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# Occupational Safety and Health for Public Safety Employees

Assessing the Evidence and the  
Implications for Public Policy

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Co-sponsored by the California Commission on  
Health and Safety and Workers' Compensation and the  
National Institute for Occupational Safety and Health



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# Summary

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## Introduction

Public safety employees are routinely asked to put their own lives and well-being at risk in order to protect the life and property of ordinary citizens. As a result, they face injury and fatality rates that are as much as three times higher than those faced by workers in non-safety occupations. These high levels of risk have motivated considerable efforts to identify the nature and causes of occupational health risks to public safety personnel, in order to better understand how to take steps to reduce these risks. However, such efforts require a comprehensive understanding of the specific risk factors associated with different aspects of public safety occupations.

The objective of this study, which was funded by both the California Commission on Health and Safety and Workers' Compensation (CHSWC) and the National Institute for Occupational Safety and Health (NIOSH), was to aid in the design of effective safety interventions by characterizing the important safety and health risks faced by public safety personnel and how those risks differ from those faced by non-safety personnel. To accomplish this, we pursued the following research goals:

- Summarize the existing literature on the injury and fatality risks to public safety employees.
- Characterize the perceived risks and the efforts currently used by public safety departments to reduce those risks.
- Describe the differences in the rates of injury, disability, and other chronic health problems for workers in public safety occupations compared with workers in other occupations.

Our work helps to identify the opportunities and challenges that policymakers and employers face in improving the workplace safety of public safety employees. A majority of our focus is on police officers and firefighters, which are the two most common safety occupations. However, when data are available, we also consider other occupations, such as emergency medical service (EMS) responders and correctional facility officers.

## Methods

To accomplish the goals of this study, we combined several different approaches. To categorize the existing knowledge of the health and safety risks of public safety employees, we conducted a thorough review of the existing literature and surveillance data. To characterize perceptions of risk and understand risk-mitigation efforts, we conducted roundtable discussions with public safety personnel from a number of police and fire departments in California. These roundtable discussions helped us to evaluate current efforts and identify areas with the most potential to improve safety and health for public safety employees. In order to study differences in chronic health conditions and work-related disability between public safety and non-safety employees, we used two sources of data. First we examined national survey databases to compare the rates of disability and chronic disease experienced by safety employees with those of non-safety employees. We also used administrative data from a sample of California public employees that included information on work-related permanent disability benefit claims and disability retirement for public safety and other personnel.

One of the key methodological issues we faced was overcoming inconsistencies in reporting between public safety workers and other workers that are driven by institutional factors, specifically compensation mechanisms. For example, in most cases and in most occupations, illnesses such as heart disease are not considered job-related in nature. However, for many firefighters, heart disease (as well as respiratory disease and certain cancers) is presumed to be job-related unless the employer is able to prove otherwise. This leads to many fatalities

involving heart disease being reported as job-related for firefighters, and substantially complicates the comparison of health and safety risks across occupations. A similar issue arises with regards to disability claims: Public safety employees are typically eligible for disability retirement benefits that are unavailable to non-safety workers. This can lead to reporting biases, which make it difficult to calculate injury and disability rates and to distinguish work-related conditions from non-work-related conditions. When possible, we attempted to circumvent this problem by focusing our analyses on data for which health conditions and disability are recorded comparably between the different occupations.

## **Findings**

Our central findings can be grouped into four separate categories: (1) characterizing the central occupational health risks to different public safety occupations, (2) describing current efforts at improving safety and identifying areas that represent the most promising targets for reform, (3) comparing the self-reported health of public safety employees with that of workers in non-safety occupations, and (4) examining differences in work-related disability claim rates of public safety employees and non-safety employees by age.

### **Characterizing the Occupational Health Risks to Public Safety Employees**

Our knowledge about the primary safety and health risks faced by public safety employees in different occupations is limited by the available data. The data available for fatal injuries are far more complete, and as a result far more is known about the causes of and circumstances surrounding fatalities. For instance, up to 50 percent of firefighter deaths are attributed to heart attacks, with vehicle accidents a distant second (about 20 percent). For law enforcement, approximately 37 percent of fatalities are attributable to vehicle accidents, and another 37 percent are attributable to assaults. This highlights the difficulty in generalizing safety and health risks, since they vary so much by occupation.

While much is known about the fatal injury risks faced by public safety employees, there are substantial gaps in our knowledge about their nonfatal injury and illness rates. Given that nonfatal injuries are far more common and amount to a much greater share of employer costs, this is an important deficiency in surveillance. Nationwide data on nonfatal firefighter injuries are collected, but there is very little widespread data reporting on nonfatal injuries or illnesses for other safety occupations. The data that do exist suggest that injury risks vary according to the specific duties that different public safety workers are engaged in. However, one finding that generalizes across the different services is that injuries are dominated heavily by strains and sprains, largely involving musculoskeletal disorders.

### **Identifying Areas that Provide the Best Opportunity for Reform**

We used a qualitative approach integrating information about safety and health risks with information on existing safety and health promotion efforts to examine the extent to which these initiatives align with the known risks that public safety employees face. This approach incorporated insights from a series of roundtable discussions with public safety workers from different departments in California. These methods allowed us to identify the perceived safety and health concerns of public safety workers, compare these concerns with the safety and health interventions in use, and identify areas that are perceived as likely candidates for reform.

The priorities for improving safety can vary depending on the criteria one is using for evaluation. Table S.1 identifies the most important safety and health concerns for firefighters, EMS responders, and police according to four different classification criteria: frequency, severity as measured by fatal accidents, severity as measured by lost work time, and injuries by type of duty. When fatal injuries are the target, heart attacks and vehicle accidents are the greatest concerns for the fire service and vehicle accidents are the greatest concern for the emergency medical service. Vehicle crashes and assaults (primarily shootings) are the highest priority for the police. When the criterion is the number of cases or the amount of lost work time (a severity measure for nonfatal injuries, and one that is most relevant for reducing employer costs),



**Table S.1**  
**Safety and Health Priorities Across Occupations, by Severity, Frequency, and Type of Duty**

Occupation	Frequency: Number of Cases (% of cases)	Severity: Most Common Fatal Injuries (% of injuries)	Severity: Most Common Lost Work Time Injuries (% of lost time)	Type of duty (% of fatal/ nonfatal injuries)
Firefighters	Strains and sprains (59%)	Heart attacks (48%); Vehicle accidents (22%)	Not available	Fireground operations (32%/53%)
EMS	Strains and sprains (55%) <sup>a</sup>	Vehicle accidents (77%)	Strains and sprains (63%) <sup>a</sup>	Driving (77%/19%); Lifting (0%/42%)
Police	Strains and sprains (64%; 42% of which are back)	Vehicle crashes (37%); Assaults (37%) <sup>b</sup>	Strains and sprains (63%; 33% of which are back)	Driving (37%/16%); Traffic stops and directing traffic (18%/not available)

<sup>a</sup> Across all nonfatal injuries, the back is three times more likely to be injured than any other body part for EMS responders.

<sup>b</sup> 94 percent of fatal assaults on police are shootings.

strains and sprains are the primary safety and health concern for all three services. Back injuries are the most common for EMS responders and the police.

A different way to classify casualties is by the type of duty the public safety employees were engaged in when injured. This classification helps target the activities that are associated with the biggest health risks. For firefighters, a majority of fatal and nonfatal injuries occur on the fireground, even though actual firefighting represents a relatively small proportion of the time spent on duty (considerably more time is spent on duty at the station, on non-emergency calls, or responding to non-fire emergencies). The most hazardous activity for EMS responders in terms of fatalities is driving, while for nonfatal injuries it is lifting and carrying patients. For police, driving is clearly the highest-risk activity, with activities conducted outside vehicles in traffic, such as traffic stops and directing traffic, also being high risk.

These findings provide a basis for guiding the design and prioritization of safety and health improvement efforts. Note, however, that the ability to design effective interventions is hampered by some severe limitations in the data on the nature and causes of injury. As such, one of the key opportunities for improving safety that arose in our roundtable discussions was to improve surveillance and monitoring systems. Improved training, modifications to protective equipment, and changes in culture and command guidance also emerged as promising tools for improving safety. However, there are a number of challenges that must be overcome in order to act on any of these items, such as budgetary restrictions and a general lack of evidence on the effectiveness of various implementation strategies.

### Comparing the Health of Public Safety Employees with That of the General Population

One approach to quantifying the adverse health consequences experienced by public safety employees is to use national survey data that contain self-reports of chronic disease and disability regardless of whether or not the condition is job-related. Table S.2 compares the percentage of police officers, firefighters, or other workers reporting a work-limiting disability, leaving their job due to poor health, having

**Table S.2**  
**Incidence of Disability and Poor Health for Police, Firefighters, Corrections Officers, and Non-Safety Occupations**

Occupation	Number of Observations	Health and Disability Measures (%)				
		Disabled	Left Job Because of Health	Have Poor Health	Receive Disability Income	Receive Workers' Comp. Income
Police	2,215	0.7	0.4	16.3	0.1	2.0
Fire	1,027	0.7	0.6	15.7	0.3	1.7
Corrections	813	1.6	1.0	25.2	0.4	2.1
Non-safety	202,709	2.1	1.0	26.9	0.2	0.9

SOURCE: March CPS, 2003–2007.

NOTE: Sample restricted to men age 18–50.

fair or poor health (as opposed to good or better), receiving disability income, or receiving workers' compensation income. Data come from the Current Population Survey (CPS), a large nationwide survey of detailed demographic and occupational statistics compiled by the U.S. Census Bureau. The table suggests that police and firefighters are less likely to be disabled than workers in other occupations. The percentage of police and firefighters reporting they have a disability that prevents or limits the kind of work they do is less than half that of other occupations (0.7 percent compared with 2.1 percent). They are also much less likely to report having poor health or leaving a job for health reasons. Corrections officers also appear somewhat healthier, though they appear more similar to non-safety employees.

Conversely, the table shows that the percentage of men receiving disability and workers' compensation income is higher among public safety workers than it is among other workers. For example, about 2 percent of police and correctional officers and 1.7 percent of firefighters report receiving workers' compensation income in the previous year. This compares with 0.9 percent of non-safety employees.

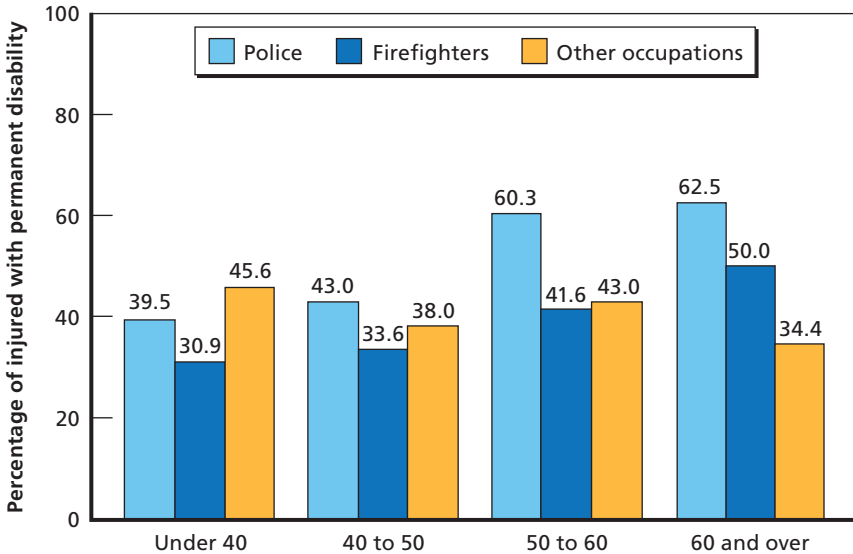
These findings indicate that public safety employees are less likely to be disabled or have poor health, despite their relatively high injury rates. These general findings were confirmed when we considered a second data source, the National Health Interview Survey (NHIS), which contains more detailed self-report information on health conditions and diseases. Police officers and firefighters were generally found to either have no difference or be less likely to suffer from disability or such adverse health conditions as pain, serious mental illness, or disease. The findings about risk factors were mixed: Police and fire employees were more likely to be obese but less likely to smoke. These results were confirmed even when other important demographic characteristics, such as age, race and education, were controlled for. There was some indication that older public safety workers in the NHIS sample are more likely to have had heart disease, which is noteworthy given the high fraction of occupational fatalities for firefighters that are attributed to heart attacks. However, the statistical significance of this relationship in our analysis is at best marginal, and further research would be required to confirm this finding.

### **Job-Related Disability Claims by Public Safety Employees**

Among all nonfatal injuries, permanently disabling workplace injuries lead to the worst outcomes for workers and impose the highest cost on employers, making them an important priority for safety interventions. However, relatively little is known about how workplace disability rates of public safety employees compare with those of non-safety personnel. To study this issue in greater depth, we used data from a sample of public employees in California to examine the rate at which public safety employees claim permanent partial disability (PPD) benefits in the state's workers' compensation system compared with non-safety employees. PPD benefits are paid in the workers' compensation system for workplace injuries that leave someone with a residual disability that limits their ability to work. The data we used indicate that public safety employees are more than three times as likely to experience a permanent disability resulting from a workplace injury than are other public sector workers in non-safety positions.

We also found that disability rates differed by occupation and age. Figure S.1 compares the rate at which public safety and non-safety employees in our sample with workplace injuries filed for PPD benefits. The percentages of injuries involving permanent disability are reported by occupation for four different age categories: less than 40, 40–50, 50–60, and 60 and over. The figure indicates a clear difference in the age-disability profile for public safety employees relative to other public employees. For both police officers and firefighters, the likelihood that they receive PPD is increasing between each age category. PPD receipt increases from 39.5 percent for police officers under 40 to 62.5 percent for police officers 60 and over. Similarly, 30.9 percent of injured firefighters under 40 receive PPD, compared with 50.0 percent of injured firefighters 60 and over. However, injured public employees in other occupations display no clear pattern across age groups. Assuming no differences in claiming behavior, these results indicate either that older public safety employees experience more severe injuries, or that the injuries they experience for a given severity level are more likely to disrupt their ability to work.

**Figure S.1.**  
**Percentage of Injured Workers Receiving Permanent Disability Benefits, by Occupation and Age at Injury**



RAND MG792-S.1

## Policy Implications

The goal of this study was to characterize the health and safety risks to public safety employees in such a way as to help identify the most promising areas for reform that would both protect employees and help alleviate the costs of disability and injury compensation. While our analysis was never intended to design or evaluate any specific interventions, our findings offer several insights for policymakers at the state and local levels who are interested in implementing a program to reduce injuries or illnesses for public safety personnel.

A persistent theme in our findings was the need for better surveillance of injury data, particularly for injuries to law enforcement and emergency medical personnel. Improved data could help researchers identify the root causes for different types of public safety employees engaged in different activities, allowing for more efficient targeting of intervention strategies. Similarly, improved monitoring of the

types of situations and injury causes that lead to the most severe and disabling injuries would allow for the design of interventions to specifically reduce the most devastating injuries. It could also help monitor possible abuse of the system, for example, by tracking anomalies in the rates of disability retirement that do not appear to correspond to any perceptible change in the rates of injury known to lead to disability.

Several other issues emerged in our analysis and roundtable discussions that are potentially fruitful areas for safety intervention. Proper training is potentially a very strong tool for improving safety, although it can be both time-consuming and expensive. Other potentially promising targets include increased information analysis and sharing, strong safety messages from department leadership, and improvements to protective equipment.

One goal of our analysis was to examine how existing safety intervention priorities match up with the risks that safety employees are exposed to. We found that safety intervention efforts were strongly oriented toward fatality risks, with a particular focus on reducing heart attacks among firefighters. Our analyses using national survey data found that safety employees are more likely to be obese and might be more likely to experience heart disease, though this second finding was not robust. More work is needed to establish the extent to which the heart attack risk for firefighters and police officers is truly elevated over other occupations in a causal manner due to job-related conditions. Such information would help establish the extent to which current interventions and compensation mechanisms are appropriately targeted.

Another important priority among police officers and firefighters is reducing strains, sprains, and musculoskeletal disorders, which are by far the leading cause of nonfatal injuries. Unfortunately, it is not clear whether existing efforts, which focus largely on reducing heart attack risk and fatal injuries, will have a noticeable effect. More detailed examination of the effectiveness of different interventions would improve the ability to select and implement appropriate programs and reduce injuries.

Reducing the number of strains and sprains could potentially reduce the number of disability retirements among safety employees.

We found that both firefighters and police officers become more susceptible to work-related disability as they age, in the sense that a workplace injury is more likely to result in a permanent disability at older ages. This was especially true for firefighters. These findings suggest that policies that help prevent injuries or mitigate the adverse impacts of injuries on the ability to work among older public safety employees could also help reduce disability retirement rates.