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# The Physical Hazards of Police Work Revisited

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## Abstract

This study examines the extent to which injuries to police officers have changed from 1996-1998 to 2006-2008. Data were obtained from injury reports filed by sworn officers of the Milwaukee (Wisconsin) Police Department. Results indicated that the frequency and rate (injury incidents per officer) of officer assaults, other suspect-related injuries, and accidents declined during the study period. While the specification of the reasons for these changes remains a topic for future research, the decline in assaults and suspect-related injuries may well be a function of the increased availability and more routine use of less lethal technology, enhanced training, and the more common use of protective equipment.

## Keywords

police officer injuries, assaults, accidents

## Introduction

Over the years, there have been many discussions in the literature about the physical hazards of police work and the corresponding injuries to officers (e.g., Fridell & Pate, 1993; Griffiths & McDaniel, 1993; Hirschel, Dean, & Lumb, 1994; Rabe-Hemp & Schuck, 2007; Taylor & Woods, 2010; Uchida, Brooks, & Kopers, 1987). Many of these studies focus on injuries that occur when officers are assaulted during the performance of specific tasks of the job such as when officers use force in arrest situations (e.g., Kaminski, Edwards, & Johnson, 1998; Kaminski & Sorensen, 1995; Lin & Jones, 2010; Smith, Kaminski, Rojek, Alpert, & Mathis, 2007; Taylor & Woods, 2010), while other studies examine assaults and/or other injuries to officers when they are dealing with other types of potentially high-risk situations (e.g., Hirschel et al., 1994; Kaminski, 2007; Uchida et al., 1987). The remaining studies examine homicides (e.g., Kaminski & Marvell, 2002; Quinet, Bordua, & Lassiter, 1997) or assaults of officers (e.g., Griffiths & McDaniel, 1993) regardless of the situation in which they occur.

The problem with considering only fatal and nonfatal assaults of officers when trying to develop an understanding of the physical hazards of the job is that most injuries to officers are not the result of assaults. Similarly, a focus on certain high risk tasks of the job (e.g., arrests) that result in accidental or felonious injuries misses most of the tasks that result in injuries. Specifically, in previous research of ours (Brandl & Stroshine, 2003; Brandl, 1996), we found that assaults were the “tip of the iceberg” of injuries to officers and that the majority of officer injuries did not occur in arrest situations. In particular, Brandl (1996), based on an analysis of data from 1993 and 1994, found that there were no officer deaths among the 2,068 injury incidents that were analyzed. Approximately 10% of all injury incidents were as a result of assaults, 35% of incidents were as a result of unintentional actions of suspects (“suspect-related injuries”), and about 55% of incidents were completely accidental. In addition, it was found that approximately 60% of injury incidents occurred while officers were performing tasks other than arrests. It was also found that most of the serious injuries were due to accidents, most medical treatment was due to accidents, and most time off of work was due to accidents. Brandl and Stroshine (2003) offered similar findings based on an analysis of injury data from 1997. Similarly, Kaminski (2007) analyzed officer injuries as a result of foot pursuits and concluded that “it may be particularly important to examine the causes and nature of accidental injuries as they appear to present a greater burden in terms of cost” (p. 69). Clearly, the physical risks of the occupation consist of much more than what is reflected in the frequency of assaults and homicides.

To further develop our understanding of the physical hazards of police work, it may now be useful to examine how injuries sustained by police officers have changed over time. In addressing this issue, it must be explicitly recognized that there are several types of situations that can result in injuries to officers: assaults (including homicides of officers), other suspect-related incidents (e.g., injuries caused by suspects who resist arrest), and accidents (e.g., vehicle accidents, trip and fall). In addition, injuries that occur as a result of each of these types of situations may have unique causes and may vary independently of one another. As a result, an examination of the physical hazards of police work must consider each of these types of situations separately. If not, inaccurate conclusions may be drawn, including conclusions about how injuries to officers may have changed over time.

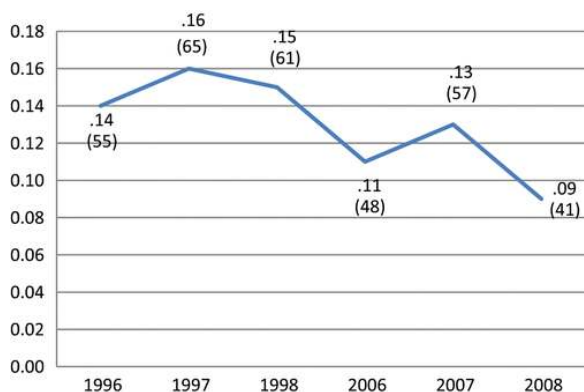
There is no research that has directly or systematically examined injuries to police officers over time. One source of data for this sort of inquiry is the Federal Bureau of Investigation (FBI) Law Enforcement Officers Killed and Assaulted (LEOKA) as well as the National Law Enforcement Officers Memorial Fund (NLEOMF). The reports that are most often produced from these data usually make year-over-year comparisons, and, of course, the focus is on officers who have been killed and assaulted. While these analyses can make dramatic headlines (“After 50-Year Low, Law Enforcement Fatalities Surge 43% in First Half of 2010,” NLEOMF, 2010) they do little in informing a systematic understanding of the overall physical hazards of police work. Studies that rigorously analyze these and related data (e.g., Fridell & Pate, 1993; Kaminski & Marvell, 2002) provide a thorough understanding of the most serious risks of the job but provide only a partial understanding of the overall risks of the job because,

once again, the physical hazards of police work include more than assaults and homicides. In this light, then, these accounts are incomplete. While many officers are assaulted and/or killed in the line of duty each year, thousands more are injured in accidents or sustain other injuries on the job.

The purpose of this study is to examine the extent to which the physical hazards of police work have changed during the last several years, in particular since the publication of our earlier studies in 1996 and 2003. A comparison of injuries over time represents a starting point by which to begin monitoring patterns and trends in officer injuries. In addressing this issue, we include a complete range of injuries, including murders and assaults of officers, injuries that occur from other interactions with suspects (i.e., “suspect-related injuries”) and injuries that occur accidentally. That data were available and collected in the same police department over time makes these analyses possible. We compare injuries sustained by officers in 1996, 1997, and 1998 with injuries that occurred in 2006, 2007, and 2008. Data for this study were obtained from the City of Milwaukee (Wisconsin) Police Department (MPD).

## Previous Research

As noted, the FBI LEOKA data do not provide a complete measure of the overall risks of the police occupation and have also been subject to other serious criticism (see Uchida & King, 2002); nevertheless, the data may provide a useful starting point for an informed discussion of the physical hazards of the job. An analysis of the number of officers killed feloniously from 1996 to 2008 (the two end data points included in the present study) would suggest that police work has become less dangerous (see Figure 1). Between 1996 and 2008, the rate at which officers were murdered in the line of duty decreased approximately 36% (LEOKA, 1996, 2008).

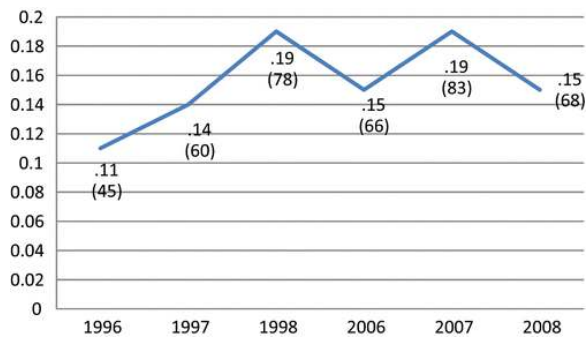


**Figure 1.** Rate (per 1,000) of officers killed feloniously, in the line of duty, 1996–2008

Source: Law Enforcement Officers Killed and Assaulted, 1996, 1997, 1998, 2006, 2007, 2008

Note: Raw frequencies presented in parentheses.

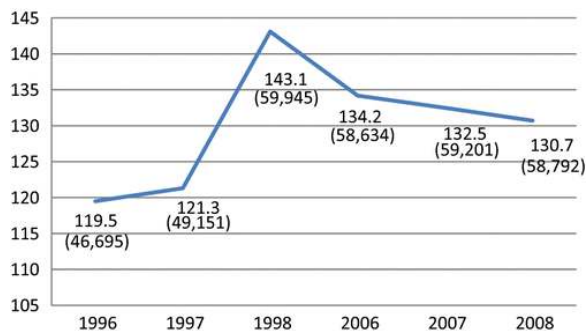
That said, other data from the FBI would suggest that the dangers of the job have increased. The rate at which officers were killed accidentally (see Figure 2) rose approximately 36% from 1996 to 2008<sup>1</sup> (LEOKA, 1996, 2008). The rate at which officers were assaulted in the line of duty (see Figure 3) increased nearly 10% (LEOKA, 1996, 2008). The generally upward trends in the rate of officer assaults and accidental deaths must be considered in light of the fact that, according to the FBI Uniform Crime Report (UCR; FBI, 1996, 1997, 1998, 2006, 2007, 2008, table 71), the number of sworn officers working in U.S. cities has increased by approximately 14% during this time frame. That the rate and number of assaults and fatal accidents has increased while the rate and number of officer murders has decreased represents mixed (and incomplete) evidence as to the changing hazards of police work.



**Figure 2.** Rate (per 1,000) of officers killed accidentally in the line of duty, 1996-2008

Source: Law Enforcement Officers Killed and Assaulted, 1996, 1997, 1998, 2006, 2007, 2008

Note: Raw frequencies presented in parentheses.



**Figure 3.** Rate (per 1,000) of officers assaulted in the line of duty, 1996-2008

Source: Law Enforcement Officers Killed and Assaulted, 1996, 1997, 1998, 2006, 2007, 2008

Note: Raw frequencies presented in parentheses.

With specific regard to the Milwaukee Police Department, the site of this study, there are reasons to believe that the physical hazards of police work may have increased over time and there are other reasons to believe that they have decreased. First, of course, injury rates are partially a function of the number of officers “available” to be injured. All else equal (e.g., number and type of calls for service), with fewer officers, one might expect the injury rate to increase. With more officers, one would expect the injury rate to decrease. As noted earlier, the number of sworn officers in the nation increased by approximately 14% from 1996 to 2008 (FBI, 1996, 2008). However, in Milwaukee, the number of officers actually declined from 1996 to 2008. In Milwaukee, in 1996, 1997, and 1998 there was an average of 1,713 police officers (patrol officers and detectives); in 2006, 2007, and 2008 there was an average of 1,604 officers, a decrease of approximately 6%. As such, just on this basis, one might expect that the rate of officer murders, assaults, suspect-related injuries, and accidents in Milwaukee increased from 1996-1998 to 2006-2008.

Second, research has also shown that there is a strong positive relationship between the violent crime rate and the rate at which police officers are killed (Kaminski, 2004). As such, if the violent crime rate increased over time, then one might expect police work to be more hazardous now than a decade ago, at least as defined by the murder of officers. Alternatively, if the rate of violent crime decreased, then police work might now be less hazardous than it was in the past. The rate of violent crime in the United States has steadily been on the decline since 1993; however, in Milwaukee, the violent crime rate actually increased from 1996 to 2008 (Uniform Crime Report, 1996-2008). The mean violent crime rate in Milwaukee in 1996-1998 was 1,003 offenses per 100,000 persons; in 2006-2008, the rate had increased to 1,314 per 100,000 persons. Accordingly, one might reasonably expect that the rate of officer murders and assaults in Milwaukee increased from 1996-1998 to 2006-2008.

Another factor to consider when examining whether and to what extent injuries to police officers have changed is the technology available to officers in doing their jobs. Technology has the ability to improve the safety of officers and reduce the likelihood of injuries. In particular, the routine use of less lethal technology has changed the risks associated with interacting with suspects and making arrests (Lin & Jones, 2010). Nationally, in 2007, nearly all local police officers were authorized to use one or more types of less lethal weapons (Reaves, 2010). In 2007, 98% of all local officers worked for a department that provided for the use of pepper spray (Reaves, 2010), up from 91% in 1997 (Reaves & Goldberg, 2000). An estimated 60% of police departments authorized the use of conducted energy devices (CEDs) in 2007, most notably Tasers or stun guns (Reaves, 2010). This was a significant increase from 1997 (Reaves & Goldberg, 2000), when only 8% of departments authorized the use of Tasers or stun guns. Police departments are also more commonly requiring their field officers to wear body armor than in the past. In 1997, about half of all local officers worked for a department that required them to wear protective body armor at all times while in the field (Reaves & Goldberg, 2000). In 2007, this figure had increased to 67% (Reaves, 2010).

In the Milwaukee Police Department specifically, the use of Oleoresin Capsicum (OC) was fully implemented prior to 1995; however, the Taser was deployed in 2004 on a test basis and was more fully implemented by 2005. Body armor was introduced in the MPD in 1986 but, of course, since that time more effective armor has been developed and worn by officers. MPD policy regarding the circumstances in which body armor must be worn became more stringent between 1996-1998 and 2006-2008. In addition, between 1996-1998 and 2006-2008, additional personal protective equipment (e.g., gloves, masks) along with corresponding training on infectious diseases and blood borne pathogens was provided to officers with regard to interactions with, and searches of, subjects with communicable diseases. Accordingly, with this technology, it may be reasonable to expect that the rate of officer murders, assaults, suspect-related incidents, and accidents in Milwaukee decreased from 1996-1998 to 2006-2008.

The greater emphasis on safety is seen not only in the increased use of less lethal weaponry and other equipment, but also in the amount and types of training officers receive. Police officers have been the recipients of improved training in the last decade, which may have implications for the prevention of injury incidents. First, the amount of training officers receive (both in the academy and after certification) has increased in recent years. In 2002, the median number of hours in basic recruit training was 720 (Hickman, 2005). By 2006, the length of basic recruit training increased to an average of 761 hr (Reaves, 2009). The bulk of academy training relates to officer safety, as seen in the coverage of topics such as firearms skills, self-defense, arrest tactics, and nonlethal weapons. The subject matter covered in training (both basic recruit and in-service) has changed in response to emerging crime and safety concerns, as well as shifting views on the “best practices” in policing (Schafer, 2007). Officers now receive training on domestic preparedness, the use of CEDs, and community policing, topics that would have received little to no coverage in the past. Relatedly, more recently there is improved knowledge and understanding about communicable diseases, particularly HIV and its transmission. Finally, the modalities of delivering training have also changed significantly (Schafer, 2007). Years ago, the academy training of police officers was largely classroom-based. While this remains true today, police administrators have begun experimenting with different modes of training delivery, such as more scenario- or reality-based training, to better prepare officers for the realities of work on the streets. In the MPD, these changes are also clearly reflected. Accordingly, with the changes in training one may expect that the rate of murders, assaults, suspect-related injuries to officers, and accidents decreased in Milwaukee from 1996-1998 to 2006-2008.

Advances in emergency trauma care (and associated officer and paramedic training) may also reduce the likelihood of the most serious officer injuries being fatal (MacKenzie et al., 2006). In Milwaukee in particular, Froedert Hospital is a Level 1 trauma care center, a designation received in 1997. As a Level 1 center, it

incorporates the best technology and provides for the highest level of specialty expertise for life-threatening injuries. This may be another reason why one might expect that the rate of fatal accidents and assaults to police officers decreased in Milwaukee from 1996-1998 to 2006-2008.

While there are compelling reasons to expect that injuries to officers may have increased or decreased over the past years, it is also possible that the nature and extent of injuries may not have changed much at all. Most fundamentally, there has not been a fundamental change in the nature of police work. Officers are still responsible for intervening in situations where they may not be invited and where they may be dealing with hostile citizens and suspects. Furthermore, the sorts of situations where officers are often injured (i.e., dealing with antagonistic suspects, driving vehicles) have not changed. As such, it may be reasonable to expect that in Milwaukee the rate of officer murders, assaults, suspect-related injuries to officers, and accidents has not changed from 1996-1998 to 2006-2008.

## Method

### Study Site

Data for this study came from injury reports filed by sworn officers employed by the Milwaukee (Wisconsin) Police Department. According to 2008 U.S. Census estimates (the most recent year at which data were collected for this study), the MPD served a population of 604,477, of which approximately 37% were African American and 12% were Latino. The largest segment of the work force was employed in the manufacturing sector, and unemployment rates were typically lower than the national average. The violent crime rate in Milwaukee tends to be slightly higher, and the property crime rate slightly lower, than cities of similar size. From 1996 to 1998 the department employed, on average, 1,713 patrol officers and detectives. From 2006 to 2008, the department employed, on average, 1,604 patrol officers and detectives.<sup>2</sup>

### Data

As mandated under worker's compensations laws and departmental policy, officers are required to complete a standard "Report of Accident" form upon sustaining a work-related injury (via an accident or an assault). The completion of these reports upon sustaining an injury has been a standard policy of the department for at least the past 20 years. The report is typically completed by the officer's supervisor at or near the time the incident occurred. The report contains data on the officers' demographic characteristics, employment information, description of the injuries, and whether medical attention was sought, along with a narrative to explain the circumstances of the incident.

In a single report, several specific injuries may be documented that resulted from a single incident. Therefore, each report documents one incident per officer, not necessarily just one particular injury. If more than one officer was injured (or killed) during the same incident, a separate report would be completed for each officer. Given that identifying data were removed from the reports prior to coding, it is not known how many officers accounted for the injury incidents that were reported.<sup>3</sup>

All of the reports that documented incidents that occurred in 1996, 1997, 1998, 2006, 2007, and 2008 and involved police officers and detectives were coded. Ideally, injury reports from 1996 and 2008 as well as all of the years in-between would have been included in this study; however, injury reports were only available for the years 1996, 1997, 1998, 2006, 2007 and 2008. For other years, only aggregate tallies of the number of injury reports filed by officers were available; in some years even these totals were not available. There is no reason to believe that the six years of data analyzed in this study are not representative of injuries in the MPD from 1996 to 2008. Departmental policy and procedure with regard to the completion of the reports did not change from 1996 to 2008. A total of 4,979 reports were included in the study (930 from 1996, 1,054 from 1997, 883 from 1998, 752 from 2006, 704 from 2007 and 656 from 2008).<sup>4</sup>



The data for the study were obtained from the injury reports and were transcribed as recorded by the supervisor who completed the reports. The variables consisted of whether the incident resulted from an assault, an accident, or from some other suspect-related interaction; whether medical attention was sought (yes/no); whether the incident resulted in any time off of work (yes/no); whether the incident resulted in death (yes/no); the activity that led to the incident; the nature of the most serious injury sustained; whether the injuries were serious; and the total number of injuries sustained.

An incident was considered as a result of an assault if the officer was hit, kicked, stabbed, shot, stabbed or spat upon. An accident resulted from a completely unintended event (e.g., automobile accident, during training). Incidents that resulted from other suspect-related interactions occurred when the actions of suspects caused officer injuries but those actions were not of an intentionally assaultive nature (e.g., a suspect was resisting, uncooperative, or fleeing).

The activity that resulted in the incident had the following values: controlling/arresting suspect, apprehending a fleeing suspect (on foot), conducting an investigation or at a call for service, motor vehicle accident, other vehicle related, processing prisoner (during booking or in lockup), during training, assisting citizen (e.g., rendering first aid), during other physical activity (e.g., while on foot patrol), during fire rescue, during shooting incident, directing traffic, performing forced entry, using other equipment, assisting citizen, other work-related stress, other incidents on police premises (e.g., desk duty), and other.

The nature of the most serious injury sustained had the following values: abrasion/laceration, contusion, sprain/strain, other muscle pain, eye injury (other than black eye), broken bone/dislocated joint, other pain, burns, gunshot wound, knife wound, smoke/fume inhalation, contact with infectious disease, human bite, contact with hazardous material, torn ligaments/tendons, and other injury. The determination of what constituted the most serious injury when more than one was identified was often not clear cut. Often, few medical details on the specific injuries were documented in the report. In some cases it was easier to identify the most serious injury (e.g., a broken bone vs. a sliver) than it was in others (e.g., a laceration vs. a contusion). When intuitively such a determination was difficult to make, the first injury listed in the report was considered most serious. Also recorded was the total number of injuries sustained in the incident. "Serious" injuries consisted of broken bones/dislocated joints, torn ligaments/tendons, serious burns, gunshot wounds, knife wounds, and human bites.

Finally, contact with an infectious disease was classified as either confirmed or unconfirmed. A contact was considered confirmed if it was stated as such in the report. A typical statement that indicated a "confirmed" contact was, "It was known that the subject has [disease]." The manner in which contact was made was defined as a human bite (coded separately), bodily fluid, and other. The disease to which the officer was exposed was coded as tuberculosis/hepatitis/HIV/chicken pox/unknown/other.

## Results

Given the purposes of this study, univariate and bivariate statistics are used in the analysis. Table 1 and Table 2 provide a breakdown of the variables used in the study with data from all six years combined. Several aspects of the tables are noteworthy. As seen in Table 1, most incidents were as a result of accidents (48.7%) with incidents that resulted from a resisting or uncooperative subject a close second (41.7%). Felonious assaults account for less than ten percent of all incidents (9.7%). In addition, of the 4,979 incidents, 1 was fatal (a murder that occurred when an officer was shot while pursuing a suspect on foot). Of all other incidents, a relatively small proportion (5.2%) resulted in serious injury. Further, in most of the incidents the injured officer did not seek medical attention (52.8%) nor did the officer lose time from work as a result of the incident (85.3%). There were, on average, 1.40 injuries sustained by officers per injury incident, with 10 injuries being the most

sustained in a single incident. Finally, in the years included in this study, there was an average of 1,659 police officers (patrol officers and detectives) employed in the MPD. Accordingly, there were a total of 3.00 injury incidents per officer during these six years combined (or a mean of .50 incidents per officer per year).

**Table 1.** Overview of Police Officer Injury Incidents (All Years)

	<i>N</i>		%
Injury due to assault	4,979		100.0
No	4,497		90.3
Yes	482		9.7
Injury due to resisting subject	4,979		100.0
No	2,905		58.3
Yes	2,074		41.7
Injury due to accident	4,979		100.0
No	2,556		51.3
Yes	2,423		48.7
Injury resulted in death	4,979		100.0
No	4,978		100.0
Yes	1		0.0
Serious injury	4,974		100.0
No	4,713		94.8
Yes	261		5.2
Medical attention sought	4,929		100.0
No	2,603		52.8
Yes	2,326		47.2
Time off work	4,979		100.0
No	4,249		85.3
Yes	730		14.7
Total injuries sustained per incident		4,979	
Mean		1.40	
Standard deviation		0.83	
Range		1-10	
Total rate of injury incidents		3.00 per officer	
Rate of assaults		0.29 per officer	
Rate of accidents		1.46 per officer	
Rate of suspect-related incidents		1.25 per officer	

Note: Missing data excluded from table.

**Table 2.** Circumstances of Police Officer Injury Incidents (All Years)

	<i>N</i>	%
Nature of most serious injury	4,974	100.1
Sprain/strain	968	19.5
Laceration/abrasion	931	18.7
Other muscle pain	918	18.5
Contusion	745	15.0
Contact with infectious disease	721	14.5
Contact with bodily fluid	361	
Broken bones/dislocated joints	138	2.8
Human bite	78	1.6

Other pain	73	1.5
Contact with hazardous material	56	1.1
Eye injury (other than black eye)	36	0.7
Smoke/fume inhalation	34	0.7
Tore ligaments/tendons	26	0.5
Gun shot wound	14	0.3
Burns	10	0.2
Knife wound	2	0.0
Other	224	4.5
Disease exposed to	799	100.0
TB	164	20.5
Hepatitis	78	9.8
HIV	45	5.6
Chicken pox	8	1.0
Unknown	364	45.6
Other	140	17.5
Activity resulting in injury	4,960	100.0
Controlling/arresting subject	2,034	41.0
Conducting investigation	795	16.0
Apprehending fleeing subject (on foot)	623	12.6
Vehicle accident	435	8.8
During training	222	4.5
Other physical activity	176	3.5
On department premises	132	2.7
Processing prisoner	128	2.6
Other vehicle related	116	2.3
Using equipment (not @ fire scene)	66	1.3
Assisting citizen/victim	49	1.0
Doing forced entry	40	0.8
Other work-related stress	32	0.6
During fire rescue/discovery	14	0.3
During shooting incident	8	0.2
Directing traffic	7	0.1
Other	83	1.7

Note: Missing data excluded from table; percentages may not sum to 100 due to rounding.

With regard to the injuries that resulted from assaults, suspect-related incidents, and accidents, AVOVA results reveal that assaults were significantly more likely to result in serious injuries (21.2% of assaults resulted in serious injuries) compared to accidents (2.9%) or suspect-related incidents (4.3%;  $p < .01$ ). Similarly, assaults (60.3%) were significantly more likely than accidents (45.1%) and suspect-related incidents (46.6%) to result in medical attention being sought ( $p > .01$ ). However, there were no differences between assaults, accidents, or suspect-related incidents in terms of time off of work (14.7%, 12.6%, 16.4%, respectively; results are not tabulated).

Table 2 contains data on the circumstances of injury incidents. As seen in Table 2, the most frequently reported injury was sprain/strain (19.5%) followed by laceration/abrasion (18.7%), "other muscle pain" (18.5%), contusion (15.0%), and contact with an infectious disease (14.5%). In 60.3% of the "contact with infectious disease" incidents the contact was confirmed to be with someone who had a disease. An additional 78 incidents involved being bitten by a subject; in 11 of these incidents the subject was confirmed to have an infectious disease. Of the 4,974 total incidents, 14 involved gunshot wounds (4 were accidents, 8 were assaults, 2 were suspect-related incidents) and 2 involved knife wounds (1 was an accident; 1 was as a result of an assault).

The 799 incidents where officers were exposed to a disease consist of 721 "contact with infectious disease" incidents and the 78 "human bite" incidents. In these 799 incidents, it was usually unknown if or what disease the subject may have had (e.g., a subject spit on an officer but it was not known if the subject had a

communicable disease or what it was). When the disease was known, it was either tuberculosis (20.5%) or Hepatitis (9.8%).

Finally, by far, the largest proportion of incidents occurred as a result of controlling/arresting suspects (41.0%). This category, along with conducting an investigation and apprehending a fleeing suspect on foot, accounted for 69.6% of all incidents. Of course, although most injuries relate to these activities, one cannot draw conclusions about the risks of these activities because the relative frequency of these activities is not specified.

It is also interesting to note the types of injuries and officer activities that were associated with assaults, suspect-related incidents, and accidents. As expected, the overwhelming majority of assaults occurred when officers were controlling/arresting suspects (90.9% of all assaults occurred when arresting suspects). The most common injuries in these incidents were bruise/black eye/contusion (30.4%), bodily fluid contact (21.7%), and human bites (15.6%). Most suspect-related incidents also occurred when officers were controlling/arresting suspects (66.4%) as well as apprehending fleeing suspects on foot (29.8%). The most common injuries in suspect-related incidents were cuts/punctures/abrasions/lacerations (26.8%), sprains/strains (24.8%), and other muscle pain (17.6%). Finally, most accidents occurred when officers were conducting investigations or at calls for service (32.1%) or as a result of vehicle crashes (16.6%). The most common types of injuries associated with accidents were other muscle pain (21.5%), sprain/strain (18.1%), and contact with infectious disease/bodily fluid (18.6%; results are not tabulated).

Table 3 presents analyses that allow for an examination of how the study variables compare across the two time periods of interest (1996-1998 vs. 2006-2008). It is through these comparisons that one may be able to draw conclusions about how injuries to officers have changed over time. First, in 1996-1998, there were a total of 2,867 incidents reported by officers compared to 2,112 incidents in 2006-2008. This decline of 405 incidents constitutes a decline of approximately 26%. However, the aggregate number of incidents does not tell the entire story; it is also important to consider the number of officers that were “available” to be injured. In 1996-1998, the mean number of police officers (patrol officers and detectives) in the MPD was 1,713.3; in 2006-2008 the mean number of officers was 1,604.3. As a result, as seen in Table 3, the total number of incidents per officer in 1996-1998 was 1.67 and in 2006-2008 it was 1.32.

**Table 3.** Overview of Police Officer Injury Incidents: 1996-1998 Versus 2006-2008

	1996-1998		2006-2008		t value
	N	%	N	%	
Total officers (patrol and detective)	1,713.3		1,604.3		
Total injury incidents	2,867		2,112		
Total rate of all injury incidents per officer	1.67		1.32		
Injury due to assault	2,867	100.0	2,112	100.0	3.0**
No	2,559	89.3	1,938	91.8	
Yes	308	10.7	174	8.2	
No. of assaults per officer	0.18		0.11		
Injury due to resisting	2,867	100.0	2,112	100.0	0.8
No	1,659	57.9	1,246	59.0	
Yes	1,208	42.2	866	41.0	
No. of resisting per officer	0.71		0.54		
Injury due to accident	2,867	100.0	2,112	100.0	-2.5*
No	1,516	52.9	1,040	49.2	
Yes	1,351	47.1	1,072	50.8	
No. of accidents per officer	0.79		0.67		
Injury resulted in death	2,867	100.0	2,112	100.0	0.9

No	2,866	100.0	2,182	100.0	
Yes	1	0.0	0	0.0	
No. of deaths per officer	0.00		0.00		
Serious injury	2,866	100.0	2,108	100.0	2.0*
No	2,700	94.2	2,013	95.5	
Yes	166	5.8	95	4.5	
Medical attention sought	2,820	100.0	2,109	100.0	6.9**
No	1,371	48.6	1,232	58.4	
Yes	1,449	51.4	877	41.6	
Time off work	2,867	100.0	2,112	100.0	-0.4
No	2,451	85.5	1,798	85.1	
Yes	416	14.5	314	14.9	
Total injuries per incident	2,867		2,112		3.0**
Mean	1.43		1.35		
Standard deviation	0.85		0.78		
Range	1-10		1-6		

Notes: Missing data rom table.

\* $p < .05$ . \*\* $p < .01$ .

As shown in Table 3, the frequency of assaults declined from 1996-1998 to 2006-2008, from 308 to 174. In 1996-98, assaults represented almost 11% of all incidents; in 2006-08 they represented just more than 8% ( $p < .01$ ). The number of assaults per officer also declined from .18 assaults per officers in 1996-1998 to .11 per officer in 2006-2008.

The number of incidents that related to resisting or uncooperative subjects also declined from 1996-1998 to 2006-2008, although the difference in proportional representation across the two time periods is not statistically significant. The number of suspect-related incidents per officer declined from .71 in 1996-1998 to .54 per officer in 2006-2008.

The number of accidents also decreased from 1996-1998 to 2006-2008 (from 1,351 to 1,072); correspondingly, the number of accidental incidents per officer declined from .79 in 1996-98 to .67 incidents per officer in 2006-2008. However, because there were substantially fewer assault and suspect-related incidents in 2006-2008 compared to 1996-1998, the proportion of all incidents that were accidental was greater in 2006-2008 than in 1996-1998 (50.8% compared to 47.1%;  $p < .05$ ).

There was one officer death (a murder) in 1996-1998 compared to none in 2006-2008. There were 166 incidents with serious injuries in 1996-1998 (5.8% of all incidents) compared to 95 (4.5% of all incidents) in 2006-2008 ( $p < .05$ ). In 1996-1998 officers also sought medical treatment for their injuries more often than in 2006-2008 ( $p < .01$ ). Although the number of incidents that resulted in time off of work declined from 416 to 314 from 1996-1998 to 2006-2008, the proportional difference was not statistically significant. Finally, the number of injuries per incident declined from a mean of 1.43 in 1996-1998 to 1.35 in 2006-2008 ( $p < .01$ ).

Table 4 shows the circumstances of injury incidents disaggregated by time periods. With regard to the nature of the most serious injury sustained, the frequency of every type of injury declined from 1996-98 to 2006-08 except for "other pain," and "other" injuries (the frequency of knife wounds and gunshot wounds stayed the same across the time periods). "Contacts with infectious diseases" had the largest decline in frequency from 1996-98 to 2006-08 (510 to 211). With regard to the activity that resulted in the injury incident, there were declines in the frequency of incidents from 1996-98 to 2006-08 in all categories except for "during training,"

“doing forced entry,” “other work-related stress,” and “during shooting incident” (the frequency of “using equipment” stayed the same across the two time periods).

**Table 4.** Circumstances of Police Officer Injury Incidents: 1996-1998 Versus 2006-2008

	1996-1998		2006-2008	
	N	%	N	%
Nature of most serious injury	2,866	100.0	2,108	99.9
Sprain/strain	489	17.1	479	22.7
Laceration/abrasion	570	19.9	361	17.1
Other muscle pain	493	17.2	425	20.2
Contusion	442	15.4	303	14.4
Contact with infectious disease	510	17.8	211	10.0
Contact with bodily fluid	256		105	
Broken bones/dislocated joints	86	3.0	52	2.5
Human bite	53	1.8	25	1.2
Other pain	27	0.9	46	2.2
Contact with hazardous material	39	1.4	17	0.8
Eye injury (other than black eye)	20	0.7	16	0.8
Smoke/fume inhalation	19	0.7	15	0.7
Tore ligaments/tendons	17	0.6	9	0.4
Gun shot wound	7	0.2	7	0.3
Burns	7	0.3	3	0.1
Knife wound	1	0.0	1	0.0
Other	87	3.0	138	6.5
Disease exposed to	557	100.1	242	100.1
TB	136	24.4	28	11.6
Hepatitis	61	11.0	17	7.0
HIV	31	5.6	14	5.8
Chicken pox	8	1.4	0	0.0
Unknown	246	44.2	109	48.8
Other	75	13.5	65	26.9
Activity resulting in injury	2,854	100.2	2,106	99.9
Controlling/arresting subject	1,224	42.9	810	38.5
Conducting investigation	439	15.4	356	16.9
Apprehending fleeing subject (on foot)	356	12.5	267	12.7
Vehicle accident	249	8.7	186	8.8
During training	72	2.5	150	7.1
Other physical activity	110	3.9	66	3.1
On department premises	70	2.5	62	2.9
Processing prisoner	95	3.3	33	1.6
Other vehicle related	79	2.8	37	1.8
Using equipment	33	1.2	33	1.6
Assisting citizen/victim	34	1.2	15	0.7
Doing forced entry	10	0.4	30	1.4
Other work-related stress	11	0.4	21	1.0
During fire rescue/discovery	11	0.4	3	0.1
During shooting incident	2	0.1	6	0.3
Directing traffic	4	0.1	3	0.1
Other	55	1.9	28	1.3

Note: Missing data excluded from table; percentages may not sum to 100 due to rounding.

## Discussion and Conclusion

The purpose of this study was to examine whether and to what extent the nature of injuries to police officers have changed from 1996-1998 to 2006-2008. In our analyses, we included a complete range of injuries: murders and assaults of officers, injuries that occur from other interactions with suspects (i.e., "suspect-related injuries") and injuries that occur as a result of accidents. Moreover, we included injuries that occurred during the performance of *any* work task. The range of incidents included here is more complete than that typically found in the literature. Most often, studies focus on murders and assaults of officers when assessing the risks of the job or the risks of certain tasks that comprise the job (e.g., Hirschel et al., 1994; Kaminski et al., 1998; Kaminski & Sorensen, 1995; Lin & Jones, 2010; Smith et al., 2007; Taylor & Woods, 2010; Uchida et al., 1987). Only a few studies examine assaults and accidents (Kaminski, 2007; Kaminski, Jefferis, & Chanhatasilpa, 2000; Violanti, Vena, & Marshall, 1996) but these studies also tend to focus on fatalities or injuries that result when performing particular tasks of the job. While these studies are informative when attempting to understand the risk of death on the job or injury in certain situations, they provide only a partial understanding of the overall physical risks or injuries that result from the job.

Our study indicates that conclusions about the risks of police work that are based only on the murders and assaults of police officers, fatal accidents, or other injuries that occur in certain situations are incomplete. Specifically, in this study, relatively few injury incidents (less than 10%) were the result of felonious assaults. Instead, the largest percentage (48.7%) of injury incidents was the result of accidents. During the years covered in this study, there was one fatality. Of all incidents where time was lost from work and where medical attention was sought, the largest proportion was as a result of accidents. Less than half of officers' injuries occurred during arrests. As a result, in order to draw more accurate conclusions about the physical hazards of police work, analyses need to be based on more inclusive data and need to consider a complete range of incidents that may result in injuries.

Furthermore, we compared the frequency and rate of injury incidents from 1996 to 1998 with incidents from 2006 to 2008 and found that the *frequency* of assaults, felonious deaths, other suspect-related injuries, and accidents all declined from 1996-1998 to 2006-2008. The *rate* at which officers experienced assaults, felonious deaths, other suspect-related injuries and accidents also declined during this time period. The largest decrease in absolute frequency and rate was with suspect-related injuries, the smallest decrease was with assaults. As such, we can conclude that assaults, other suspect-related injuries, *and* accidents have declined from 1996-1998 to 2006-2008. It is interesting to note the decrease in injuries from assaults in spite of an increase in the violent crime rate.

With regard to the nature of injuries sustained by officers in 1996-1998 compared to 2006-2008, we found that the frequency of virtually all types of injuries (e.g., sprain, laceration, contusion) decreased during the study period. The most dramatic decrease from 1996-1998 to 2006-2008 was with the frequency of contacts with infectious diseases. In 1996-1998, approximately 18% of all injury incidents involved contact with infectious disease; by 2006-2008, this decreased to 10% of all injury incidents. The proportion of serious injuries also significantly declined as did the proportion of injuries that required medical attention.

As suggested earlier, the significant decline in the rate and frequency of assaults and other suspect-related injuries may very well be a result of the increased availability and more routine use of less lethal technology (see Lin & Jones, 2010 for a similar argument). The decline in accidents (especially accidental exposure to infectious diseases) may be best explained by the increased and more effective training, and more common use of protective equipment. However, these explanations remain speculative at this point.

This research has implications for policy as well as future research. First, police administrators should be mindful that physical injuries are only part of the risks of the police job; another important dimension of the hazards of

police work is the psychological consequences of physical injuries, in particular those that result from assaults. Although assaults are relatively infrequent compared to accidents, they are likely to have far greater negative emotional affects. Indeed, Violanti (1994) found that police officers ranked being physically attacked the third most significant stressor in police work, just behind killing someone in the line of duty and having a fellow officer killed. Officer assaults may also account for the high incidences of posttraumatic stress disorder among police officers (Maguen et al., 2009). Accordingly, appropriate mental health services should be available for officers who have been assaulted and efforts should be made to eliminate the stigma associated with such services.

Second, if the use of less lethal technology accounts for the decline in assaults and suspect-related injuries to officers, as is suggested by other research (Lin & Jones, 2010; Kaminski, et al., 1998; Smith et al., 2007), it may logically follow that further positive benefits in officer safety may be realized if the technology was more widely adopted. At the same time, however, it must be realized that there are limits to the situations in which such technology may be appropriately used. In addition, other unintended negative consequences may result from such technology (e.g., increased frequency by which force is used).

Finally, although the psychological consequences of assaults are likely greater than those of accidents, it should also be understood that accidents, because of their sheer volume, account not only for most injuries but also for most of the time lost from work and most medical treatment sought. As a result, the prevention of accidents is a worthwhile goal. Businesses in the private sector (e.g., manufacturing) that experience high rates of accidents have responded proactively. In adopting a “culture of safety,” these businesses aim to prevent rather than respond to accidents; every accident is recorded, documented, and patterns of accidents and injuries are analyzed. Such accident prevention programs have been found to be successful (DeJoy, Della, Vandenberg, & Wilson, 2010) but have not been implemented or tested in police organizations. Efforts to develop and test such initiatives may be worthwhile.

There is a clear need for additional research on the physical hazards of police work. Our findings may be unique to the time period and the police department studied. In fact, this study may be best considered a case study of one particular police department. As such, the generalizability of the results of this study remains an empirical issue. In addition, we were not able to control for other potentially important factors that may have influenced the changing nature of injuries in police work during time frame under examination. For instance, it would have been useful to be able to control for the age of officers who were employed in the department and who were injured. It would also be useful to examine variations in the frequency by which individual officers were injured in the line of duty. One could reasonably expect that some officers sustain injuries more often than others; what characteristics differentiate “injury-prone” officers from others? The rate at which officers sustain injuries may be related to how officers do their work; different styles and activity levels may translate into different injury rates. For instance, younger officers, who are generally more active, or officers who make a lot of arrests, may put themselves in more situations that are likely to result in injury. Researchers might also consider situating the study of police injuries within the broader context of a discussion of danger. The threat of injury undoubtedly contributes to officer’s perceptions of danger, which in turn plays a significant role in shaping police culture (Crank, 2004). The data in this study did not allow us to draw conclusions about the dangerousness of policing. Additional research would continue to add to the discussion about injuries to police officers, and would allow us to draw more definitive conclusions regarding the hazards of police work over time.

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## Notes

1. Although it should be noted that in 2009 the number of officers killed in accidents fell nearly to the 1996 level (LEOKA, 2009).
2. Specifically, in 1996, the department employed 2,130 sworn officers (1,737 were patrol officers and detectives). In 1997, the department employed 2,113 officers (1,733 patrol and detective). In 1998, the department employed 2,045 sworn officers (1,670 were patrol officers and detectives). In 2006, the department employed 1,951 sworn officers (1,574 were patrol officers and detectives). In 2007, the department employed 1,936 sworn officers (1,570 were patrol officers and detectives). In 2008, the department employed 2,016 sworn officers (1,669 were patrol officers and detectives).
3. In all likelihood, a relatively small proportion of officers account for a relatively large proportion of injury incidents. As discussed below, specification of individual differences among officers with regard to this issue is an important and worthwhile topic for future research.
4. The number of reports from the years where only aggregate totals were available was as follows: 768 reports from 1999, 819 reports from 2000, and 702 reports from 2001.

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