injuries, there was a need for further research into causation and prevention.

EMS workers, including paramedics and emergency medical technicians, are in a dangerous profession with one of the highest rates of work-related injuries. Specifically, their rate of non-fatal injuries per 10,000 full-time workers was 273.9, 153.5, and 381.2, depending on whether they were employed privately, by a state, or by a local government [11]. The daily tasks of EMS workers put them at high risk of occupational musculoskeletal injury. EMS workers were found to be at elevated risk of injury due to overexertion, transportation-related incidents, assaults, and falls [12, 13]. Reichard and associates [12] found that the most common EMS worker injury was a sprain or strain. Dropkin et al. [14] reported that EMS workers were ranked highest for injuries attained due to overexertion and patient handling. Du et al. [15] reported that EMS workers were 2.9 times more likely to have fatal injuries on the job, 2.5 times more likely to suffer injuries that would require time away from work, and 13 times more likely to suffer lower back pain compared to workers in other industries.

Previous studies have analyzed occupational injuries more generally for police officers, firefighters, and EMS workers. The current study investigated musculoskeletal knee, shoulder, and lumbar spine injuries in workers' compensation claims in the State of Ohio over a five-year time period in order to understand the associated costs (medical and indemnity), lost days, opioid medication use as well as underlying causes.

2. Methods

This study is a secondary analysis of data reported to the Ohio Bureau of Workers' Compensation (Ohio BWC), a state agency that provides insurance for injuries in the workplace. These data contain the number of injuries sustained by Police Officers, Police Leaders, Firefighters, Firefighter Leaders, Volunteer Firefighters, EMS, and Firefighter/EMS from beginning of 2010 to the end of 2014 (5-year period). All information was de-identified and assigned an anonymous identification claim number to ensure single-person claims. A total of 4,102 claims were included in the database.

The classification of the occupations was performed by using the occupation description, which was provided by Ohio BWC, combined with NCCI manual classification numbers. In some cases, the manual number was replaced by a standard occupation code (SOC). The following is a breakdown for the manual numbers and the SOC (see Table 1).

Classification of body region was based on the ICD-9 codes for back, knee, shoulder, and for claims with multiple areas (involving the low back only, a knee only, a shoulder only, or multiple areas of the body). The drugs prescribed in the claim were also used in the analysis.

General demographic information was reported such as age and gender. The outcome variables

Table 1
Classification codes for occupations within scope

Occupation group	NCCI manual classification	Standard occupation code
EMS	2890, 5123	7705
Firefighter/EMS	5111, 5123	7705, 7710, 7711
Firefighters	5111, 5123	7710, 7711
Firefighter Leader	5111, 5123	7710
Volunteer Firefighters	5123	7710, 7711
Police Officer	5112, 5132, 5134, 5144	7720
Police Leader	5112, 5132, 5134	7720

included the costs associated with the claim, including indemnity costs, medical costs, and total costs; the number of days off the job; and the number of light duty days as well as opioid prescriptions in the claim. Based on the prescription data, a morphine equivalent dose (MED) was calculated based on equivalent daily milligram dose of morphine to the daily dose of a given opioid (e.g. Hydrocodone 10 mg three times daily has a MED of 30, Oxycodone 10 mg three times daily has an MED of 45) [16]. The average MED (average dose for claim), the maximum MED (highest prescribed dose in the claim), and the number of days for which opioids were prescribed were calculated for each claim. The causes of the injury include motor vehicle injuries, falls, fire, being struck by a foreign object, overexertion, assault, being crushed by a foreign object, and a not-applicable category. The nature of the injury ranged from injuries to the back, knee, shoulder, and multiple musculoskeletal injuries.

Data related to injury cost also were gathered and stratified into two categories. The first category is "medical," meaning any cost associated with hospital bills, medication, and other such services necessary for injury recovery. The second category is "indemnity," which refers to the costs of lost workdays and other non-medical costs. These costs were summed to total costs for each case. The total costs, medical costs, and indemnity costs were stratified based on the nature of the injury.

2.1. Data and statistical analysis

The initial analysis was a simple descriptive analysis identifying averages and standard deviations for the outcome variable as a function of occupational group. Statistical analysis consisted of univariate analysis of variance (ANOVA) with *post-hoc* Tukey tests to determine the source of any significant effects among occupations. The ANOVAs were blocked on body region. Statistical significance was determined at the $p < 0.05$ level.

3. Results

Since there were not statistically significant differences between emergency occupations (ANOVA $P > 0.05$), the study will provide descriptive results. The insignificant differences were likely due to the large variability in costs values as noted by the large standard deviations. Of the seven occupational categories studied, Police Leaders ranked the highest in indemnity ($7,461) and total costs ($15,161) while Firefighter Leader claims had the highest medical costs ($8,204) (see Fig. 1). On the other hand, Volunteer Firefighter claims ranked the lowest in total ($5,863), indemnity ($2,171), and medical ($3,692) costs for all occupational groups.

Analyzing claim costs by the area of body injured (See Table 2) revealed that Volunteer Firefighter injury claims ranked the lowest for knee ($2,771), back ($3,247), and multiple body area ($1,992) injuries for total costs. Police Leader claim indemnity costs ranked highest among back ($17,216) and knee ($5,836) injuries. EMS indemnity costs ranked highest for multiple body area injuries ($21,887) while Firefighter Leader claims were the highest medical costs among shoulder injuries ($14,619). EMS and Police Officers' claims had the 1st and 2nd most expensive average medical costs for multiple body area injuries ($16,210 and $12,584, respectively).

Table 3 provides a summary of the breakdown of the number of claims for the underlying contributors to the injuries. Overexertion injuries were the dominant contributor for EMS (61.7%), Firefighters/EMS (68.0%), Firefighter (63.7%), Firefighter Leader (64.3%), and Volunteer Firefighter (66.7%) back injuries. Overexertion was also a primary contributor to EMS (61.2%), Firefighter/EMS (62.5%), Firefighter (62.9%), Firefighter Leader (52.9%), and Police Leader (51.4%) shoulder injuries. Falls contributed to about a third of the knee and multiple body area injuries for all occupations. Motor vehicle crashes contributed to about 20% of EMS, Firefighter Leaders, Police Officers, and Police Leaders' back and multiple injuries. There were few fire-related injuries (less than 1% of claims in most body regions with exception of 4% for firefighters with multiple body area injury claims). As expected, assaults were a common cause of Police Officer (8.5%) and Police Leader (6.9%) injuries. However,

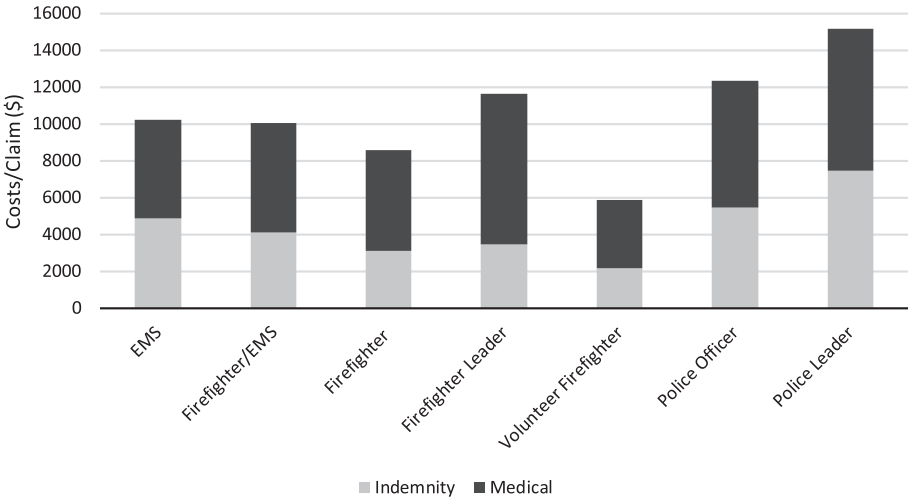

Fig. 1. Medical and indemnity costs per claim for all occupations (total costs are two bars combined).

Table 2
Total cost per claim, medical cost per claim, and indemnity costs per claim (mean and standard deviation) as a function of emergency occupation

Occupation Group	Back			Knee		
	Total	**Indemnity**	**Medical**	**Total**	**Indemnity**	**Medical**
EMS	$6,030 ($17,490)	$2,350 ($8,840)	$3,680 ($9,882)	$7,957 ($17,103)	$3,972 ($11,011)	$3,985 ($7,319)
Firefighter EMS	$7,637 ($25,744)	$3,546 ($19,901)	$4,092 ($8,108)	$9,869 ($18,210)	$3,599 ($11,355)	$6,271 ($10,297)
Firefighter	$9,842 ($55,939)	$4,169 ($34,826)	$5,313 ($22,394)	$6,343 ($11,148)	$1,698 ($3,507)	$4,645 ($8,756)
Firefighter Lead	$10,018 ($38,375)	$4,396 ($20,739)	$5,621 ($18,499)	$9,615 ($13,819)	$3,383 ($7,674)	$6,232 ($8,846)
Volunteer Firefighter	$3,247 ($5,312)	$1,542 ($3,361)	$1,705 ($2,263)	$2,771 ($5,995)	$347 ($724)	$2,424 ($5,450)
Police	$10,689 ($23,394)	$4,573 ($16,551)	$6,125 ($15,697)	$7,726 ($23,166)	$4,038 ($15,790)	$4,678 ($9,306)
Police Leader	$27,433 ($73,384)	$17,216 ($48,261)	$10,217 ($25,701)	$12,862 ($29,487)	$5,836 ($20,641)	$7,026 ($11,873)
Occupation group	Shoulder			Multiple		
	Total	**Indemnity**	**Medical**	**Total**	**Indemnity**	**Medical**
EMS	$12,756 ($37,434)	$5,891 ($23,648)	$6,865 ($14,644)	$38,097 ($86,416)	$21,887 ($53,261)	$16,210 ($33,376)
Firefighter EMS	$14,392 ($30,525)	$7,256 ($18,625)	$6,956 ($14,196)	$14,212 ($27,037)	$7,256 ($16,450)	$6,956 ($11,511)
Firefighter	$9,041 ($18,101)	$2,990 ($11,529)	$6,051 ($9,045)	$11,585 ($14,049)	$3,722 ($4,255)	$7,863 ($10,476)
Firefighter Lead	$17,189 ($49,439)	$2,570 ($5,902)	$14,619 ($49,192)	$7,231 ($7,318)	$2,876 ($3,626)	$4,355 ($4,490)
Volunteer Firefighter	$13,438 ($24,232)	$5,556 ($12,142)	$7,882 ($14,394)	$1,992 ($2,292)	$1,704 ($2,409)	$288 ($117)
Police	$14,681 ($44,152)	$5,858 ($23,435)	$8,823 ($27,896)	$27,676 ($52,786)	$15,092 ($38,678)	$12,584 ($18,864)
Police Leader	$8,481 ($11,796)	$2,162 ($3,745)	$6,320 ($9,375)	$15,704 ($25,392)	$7,115 ($16,645)	$8,590 ($17,475)

assaults were also an unexpected contributor for volunteer firefighters (back-6.6%, and knee-4.2%) as compared to Firefighters (back-0%, and knee-0.3%) and Police (back-6.2%, knee-6.6%, shoulder-13.4%, and multiple-10.4%).

As expected, due to the large percentage of male workers in the professions studied, almost all the occupations had injury claims with more than an 80% male predominance, with Firefighter Leads being the highest at 97%. The one occupation that had almost an even distribution between male (45%) and female (55%) claims was EMS.

The average worker ages in the claims for the Firefighter Leaders (48.3 years, s.d. 7.0) and Police Leaders (44.3 years, s.d. 7.6) were significantly higher ($p < 0.05$) than non-leaders for injuries across all areas of the body, while the injured Volunteer Firefighters (35.8 years s.d.12.3) were the youngest. All other occupation groups had average age at injury between 35 to 40 years old, specifically Firefighters (42.5 years, s.d. 9.0), Firefighter/EMS (39.5 years, s.d. 9.3), EMS (36.4 years, s.d. 10.4), and Police Officers (39.9 years, s.d. 8.6).

Police Leaders had the highest number of average lost days from work per claim (64.3 days) followed by Police (52.7 days), EMS (50.0 days), Firefighters/EMS (49.9 days), Firefighter Leaders (37.2 days), Firefighters (34.9 days), and Volunteer Firefighters

Table 3
Number of claims for specified contributors as a function of emergency occupation

	EMS				Firefighters/EMS			
	Back	**Knee**	**Shoulder**	**Multiple**	**Back**	**Knee**	**Shoulder**	**Multiple**
Total	180	79	98	25	250	145	120	30
Motor vehicle	17	9	8	6	4	6	3	2
Falls	15	23	7	8	10	43	11	10
Fire	0	0	0	0	1	0	0	0
Striking/struck by	1	6	3	1	2	12	4	3
Overexertion	111	26	60	5	170	50	75	8
Assault	0	0	0	1	1	0	0	1
Crushed	0	2	0	0	2	2	0	1
N/A	36	13	20	4	60	32	27	5
	Firefighters				Firefighter Leaders			
	Back	**Knee**	**Shoulder**	**Multiple**	**Back**	**Knee**	**Shoulder**	**Multiple**
Total	413	306	294	51	42	38	34	9
Motor vehicle	13	2	6	4	0	0	1	2
Falls	49	119	41	28	9	13	9	3
Fire	2	2	1	2	0	0	0	0
Striking/struck by	8	12	15	3	0	1	1	0
Overexertion	263	120	185	3	27	18	18	4
Assault	0	1	0	0	0	0	0	0
Crushed	1	1	0	0	0	1	1	0
N/A	77	49	46	11	6	5	4	0
	Volunteer Firefighters				Police Officers			
	Back	**Knee**	**Shoulder**	**Multiple**	**Back**	**Knee**	**Shoulder**	**Multiple**
Total	15	24	16	2	450	696	434	192
Motor vehicle	0	2	1	1	111	32	51	74
Falls	0	4	1	1	85	190	73	55
Fire	0	0	0	0	0	0	0	0
Striking/struck by	0	1	1	0	9	60	22	8
Overexertion	10	9	5	0	131	212	125	12
Assault	1	1	0	0	28	46	57	20
Crushed	0	0	0	0	1	4	6	0
N/A	4	7	8	0	85	152	100	23
	Police Leaders							
	Back	**Knee**	**Shoulder**	**Multiple**				
Total	35	63	44	17				
Motor vehicle	7	0	4	3				
Falls	4	19	8	7				
Fire	0	0	0	0				
Striking/struck by	2	5	2	0				
Overexertion	10	15	18	2				
Assault	1	2	4	4				
Crushed	0	0	0	0				
N/A	11	22	8	1				

(25.0 days) (not significant at $p > 0.05$). Average claim lost days for the individual body parts are shown in Table 4. Among back injury claims, Police Leader claims had highest lost days (139.2 days); for knee injury claims, Firefighters/EMS had greatest number of lost days (52.0 days); for shoulder and multiple body area injury claims, EMS workers had the highest average numbers of lost days (shoulder - 71.8 days) and (multiple -169.6 days).

Table 5 provides a summary of the prescription and specifically opioid usage for the occupation groups. In general, Volunteer Firefighters had the highest percentage of claims with prescribed medications (23%) and the majority of these claims included prescribed opioids (15.8% of total Volunteer Firefighter claims). Several occupational groups (EMS, Firefighter/EMS, and police leader) had about 17% of claims with prescriptions with the majority of those claims (13%) with opioid prescriptions. The level of opioid prescriptions provided a slightly different picture, where Firefighter/EMS had the highest percentage of medication-prescription claims with MaxMED (the maximum daily prescribed opioid dose in the claim as a morphine-equivalent dose in milligrams) ≥ 80 (37%), followed by Firefighter leader (36%) and Police Officer (31%). These same

Table 4
Total lost days (mean and standard deviation) as a function of body region and emergency occupation

Occupation group	Back	Knee
EMS	23.8 (110.1)	44.9 (148.9)
Firefighter EMS	39.1 (4.1)	52.0 (124.9)
Firefighter	26.3 (119.6)	33.2 (5.0)
Firefighter Lead	27.1 (90.0)	45.9 (105.5)
Volunteer Firefighter	8.9 (23.1)	12.5 (35.7)
Police	39.3 (167.7)	35.1 (139.0)
Police Leader	139.2 (458.4)	49.5 (198.2)
Occupation group	Shoulder	Multiple
EMS	71.8 (267.7)	169.6 (419.0)
Firefighter EMS	66.2 (138.7)	64.3 (156.4)
Firefighter	45.6 (132.4)	52.9 (121.5)
Firefighter Lead	40.8 (79.4)	33.3 (46.4)
Volunteer Firefighter	62.1 (138.6)	0 (0)
Police	59.5 (185.4)	132.2 (334.2)
Police Leader	22.9 (4.1)	72.1 (144.0)

safety occupations also had the highest average MaxMED levels within claims receiving prescription medications (Firefighter Leader: 87.5 MED, EMS: 71.4 MED, Firefighter/EMS: 60.4 MED, and Police Officers: 59.7).

4. Discussion

While there was a lot of variability in the cost of claims for the emergency workers in the State of Ohio Workers' Compensation system, there were some interesting findings. First, the Police Leader and Firefighter Leader claims had higher total costs per claim (about $14,000 and $12,000, respectively) than corresponding non-leader career Police Officers and Firefighters (about $12,000 and $8,500, respectively). The reasons why the costs per claim were higher for Police and Firefighter Leaders are not known, but it could be that Leaders were not in field regularly so they may not be as resilient to injuries (e.g., not as conditioned as those not working in a leadership role). The age of Police Officer Leaders and Firefighter Leaders (on average 5 years older than career employees) may be one underlying factor for the higher costs per claim. High amounts of stress could also be a reason why the injury rate in Police and Firefighter Leaders were higher. These results should be investigated further to discover the underlying factors. Another interesting result was that Volunteer Firefighters had the lowest total costs per claim (30% lower than paid Firefighters). It is possible that claims made by volunteers were run through their private insurance from their primary job, which would have kept their worker compensation costs in our dataset lower. EMS and Firefighter/EMS workers averaged close to $10,000 per claim. This is a lower average cost than the Police Officers, Police Leaders, and Firefighter Leaders, but more expensive than the Firefighters.

Second, certain body regions had higher cost injuries than others given the specific occupation: Police Leader had highest total costs for backs (∼$27,000 per claim) and Knees (∼$13,000 per claim) while Firefighter Leader had highest total costs for shoulders (∼$17,000 per claim). Police Officers had the costliest multiple injury claims (∼$27,000 per claim). These results indicate that a significant amount of resources are spent per claim for certain emergency personnel.

Third, looking at all emergency personnel in the injury claims studied, many of these claims had a significant number of lost days from work (on average, there were 53 lost days per claim). Firefighter Leader and Volunteer Firefighters had the lowest lost days per claim (37 and 21 days, respectively). EMS and Police Leaders had around 75 days per claim, on average. These lost days from work represent a significant loss of productivity, and they have high associated costs, including both the injured worker's indemnity costs and potential overtime of other personnel covering the injured worker's shifts.

Fourth, the investigation of the underlying causes of the injuries indicated that overexertion was the most common cause. Overexertion was coded as the main cause of between 27% to 56% of injuries within the various occupation categories studied, and it was the coded cause of 41% of all injuries studied. Previous researchers have found police officers are susceptible to motor vehicle crashes, overexertion injuries, and personal factors such as weight and age [2, 6, 4, 17]. In our data, motor vehicle accidents were only found to be a significant causal contributor to Police Officer injuries (15% of their claims). Falls also contributed to many Firefighter, Firefighter Leader, Police Officer, and Police Leader injuries (about 25%). Fires were very small contributors to any type of Firefighter injury (0.5% of all Firefighter claims).

Fifth, treatment for the emergency personnel included prescribed opioid drugs at an alarming level with almost 10% of claims having opioids. Among claims with prescription medications, 30% had a MaxMED >80. These levels of opioid prescription are of concern given the high opioid overdose rates in Ohio (24.6 deaths per 100,000 people: 5th highest

Table 5
Breakdown of prescription and opioid prescription as a function of emergency occupation

Occupation	Percent on meds	Percent with opioids	Percent with opioids if on meds	Percent MaxMED ≥ 80 just claims with meds	Percent MaxMED ≥ 80 all claims	Ave. MaxMED just claims with meds	Ave. MaxMED all claims
EMS	16.8%	13.1%	78.1%	25.0%	4.2%	71.4 (98.8)	12.0 (48.2)
Firefighter /EMS	17.3%	13.2%	76.6%	37.2%	6.4%	60.4 (61.0)	10.4 (34.0)
Firefighter	12.7%	7.5%	59.3%	17.0%	2.2%	38.5 (61.4)	4.9 (25.3)
Firefighter Leader	11.4%	9.8%	85.7%	35.7%	4.1%	87.5 (83.5)	10.0 (39.0)
Police Officer	14.7%	11.1%	75.1%	31.0%	4.6%	59.7 (62.7)	8.8 (32.0)
Police Leader	16.4%	11.3%	69.2%	26.9%	4.4%	46.2 (47.4)	7.6 (25.5)
Volunteer Firefighter	22.8%	15.8%	69.2%	23.1%	5.3%	42.6 (37.1)	9.7 (24.9)
All	**14.5%**	**10.4%**		**28.1%**	**4.1%**	*56.0 (67.2)*	*8.3 (32.6)*

state in US) [18]. Many opioid overdoses occur in workers prescribed this category of medications after they suffered a work-related injury, since Cheng et al. [19] showed that 57% of overdose deaths had at least one work-related injury previously.

There are several considerations when interpreting the results in this study. First, the cost data had very high variability that resulted in a lack of statistically significant differences between groups. However, the data indicate that most emergency occupations had significant costs associated with their common musculoskeletal injury claims. Second, the claims represent reported cases in a single state compensation system (Ohio BWC). Although the results are derived from a large state-run compensation system dataset, policies and procedures vary from state to state, and industries may have regional dependence. Therefore, one must be careful when trying to apply this data generally to other states. Third, there was no knowledge of the total number of emergency personnel exposed in each occupational category. Therefore, it is impossible to calculate any incidence rates for injuries within each occupational category. Fourth, claim costs analyzed were the current values at the time the Ohio BWC data was generated (November, 2016). This means that data generated from November 2016 to the present day was censored. An analysis of data beyond November, 2016 may lead to a change in the results. The database was thoroughly evaluated for consistencies and potential outliers by two researchers. Overall, the research team is confident that the errors were limited and typical of workers' compensation data. Fifth, the injury causation data were limited to the set of causation codes available, without direct measurement of the work conditions/exposures. This means that qualitative statements, such as how injuries occurred and how injuries can be decreased, cannot be ascertained without further data gathering.

5. Conclusion

The purpose of this study was to investigate seven categories of Emergency Responders in the State of Ohio for musculoskeletal knee, shoulder, and lumbar spine compensation injury claims to recognize the medical and indemnity costs, lost days, opioid prescription patterns, and underlying causes for these injuries. While there were no statistically significant differences in these values between emergency occupations, the study did provide descriptive results. Trends were identified in police officer, firefighter, and EMS workers' compensation injury claims cost data in the State of Ohio. The trends identified showed that Police Leader and Firefighter Leader claims had higher total costs per claim than career police officers and firefighters. Police Leaders had the highest total costs for backs and knees, Firefighter Leaders had the highest total costs for shoulders, and career police officers had the highest total costs for multiple injuries. Looking at all emergency worker injury claims studies, on average, there were 53 lost days from work per claim, which certainly had significant direct impact on the costs of these claims. Overexertion was the most common cause of emergency personnel injury. Opioids were prescribed in almost 10% of claims, and 30% of the claims where medications were prescribed had at least one day where opioids were prescribed at a level greater than or equal to 80 mg of morphine on a daily basis. Based on these identified trends, future studies in workers' compensation injury claims in MSDs, opioid prescriptions, and medical and indemnity costs for emergency occupations are warranted.

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Conflict of interest

None to report.

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