

**TIRED COPS: PROBABLE CONNECTIONS
BETWEEN FATIGUE AND THE PERFORMANCE,
HEALTH AND SAFETY OF PATROL OFFICERS**

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This paper proposes a number of connections between administratively controllable causes of fatigue and problems associated with police performance, health, and safety – problems that have long been overlooked. The effects of fatigue on human behavior, performance, and physiology are well understood, and widely known. Excess fatigue arising from sleep loss, circadian disruption, and other factors tends to decrease alertness, impair performance, and worsen mood. It therefore may be expected to influence the performance, health, and safety of patrol officers. The argument is made that much of the fatigue experienced by patrol officers could be controlled administratively, just as we control the working hours of many other occupational groups.

As was emphasized in a recent special issue of *Human Factors* devoted to fatigue, it is important to approach fatigue-related research in a holistic, interdisciplinary manner (Mital and Kumar, 1994:195-6). This paper examines ways in which interactions between physiological and psychological effects associated with fatigue may be expected to influence the performance, health, and safety of patrol officers. It also attempts to assess ways that the social, cultural, and economic construction of field police work may have obscured this problem and the potential for its control.

After a brief overview, the discussion that follows uses research on police, anecdotal evidence, official statistics and the results of a preliminary overtime survey to identify what we do and do not know about the sources and pervasiveness of fatigue among police patrol officers. It then examines known and probable ways that the performance, health, and safety of these officers can be affected by both short-term and chronic fatigue. Next, the question of why researchers,

managers, and employee organizations largely have ignored the effects of fatigue on police officers is considered, and potentially feasible strategies for controlling officer fatigue are described. Important conceptual, ethical, economic, liability, and policy issues are discussed and extensive research and policy recommendations are made.

OVERVIEW

The focus here will be primarily on field police officers in high crime rate urban settings. The rationale for this is that the effects of fatigue are likely to be more pronounced in these extreme settings, and the deleterious effects on officers and the communities they serve are likely to be more severe. Moreover, if future administrative, regulatory, or legal changes succeed in controlling officer fatigue under the kinds of conditions often found in these areas, they probably also would be successful in less extreme policing environments.

Fatigue is widespread in police work. Rookies adjust to it as they do to the chafe of their body armor. Veterans – including managers – scarcely notice the weight it adds to their professional burden and how it abrades their family life. Psychologists, health care professionals, researchers, and practitioners all acknowledge fatigue as a fundamental source of stress in the police environment (e.g. Brown and Campbell, 1994; Burke, 1994; Kroes, 1985:32-6; Tang and Hammontree, 1992; Violanti and Aron, 1993; Violanti *et al.*, 1986; Yarmey, 1990). Seeing fatigue as part of the police environment, however, has made it easy to ignore the possibility that it could be controlled. And it has obscured possible links between fatigue and a number of intractable police problems. We control the work hours of truck drivers, pilots and medical interns. Why have we ignored the obvious dangers associated with tired cops?

One reason for ignoring fatigue may be that we often have unrealistic physical and emotional expectations of patrol officers. Patrol officers often have to resolve complicated, emotionally-charged, and threatening situations; drive while subdividing their attention between vehicular traffic, sending and receiving communications, and watching for offenders and people needing help; and also, ironically, stay alert during long periods of crushing boredom. There often are times when they perform their duties while exhausted from job-related activities that result in chronic lack of sleep and irregular sleep patterns (e.g. overtime

assignments, sleep disruption associated with off-duty court appearances, and shift changes). Many of these activities could be modified by administrative and regulatory action. Yet not only do we generally fail to regulate the hours police officers work, we collect very few data on important administratively controllable sources of fatigue such as overtime. When we do, overtime almost always is treated as an economic issue rather than a performance, health, or safety issue.

Overtime is a central topic in this discussion for three reasons:

- (1) Past research, extensive anecdotal evidence, personal experience, and results of a preliminary survey all indicate that patrol officers in high-crime urban areas often work substantial amounts of overtime.
- (2) Research by physicians, psychologists, physiologists, and human factors engineers demonstrates a strong link between substantial amounts of overtime work, especially erratic overtime, and fatigue associated with both overwork and sleep disruption.
- (3) Little attention has been given to deleterious links between overtime and police fatigue.

Although shift work and moonlighting (secondary employment) also can be important administratively-controllable sources of fatigue, they will be given less attention here because, unlike overtime, they have not been ignored. There is a solid body of research on problems associated with shift work and how they may be dealt with. The importance of properly managing shift work problems in police organizations has been recognized by managers and employee organizations (e.g. O'Neill and Cushing, 1991). Moonlighting, while quite common in many departments (Arcuri *et al.*, 1987; Bayley, 1994, p. 67; Reiss, 1988), also has received substantial attention; all but 4 percent of US local law enforcement agencies with 100 or more officers have written policies pertaining to off-duty employment (Reaves and Smith, 1995, Table 21a).

Unfortunately, a number of social, economic, administrative, and organizational factors may have prevented similar recognition of problematic aspects of overtime work and encouraged officers and police managers to undervalue or ignore fatigue-related risks associated with overtime work. When judged by hours of service rules and regulations in occupations that arguably are no more challenging than patrol work – and

in which the human, social, and economic consequences of diminished performance may be less serious – it seems likely that patrol officers often work too much overtime.

SOURCES AND PERVASIVENESS OF FATIGUE

This and the following section discuss the prevalence of fatigue and its relationship to hours-of-work rules in other occupations. An attempt is made to determine if patrol officers, especially those working in high-crime urban areas, often may be more fatigued than is consistent with accepted practices for other types of workers and whether it is reasonable to apply similar standards to police. Fatigue and its antecedents such as overwork, irregular and disrupted sleep patterns, and other well-known stressors often are perceived as “normal” aspects of the police environment. Although there has been almost no attempt to measure fatigue among police officers directly, perceptions about the general pervasiveness of fatigue are supported by a substantial body of evidence from research findings and official statistics, anecdotal sources, and extensive personal experience¹. Results from a preliminary telephone survey conducted to obtain more detailed information about overtime practices also confirm this conception of police work.

Common Sources of Fatigue

At times, patrol work is very challenging physically and emotionally. Other times, it is excruciatingly boring. Both boredom and the physically and emotionally challenging nature of patrol work contribute to the fatigue officers experience. The effects of these kinds of occupational stressors can be thought of as providing a baseline level of fatigue for patrol officers.

Beyond this baseline, a number of other factors that are more or less amenable to change also contribute to officer fatigue. Overtime work adds to fatigue by increasing the amount of work performed beyond normal levels and disrupting sleep patterns. Other job-related sources of fatigue include off-duty court appearances (e.g. Boorstin, 1986; Duggan, 1993; Harriston, 1993; Kroes, 1985), shift changes (O’Neill and Cushing, 1991; Pierce and Dunham, 1992; Scott, 1990), and attending college².

Combinations of stressors in the police patrol environment produce cumulative and synergistic effects. For example, overwork, loss

of sleep, irregular sleep patterns, boredom, or high anxiety each can increase fatigue and the rate at which it accumulates. The net effect of interactions between these kinds of stressors can be more than additive. Chronic exposure tends to magnify their effects even more, in part because people tend to develop maladaptations. Another problem associated with chronic exposure to these kinds of problems is that their aftereffects tend to spill over into leisure time, perhaps for several weeks. This can make recuperation all but impossible (Gardell, 1987:65-6). The result is a vicious cycle in which fatigue diminishes an individual's ability to cope with many other job stressors in a healthy manner and they, in turn, increase fatigue (e.g. Hockey, 1986; Mitler *et al.*, 1988; Monk, 1990). Over time, this process often can be expected to lead to a downward spiral in which the erosion of an officer's ability to function effectively accelerates to crisis proportions.

ANECDOTAL EVIDENCE

Tired, urban street cops are a national icon. Weary from overtime assignments, shift work, night school, endless hours spent waiting to testify, and the emotional and physical demands of the job – not to mention trying to patch together a family and social life during irregular islands of off-duty time – they fend off fatigue with coffee and hard-bitten humor. They are on TV and in the movies, in Joe Wambaugh's books, at the local doughnut shop at three a.m. and slumped in the corner of your local criminal court. If you are a street cop, especially in a high-crime urban area, chances are good that one often stares back at you from the mirror as you shave or put on your make-up before shift. If, like me, you spent a sizable part of your life in that role, the residue from that fatigue is etched into your body and psyche.

In an article on court-related police overtime, for example, Washington Post reporter Paul Duggan interviewed officers in the crowded, dingy room where police wait to testify in a Washington, DC, Superior Court building. A veteran officer provided a glimpse of the grinding level of fatigue that pervades much police work:

[Court-related overtime is] not as easy as it sounds. ... You don't know what it does to people's families. You can't make any plans. And most street officers – you have to show up for your next tour, no matter how tired you are ... You're tired and exhausted and running on empty ... You'll see guys sleeping in

here. You know why? Because they've been up all night, and they're tired, and they have to go back out and work. And if you're not alert on the street, you're dead (Duggan, 1993:A8).

The officer in charge of court liaison interviewed by Duggan shed some light on why the system persists, describing the frustration officers experience when forced to wait endlessly with little hope of actually testifying: "With the new officers, at first, it's like, 'Hey, wait a minute.' 'Why am I here?' But then they get a couple of paychecks, and they start to appreciate it" (Duggan, 1993:A8). An unpublished survey conducted in 1982 by the National Association of Criminal Justice Planners reported that up to 75 percent of all court appearances in some agencies involved overtime (Lindgren, 1983:94). Arrests made late in an officer's shift are another common source of overtime.

Based on personal observation, another practice that is poorly documented but common is having patrol officers work double shifts to fill in for other officers who call in sick or meet other demands for service. Although rare, triple shifts are not unheard of (e.g. Bayley, 1994:68).

Research Findings and Official Statistics

Three major sources of nationwide comparative data on police salaries and expenditures can be used to develop information about police work hours. One is an annual survey about police personnel and expenditures conducted by the International City Manager's Association. The other two are conducted by the US Bureau of Justice Statistics under the Law Enforcement Management and Administrative Statistics (LEMAS) program (Reaves, 1992a; 1992b) and the Survey of Criminal Justice Expenditure and Employment series (US Department of Justice, 1991a; 1991b). ICMA reports on standard duty hours per week, but not the number of hours actually worked. LEMAS collects data on overtime expenditures, but they are reported as the total overtime expenditure per agency and per full-time officer within each agency.

Unfortunately, there is no way to estimate accurately from these data how many hours of overtime are worked on average per officer per year³. Neither is it possible to estimate the *range* of overtime worked by officers in different assignments or by different officers. Perhaps more important, there also is no way to estimate hours worked per day, week, or month. As will be discussed later, data such as these are particularly

important for identifying the kinds of practices likely to result in extreme short-term and chronic fatigue.

A very tentative estimate of the amount of overtime worked by sworn officers in police agencies can be calculated by using data from ICMA and LEMAS. Police departments typically employ eight- or ten-hour work days and 40-hour work weeks (ICMA, 1995, Table 2/22). On average, police departments' salary and wage costs constitute two-thirds of total operating expenditures (ICMA, 1995, Table 3/21). In 1990, ten of the 12 US police departments that reported employing more than 2,000 sworn officers also reported overtime expenditures for FY1990 in the LEMAS survey. These departments devoted from 1.7 to 10.5 percent of their operating expenditures to overtime during that period. National medians for all reporting state, county, and municipal police and sheriff's departments with 100 or more officers also fall within this range. If these large agencies devoted an average proportion of their operating expenditures to salaries and wages, overtime would account for 2.6 to 15.8 percent of salary expenditures⁴.

The best conclusion about the pervasiveness of fatigue that can be made from official data is that officers in most law enforcement agencies work overtime and that overtime expenditures tend to constitute a substantial proportion of overall operating expenditures. There is no information about how the overtime is distributed among officers or the extent to which overtime contributes to excess fatigue.

Preliminary Survey Results

When I was a patrol deputy and sergeant in South Central and East Los Angeles during the 1970s, it was not unusual for officers in those high crime rate areas to work 80 or more hours of overtime per month. Conversations with law enforcement officers and managers over the years led me to believe that similar amounts of overtime work continue to be associated with "hot" patrol assignments. For example, the chief of a large local law enforcement agency recently told me that one officer on his department worked 1,500 hours of overtime last year. However, when I raised the possibility with a colleague that overtime work might be an important source of fatigue in locations such as these, he argued that now there probably was much less overtime due to increasingly constrained municipal budgets. His argument seemed very plausible. The pilot telephone survey described below was intended to help determine whether it was worth pursuing this line of research by

quickly testing the assumption that patrol officer overtime patterns had changed little over time.

Survey Population

For reasons discussed earlier, high crime rate urban police patrol officers were chosen as the survey population. Public information officers at the 12 police departments that reported employing more than 2,000 sworn officers in the 1990 LEMAS survey⁵ were telephoned and asked to identify which precinct, substation, district, or division in their department was commonly identified by officers as having the highest level of street crime.

Survey Methods

Because this was a preliminary survey intended to determine if there was a problem worthy of additional study, I elected not to attempt to obtain information formally through official channels. Overtime often is a politically sensitive topic and I hoped to avoid the time-intensive formalities it would take to obtain official data. Instead, with the help of a research assistant who had been successful obtaining donations for the University via telephone solicitations, I telephoned the watch sergeants⁶ on all three shifts who supervised patrol officers at the "hottest" patrol assignments in each of the 12 largest urban police departments. The calls were made between May 18 and June 7, 1995. If no sergeant was available, or if the sergeant contacted would not discuss overtime practices with us, two follow-up calls to that shift were attempted on later dates. If those calls also were unsuccessful, no data were recorded for the shift in that department. Because there can be variation in how departments characterize work shifts, we counted a watch sergeant as supervising graveyard shift if he or she was on duty from 2400 to 0800 hours when we called, day shift from 0800 to 1600, and evening shift from 1600 to 2400.

We identified ourselves, advised the sergeants that we were attempting to obtain a rough estimate about how much overtime non-supervisory patrol officers worked in areas similar to their own across the country, and asked if they would consent to a four-minute interview. They were assured that none of the information they provided would be attributed to them or their department. Those who were skeptical were

invited to contact our campus police department for confirmation. Those who agreed to be interviewed then were asked to make estimates about overtime⁷ based on their personal experience at that assignment. They also were asked to estimate the average proportion of overtime associated with waiting to testify, testifying, or being on call for court; whether there were any patrol officers at their station who had worked no overtime during the previous month, and whether their department had a policy limiting how many hours an officer may work per day, week, or month.

Survey Results

A total of 53 calls were made. Washington, DC, was excluded after the survey began because Congress had recently suspended all police overtime work. We were unable to obtain any information about overtime from NYPD watch sergeants. Among the other ten departments, watch sergeants from 20 out of 30 possible shifts responded, five on graveyard shifts, seven on day shifts, and eight on evening shifts. We obtained information for all three shifts from two departments, for two different shifts at six departments, and from only one shift at two departments.

Most departments reportedly had no policy limiting how many hours an officer may work in a day, week, or month⁸. Only four out of the 20 watch sergeants reported that there were patrol officers on their shifts who did not work any overtime during the previous month. Table 1 summarizes our findings about average overtime worked and the ranges of overtime reported. Departments are listed in no particular order and lettered rather than named to ensure confidentiality.

Interpretation of Survey Results

This survey was an attempt to obtain a snapshot of overtime practices in order to falsify the assumption that patrol officers in many high-crime urban areas continue to work substantial amounts of overtime. For this reason, no attempt is made at analyses beyond simple measures of central tendency and variability.

Watch sergeants' estimates about contemporary overtime practices in these settings were surprisingly consistent with my own experience in Los Angeles two decades ago. There also was general consistency from department to department and shift to shift. There

Table 1
SUMMARY OF SUPERVISING PATROL SERGEANTS' ESTIMATES OF
OVERTIME WORKED BY PATROL OFFICERS IN HIGH CRIME RATE
PRECINCTS IN TEN OF THE 12 LARGEST US POLICE DEPARTMENTS^a

Dept. or Shift	No. of Sergeants Reporting	Average Month/Officer	Highest in a Month	Highest in a Week	Percentage Court-related
A	2	25	80	30	50
B	3	23	74	25	77
C	1	20	120	35	—
D	2	21	60	22	11
E	2	18	47	13	56
F	2	28	64	22	78
G	3	18	70	33	75
H	2	28	70	30	66
I	1	23	50	15	25
J	2	23	60	26	12
Means ^b	2	22.8	68.3	25.2	54.2
Ranges ^c	1-3	15-40	40-120	13-40	10-90
Graveyard Shifts	5	20	59	21	44
Day Shifts	7	22	66	28	60
Evening Shifts	8	25	76	26	57

^a Estimates are averaged among sergeants reporting in each department. Shift estimates are averaged among departments reporting

^b Calculated from original data, rather than averaged from within-department data

^c Reported by all watch sergeants, not as averaged within departments

appears to be a substantial amount of overtime worked by patrol officers in many high crime rate urban areas. And some officers, some of the time, appear to be working large amounts of overtime.

OVERTIME AS A VALID INDICATOR OF FATIGUE

Given the convergence of evidence from research findings and official statistics, anecdotal sources, personal observation, and the pilot survey, it appears reasonable to assert that police officers often work long hours. The key question that remains unanswered is this: How much do overtime and other administratively controllable activities contribute to

excess police fatigue? One way to address this question is to compare police overtime practices with what is considered usual and accepted practice with regard to hours worked in other occupations where – as in police work – an employee’s performance has important public safety implications. To be valid, this comparison requires that three propositions be true:

- (1) *Hours worked.* Police patrol officers sometimes work overtime in excess of standards for other occupations where employee performance has important public safety implications and for which empirically-based standards are enforced in order to avoid accidents and injuries caused by the detrimental effects of fatigue on worker performance.
- (2) *Vulnerability.* Police are at least as vulnerable to fatigue as a result of overwork and chronic sleep disruption as members of occupational groups whose hours of work are regulated as a matter of public safety, because the physiological, psychological, and cognitive demands of police work on officers in the patrol environment often equal or exceed the occupational demands placed on those groups.
- (3) *Costs.* The potential social, economic, and human costs of fatigue-related impairment to police performance are equal to or greater than those for occupational groups whose hours of work are regulated as a matter of public safety.

Hours of Work Standards

We restrict the work hours of truck drivers, pilots, and nuclear power plant operators in order to avoid fatigue-related accidents and injuries. For example, one of the first acts of the Interstate Commerce Commission after it was created in 1887 was to establish hours of service regulations for railroad workers (45 USC §61). Similarly, the Motor Carrier Act of 1935 established national hours of service regulations for commercial interstate truck drivers. More recent hours of work regulations based on empirical research for the nuclear power industry, the Air Force, and three transportation industries are reviewed by Lewis (1985a, pp. 1.1-1.7).

Despite these precedents regarding government’s interest in work hours and issues concerning human physical limitations and fatigue, there

Table 2
RECOMMENDATIONS AND STANDARDS LIMITING HOURS OF WORK IN
SEVERAL OCCUPATIONS WHERE EMPLOYEE PERFORMANCE HAS
IMPORTANT PUBLIC SAFETY IMPLICATIONS^a

Period	Total Hours/Total Overtime Allowed ^b			
	Nuclear Power Plant Operators ^c	Commercial Aviation	Airforce	Interstate Trucking
1 Day	12 ^d /4	8/0	12/4	10/2
2 Days	24/8			
7 Days	60/20	30/0		60/20
28 Days ^e	192/32	100/0	125/0	
1 Quarter		300/0	330/0	
1 Year	2,260/180	1,000/0		

^a This table is adapted from Lewis (1985b, Table 2.4)

^b Overtime is calculated as consecutive hours worked in excess of eight per day, 40 per week, etc.

^c This is the standard recommended by the Nuclear Regulatory Commission, the current legal standard is more limited in scope and more permissive at the one- and seven-day period and does not cover longer time periods.

^d "A limit of 16h is sometimes allowed in the event of a problem during operation, but no individual should be approved to work more than one 16-h day in a 7-day period or more than two 16-h days in a 28-day period"

^e Commercial aviation and the US Air Force use 30 days as the base for this period

do not appear to be any national or state laws, regulations, or recommendations setting hours of work standards for law enforcement officers. Even medical resident interns have had standards set in recent years⁹. Table 2 compares recommendations and legal standards that limit hours of work in a number of other occupations. Note that total hours figures given on the left of each set include allowable overtime. That is, if the maximum hours allowed for a week is 60, up to 20 hours of overtime is allowed per 40-hour work week, and the table notation would be 60 / 20. If, for example, a 48-hour work week were employed, only 12 hours of overtime would be allowed.

If the standards set for the occupations in Table 2 are reasonable approximations of limits beyond which work can be expected to cause excess fatigue, it would appear that the levels of overtime worked by police officers often may be sufficient to cause excess fatigue.

Vulnerability of Police to Fatigue's Effects

Although no standards for maximum hours of work have been set for law enforcement officers working patrol assignments, it may be

argued that they generally would be more vulnerable to accidents, injuries, and making poor decisions due to fatigue than people working in the occupations covered by Table 2. While the risk of being injured – or causing injury to others – is a constant in all of these occupations, there are substantial differences between them. For example, nuclear power plant operators work in carefully designed and controlled environments with engineered safety systems and administrative safeguards such as direct supervision, independent verification of perceived problems, and other quality control procedures that are designed to prevent errors and ensure safety (Baker *et al.*, 1994:245).

Commercial and military pilots, like nuclear power plant operators, work in carefully engineered settings albeit with more environmental variation, especially due to weather conditions. Truckers face the vagaries of traffic and weather, but have to deal with fewer complex systems than pilots and power plant operators.

Depending on their specialties, medical interns may have to deal with complex and unpredictable problems in chaotic emergency rooms or carefully choreographed surgeries. They also face the emotional strain of dealing directly with human suffering. Compared with patrol officers, however, they seldom are threatened personally and operate in a much more confined and relatively controllable environment. Moreover, once their residency training period is completed, the intensity of their job usually abates and their level of control over it increases substantially. Many police officers spend from five to 15 years in patrol work, then move on to other demanding assignments.

From the standpoint of performance, safety and accident prevention, patrol officers' jobs combine many of the worst aspects of all of these occupations. They work in highly unstructured, unpredictable environments with little direct supervision. They face the constant possibility of both accidental and malicious injury. And they have little control over their schedules because, for example, of the vagaries of court appearances. In spite of this, fatigue and overwork still generally are treated as normal parts of the work environment by police officers and their employee organizations, by police managers, and by policy makers.

Comparability of Potential Costs of Fatigue

As Mitler *et al.* (1994) describe, errors in judgment associated with sleep loss have been linked to many costly catastrophes. Some, like the Challenger explosion, Three Mile Island and Chernobyl nuclear

accidents, and the grounding of the Exxon Valdez, are well known (although few people probably are aware of the important role played by sleep loss). Others, like 57 percent of the heavy truck driver traffic fatalities, are more obscure (Miller *et al.*, 1994:455-7).

If we extrapolate the effects of fatigue found in research on other occupational groups to police (i.e. decreased alertness, impaired performance, worsened mood), it is reasonable to expect that fatigue is likely to be associated with serious problems among police patrol officers, such as increasing risk of excessive use of force, accidents, stress-related illnesses, and disability retirements. But we do not know the strength of this association or how it may be affected by individual and organizational attributes. These problems cost thousands of officers their careers, their physical and emotional health, and their lives – and they cost local, state, and national government millions of dollars.

As Barrineau (1987:35) notes, “there is no group of workers, public or private, more susceptible to liability litigation than law enforcement officers ... Given the complex nature of the unenviable tasks they must perform, it is simply impossible for law enforcement officers to flawlessly perform their duties; mistakes are inevitable”. Mistreatment of suspects or prisoners is one of the major sources of claims against local governments and liability losses (Swanke, 1989). Los Angeles city, for example, paid more than \$20 million in legal judgments, settlements, and verdicts for excessive use of force from 1986 to 1990 (Christopher, 1991:56). Los Angeles county paid \$15.5 million from January 1989 to May 1992 (Kolts, 1992:26). New York City paid \$44 million from 1987 to 1991 to settle police misconduct cases (Staff, cited in Kappeler, 1993:7).

Similarly, disability retirement is one of the leading sources of turnover in municipal police departments. In a recent survey of 303 departments conducted by the Police Foundation (1990:46), 0.8 percent of male and 0.7 percent of female officers received disability retirements each year. These rates were much higher in the five reporting cities with more than 1 million population: 1.7 percent for male and 0.9 percent for female officers. In Los Angeles, “a single disability pension can cost the taxpayers ... close to one million dollars over the lifetime of the employee” (Christopher, 1991:146).

In summary, the physiological, psychological, and cognitive demands of police patrol work often equal or exceed those of occupational groups such as truck drivers, power plant operators and pilots whose work hours are regulated because of fatigue-related public

safety considerations. The magnitude of potential costs associated with fatigue-related performance decrements also are similar. Lacking valid standards developed specifically for patrol officers, it seems appropriate to judge police overtime practices in comparison to the standards for the occupational groups shown in Table 2.

HOW FATIGUE AFFECTS OFFICER PERFORMANCE, HEALTH, AND SAFETY

The literature on the effects of fatigue on performance, health, and safety has been developed extensively over the last century in such diverse fields as industrial and safety engineering, management, ergonomics, human factors, medicine, psychology, and sociology. Anything more than a brief overview of those findings that appear most directly relevant to police work is beyond the scope of this paper¹⁰.

Fatigue associated with cumulative sleep loss and disruption of circadian rhythms due to such things as shift work and overtime assignments can decrease alertness, impair performance, and worsen mood (Bonnet, 1985; Broughton and Ogilvie, 1992; Mitler *et al.*, 1994). As Rosekind *et al.* (1994:328) noted in their study of potential fatigue countermeasures, "Although many factors may affect the subjective report of fatigue (e.g. workload, stress, environmental factors), the most substantial empirical data suggest that the two principal physiological sources of fatigue are sleep loss and circadian disruption".

Fatigue and Cognitive Performance

As Cottam and Marenin (1981:132) advised, "Before the quality of patrol work can be improved, one needs to understand the obstacles which prevent accurate perception, information processing and judgment formation". Fatigue seems likely to interfere with decision making in two ways that are particularly problematic for police officers: by interfering with the formation of sound judgments, and by inducing poor responses via increased irritability.

Given the tendency of patrol work to shift unpredictably from boredom to complex emotionally and physically challenging crises, it is important to note that the detrimental effects of fatigue increase in complex or stressful situations (Park, 1987:33-78) and during periods of low activity (Dwyer, 1991:107-8).

Mentally and emotionally, fatigue tends to reduce the abstractive and integrative frames of reference that support and give perspective to our thoughts, activities, and perceptions. Because it narrows perspective, fatigue also tends to increase anxiety and fearfulness, thus lowering a person's ability to deal appropriately with complex stressful situations and increasing the likelihood of stress-related illness (e.g. Brown and Campbell, 1994; Kroes, 1985:147-8; Monk, 1990). As Park (1987) notes, fatigue tends to lower the quality of decision-making processes – and thus increase the probability that sub-optimal decisions will be made. Tired people also are more irritable and prone to anger (e.g. Thayer, 1989:110-36)¹¹.

Fatigue and Officer Misconduct

Because fatigue tends to increase irritability and fearfulness while diminishing the capacity of officers to make sound decisions, it is likely to increase the probability of officer misconduct, especially misconduct associated with the use of excessive force. The hypothesis advanced here is that excess fatigue will tend to promote officer misconduct above and beyond that which arises from sources that are venal, self-serving, and brutish. Even the best officers assigned to patrol high crime rate areas will likely, on occasion, overreach in threatening situations, lose their tempers, and make bad – perhaps illegal – judgments due to fatigue or chronic fatigue. And it is likely that, having done so, many of them will tend to do as police officers and others in similar positions of power and authority often have done in the past; they will lie about their misconduct and the misconduct of their peers (Bayley, 1994:67; Christopher, 1991:168-9; Knapp, 1972; Rudovsky, 1992:482)¹².

Fatigue, Safety, and Accidents

Data on police accidents are sparse. However, since the widespread adoption of soft body armor began reducing fatal shootings in the mid-1980s, on average each year as many officers have been killed accidentally as feloniously. That is, such things as vehicle accidents^[13], falls, and accidental shootings have killed as many officers each year as gunfights, family disturbances, arrest situations, and traffic stops (Maguire and Pastore, 1994, Tables 3.154, 3.157, 3.160).

The link between fatigue and accidents has been acknowledged at least since early in this century (e.g. Dwyer, 1991:57-8; Münsterberg, 1913). For decades, research has shown that fatigue tends to undermine a

person's ability to make sound decisions, control his or her emotions, and perform complex motor tasks such as driving a vehicle (e.g. Brown, 1994; Viteles, 1932:438-511). During periods of low activity, fatigue tends to increase accident proneness; tired people have more accidents because they tend to be less attentive, slower to react to impending hazards, and more likely to respond inappropriately (Dwyer, 1991; Lauber and Kayten, 1988).

In summary, although as yet there has been little research on the effects of fatigue on police patrol officers *per se*, it would be astounding if fatigue did not significantly diminish police performance and contribute to conditions that can increase the probability of accidents, injuries, and illness. We limit the amount of time that pilots, medical interns and truck drivers work, yet tolerate chronically fatigued cops. We discipline officers who report for duty impaired by alcohol yet ignore – and often contribute to – impairment related to fatigue. Why?

WHY HAVEN'T WE TRIED TO CONTROL POLICE FATIGUE?

The problems associated with police fatigue tend to be ignored because of cultural stereotypes and economic incentives. The way we conceive of police work and the level of status we attach to police officers as compared to other players in the criminal justice system influence how the police act and how they are treated. What we pay for – and out of whose budget – also can be important.

The Social Construction of Police Work

Cultural Myths

Police managers, politicians, and the media often portray police officers as a “thin blue line” of warriors standing between civilization and the barbarian hordes (e.g. Gates, 1992; cf. McNamara, 1991:M1). Officers often tend to be seen – and many see themselves – as soldiers rather than peace officers (Skolnick and Fyfe, 1993:113-33). This misapplication of a combat metaphor, and the all too frequent willingness of police to embrace it, encourages the public to have unrealistic expectations about the ability of urban patrol officers to withstand the long-term physical, emotional, and moral corrosion of occupational stressors that can be magnified by chronic fatigue¹⁴. This unrealistic

expectation that cops, rather than communities, control crime increases the zeal with which many officers approach their jobs. And that zeal can lead to immoderate and imprudent behavior.

A less dramatic form of cultural stereotype that blinds us to ways that we might control police fatigue is our tendency to consider overwork and overtime immutable parts of the police environment. As one of the few books on police personnel administration puts it, "Officers, especially patrolmen, are constantly called upon to work overtime; police work is no 9-to-5 job" (Bopp, 1974:108). When overtime is discussed in most police administration texts, fatigue is ignored; only economic and compensation issues are dealt with (e.g. Bopp, 1974; Wilson and McLaren, 1972). Because of this, there is little reason to expect that managers, who themselves are members of the police subculture, will perceive fatigue as a controllable variable rather than an inevitable part of the environment.

Operational Imperatives

Managers depend on overtime to provide the flexibility they need to respond to fluctuating demands for service. For example, while protesting proposed cuts in overtime, Washington, DC, Police Chief Isaac Fullwood Jr claimed that the cuts would deprive his department of the ability to focus special attention on high crime areas and events. According to him, "Cutting overtime is the equivalent of losing 122 police officers a day from the force [roughly 4.5% of his available patrol force]" (Horwitz and Melton, 1990:A22).

Similarly, in an effort to reduce street crime drastically, Houston Police Chief Sam Nuchia instituted what was known as the 655 program in 1991. Under that program, he increased the effective size of his department by 17 percent, putting the equivalent of 655 new officers on duty via overtime until that many officers could be hired and trained (see Claiborne, 1994; Serrano, 1994; Suro, 1991).

Although police managers have a great deal of discretion about officers' work hours, an important source of overtime associated with the courts largely is beyond their control.

Status Differentials

The lower status our society assigns to police compared to members of the legal profession also contributes substantially to officer

fatigue. Judges and trial attorneys often demonstrate callous disregard for police budgets and officers' leisure time. Court-related overtime is a major source of uncontrollable overtime. On any given day, a large proportion of an agency's officers may be testifying in court (Kroes, 1985:106), often on overtime (Lindgren, 1983:94). Officers seldom testify, but they do spend a great deal of time in courthouses waiting for the remote possibility that an attorney will call them to the stand. If an officer is not available to testify when a case is called, the case is dismissed – and the officer often is subject to sanction from the court and/or his or her agency¹⁵. This is a direct consequence of the higher status accorded attorneys; if a court appearance is inconvenient for an attorney, he or she merely requests a continuance which routinely is granted. In most jurisdictions, trial courts only operate during daytime hours. Although the potential public safety consequences of fatigued judges and attorneys are substantially less dire than those associated with chronically tired cops, status prevails over common sense in the courts.

The cultural and social construction of police work encourages us to ignore the effects of fatigue on police officers. After a careful review of the literature, I have found no evidence that the many health care professionals and researchers who have studied police work saw a need to limit overtime. It appears that we all have been blinded by our social conceptions about the nature of police work.

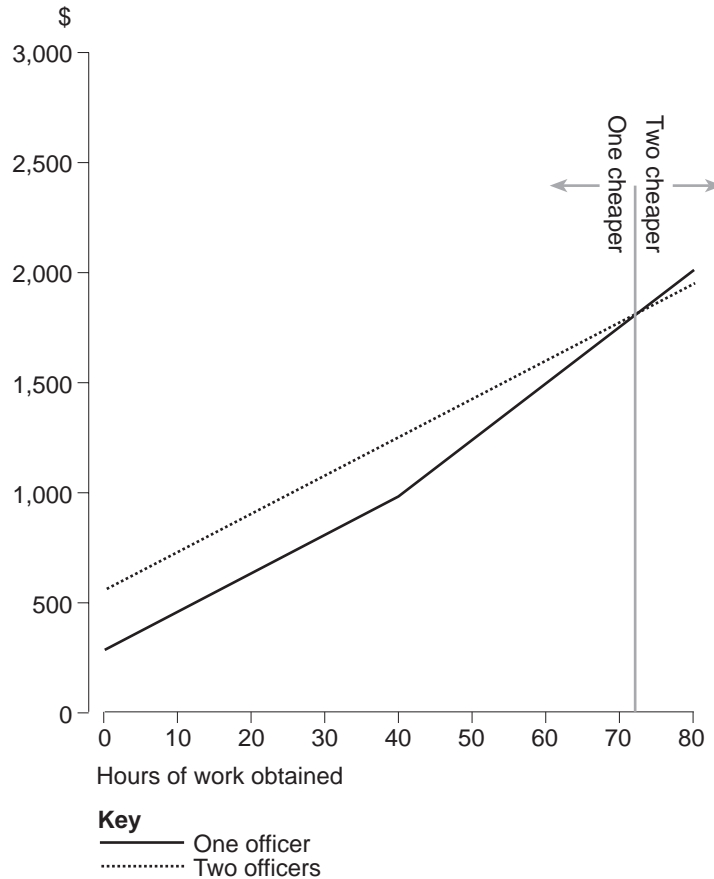
Why Don't Police Managers Control Overtime?

Perceived Benefits

Police managers usually understand the demands of the job because most of them have come up through the ranks. But they also have strong economic incentives to allow fatigued officers to work. Overtime often makes good economic sense within the limited calculus of law enforcement managers. On average, personnel expenses account for more than 85 per cent of most police department budget expenditures (Reaves, 1992b, p. 3). High recruitment and training costs coupled with expensive benefits packages for urban officers mean that there is a wide margin within which it is cheaper for a manager to pay an officer 1.5 times his or her salary than to hire an additional officer – at least in terms of a police department's budget.

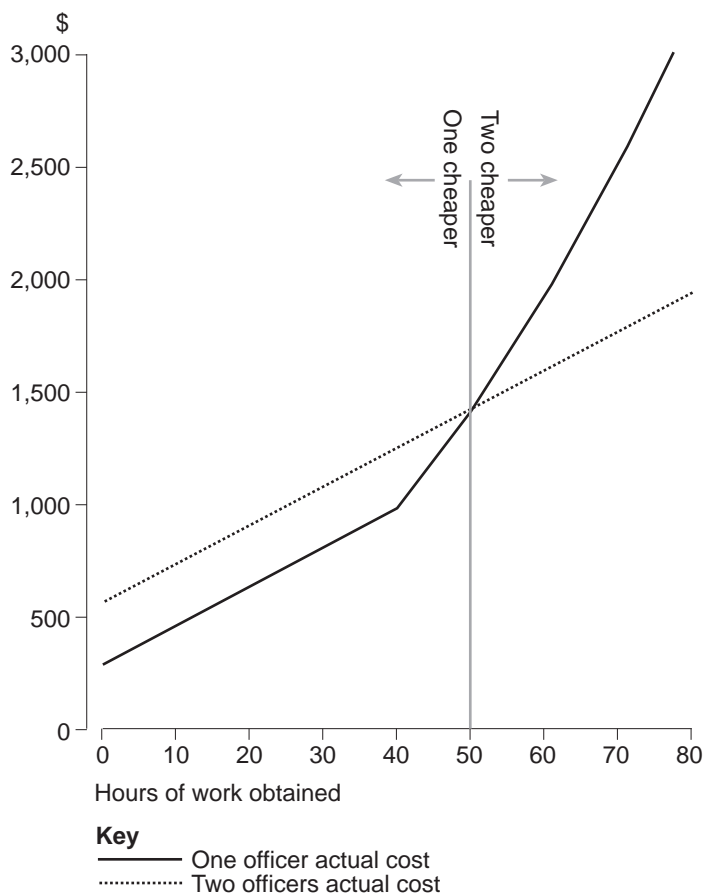
Figure 1 provides an estimate of average costs and benefits associated with the use of overtime assignments for the 13 largest US

Figure 1:
COMPARISON OF COSTS PER HOURS OF WORK OBTAINED IN A WEEK
FROM ONE VERSUS TWO OFFICERS WHEN OVERTIME IS PAID AT 1.5
TIMES BASE PAY RATE



police departments. Based on data provided in the 1990 Law Enforcement Management and Administrative Statistics survey on salaries and training (Reaves, 1992a; 1992b) and benefits information gathered by the Bureau of Justice Statistics as part of the 1994 Crime Control Act's Police Hiring Supplement Program (Reaves, personal communication, April 26 1995), it appears that it often can be substantially less expensive for a manager to meet departmental

Figure 2:
ILLUSTRATIVE COMPARISON OF COSTS PER HOURS OF WORK OBTAINED
IN A WEEK FROM ONE VERSUS TWO OFFICERS WHEN HYPOTHETICAL
FATIGUE-RELATED OVERTIME COSTS ARE CONSIDERED



commitments by paying overtime to an experienced officer than by employing an additional officer. (Spreadsheet equations for generating Figures 1 and 2 are given in the Appendix.) If, for the sake of illustration, we accept the calculations from which this figure was generated, it appears that paying overtime can be as much as 21 percent less expensive per hour than expanding staff. As Figure 1 shows, the management cost differential (i.e. the difference between the hourly costs of work obtained

from one vs two officers indicated by the area between the two lines) gradually declines until paying one officer time-and-a-half eventually becomes more expensive than investing in an additional officer. Overtime becomes more expensive than hiring an additional officer at the point where the two lines intersect.

Hidden Costs

Of course, if fatigue arising from overtime has substantial detrimental effects on patrol officers, there also are substantial overtime costs associated with such problems as civil liability, on-duty injuries and illness, and early retirement. However, these costs typically are not charged against managers' budgets. This is important. Workers' compensation claims, civil damages, and retirement benefits usually are charged against retirement, insurance, and general funds in which managers have only the same diffuse interest as any other citizen. Managers who otherwise might be expected to control officer fatigue by drastically curtailing overtime are presented with substantial incentives for not doing so.

Figure 2 illustrates what the cost-benefit curve for overtime might look like if managers were made fully accountable for the expected cumulative costs of higher fatigue associated with more hours of work per week. An analysis of the actual costs of accidents, injuries, and misconduct associated with increasing fatigue due to each additional hour of overtime is beyond the scope of this essay. But these costs are substantial. For example, in recent years, excessive use of force judgments alone accounted for roughly 1 percent of the Los Angeles Police Department's annual expenditure for salaries and wages (Christopher, 1991:56; ICMA, 1994:125).

Given that the costs of these problems and the links between them and fatigue in many other work environments are well documented, it seems reasonable to project a simple progressive fatigue-related increase in the cost of overtime. The calculations used to generate Figure 2 added an additional hypothetical 0.015 of cost per hour of overtime worked per week. In other words, the first hour of overtime was calculated as costing 1.515 an officer's base salary, the third hour 1.530, the fifteenth hour 1.725, and so forth.

Comparing Figures 1 and 2, it becomes obvious that the amount of overtime that an economically rational manager assigns or allows can vary drastically depending on the costs for which he or she is held

accountable. In the “ballpark” examples used here (which only consider salary, benefits, and training costs) it would be less expensive to have one officer work as many as 30 hours of overtime per week than hire an additional officer. On the other hand, if managers were charged progressively for additional costs associated with fatigue-related accidents, injuries, and lawsuits, then overtime only would make sense for up to ten hours per week¹⁶.

Thus managers may tend to use overtime even when it is economically irrational in a larger sense and when it diminishes the public safety they are charged with protecting. This is consistent with Bayley’s (1994:55) conclusion that the resource allocation decisions of police managers often tend to be driven by organizational convenience, institutional tradition, and worker morale rather than community safety.

Why Don’t Police Officers Advocate Overtime Controls?

Police officers and their employee organizations and unions are unlikely to try to limit overtime because of culture and economics. This is unfortunate because, under most circumstances, employees who are free to organize and deal with management can be expected to ensure their own welfare. Although police employee organizations have fought successfully for many reforms related to health and safety, they generally have ignored the need to limit overtime and other sources of fatigue. Part of this probably stems from the same sub-cultural beliefs that blind managers, researchers, and the public to the hazards associated with fatigued police. But economic factors undoubtedly also play a major role.

The plain fact is that police officers often become dependent on overtime. At a minimum, overtime pays for the nice extras in life – the extra car, nicer house, vacation, fishing boat, ski trips, private schools for children and other things that measurably improve the quality of life for people whose jobs can be extraordinarily stressful. With overtime, for instance, the average deputy sheriff in Orange County, California with five years of experience earns as much as many of my colleagues at a major research university who are full professors. In my nine years of experience with the Los Angeles County Sheriff’s Department, it was not unusual for patrol officers to decline transfer to less arduous assignments or avoid taking promotional exams because they said they could not afford to lose overtime wages. During one year in the early 1970s, several deputies with whom I worked earned more than our captain because of overtime. Similar situations have been reported in New York (Boorstin,

1986:B3L), Seattle (Bayley, 1994:67), and Washington, DC, (Harriston, 1993:B3) police departments. As Bayley (1994:67) notes, police officers tend to be preoccupied with monetary rewards and regard overtime as an entitlement.

Although it has been reported that officers in some departments rely on overtime because of inadequate pay raises or increased living costs (e.g. Kappeler *et al.*, 1994:227), this generally does not appear to be the case. Since 1984, national average entry-level police salaries and maximum salaries for non-supervisors have outpaced the Consumer Price Index by 7 percent and 17 percent respectively (ICMA, 1995:Table 3/6; US Bureau of Labor Statistics, 1995, Table 747)¹⁷.

In summary, it appears that the two major internal forces that *could* reform fatigue-related police problems are neutralized. Managers lack motivation because their economic utility functions do not accurately reflect the true costs of overtime work and because overtime provides them with needed staffing flexibility. Employee organizations are not motivated to improve things because their constituents tend to depend on overtime to maintain their lifestyles. Off-duty court appearances are the primary external source of overtime. Status differentials between police and attorneys and judges, as well as a lack of economic incentive, mean that the courts also tend to lack motivation to curb overtime. Perhaps most important, the public, police managers and officers, health care professionals, and researchers generally appear to have been blinded by the perception that fatigue is an immutable part of the police environment. What can be done to remedy this collective myopia?

ATTACKING THE PROBLEM

There seem to be urgent needs for both research and policy development. It is important to assess clearly the significance of any connections between administratively controllable sources of fatigue and problems such as diminished performance, accidents, and illness. And many, if not most, law enforcement agencies probably need to reconsider the way they manage those sources of fatigue.

Research Recommendations

We need to know how much fatigue is out there and how it affects police officers, particularly those in patrol assignments. The conjectures

made here have been based on personal experience and informal discussions with street cops over 25 years, a limited preliminary telephone survey, a broad analysis of the technical and scientific literature, and anecdotal evidence of the pervasive treatment of overwork, overtime, and fatigue as usual adjuncts of police work in both the media and literature on police management, health, and safety. Some important issues undoubtedly have been missed and others may have been overstated, but it seems likely that most of the connections drawn here will be confirmed by future research.

What should that research address? The following list provides examples of some of the more important – and readily measurable – research questions. The methods appropriate to these questions include self-report surveys, analysis of archival materials, and ethnographic studies. They also include experiments and quasi-experiments:

(1) Prevalence of fatigue:

- What, if any, relationship exists between fatigue and the number and type of hours worked per day, week, month, and year by patrol officers?
- What do patrol officers report about the subjective effects of fatigue and their strategies for managing it?
- What are their attitudes toward fatigue in themselves and their peers?

(2) Effects of fatigue:

- Is there a robust correlation between administratively controllable sources of fatigue and diminished performance measured by such things as frequency of citizen complaints, on-duty accidents and injuries, accidents while driving to and from work, and proportion of cases rejected for prosecution?
- What are the fatigue-related characteristics of the life histories of officers who receive early medical retirements for cardiac or stress-related conditions?
- Are there links between fatigue and officer fatalities on or off the job?

- How does excess fatigue affect the families of police officers in terms of problems such as marital difficulties and family violence that have been targeted by Law Enforcement Family Support legislation under §210201 of the 1994 Crime Act?
 - Are there age-, gender-, attitude-, or experience-based differences in the way patrol officers are affected by and respond to fatigue and fatigue-inducers?
- (3) Costs of fatigue:
- Is there evidence that police managers implicitly or explicitly make manning decisions based on the economic criteria illustrated in Figures 1 and 2?
 - What do the real overtime cost-benefit curves look like and how do they vary as the number of hours worked increases?
 - What, if any, costs can be traced back to overtime-induced fatigue and how do they compare to the cost of doing without overtime?
 - What are the human – as opposed to fiscal – costs of administratively-controllable fatigue?
 - What is the extent of police managers' potential liability under 42 USC §1983 for misbehavior by, or injury to, subordinates who were likely to be impaired due to administratively-controllable excess fatigue?
- (4) Measuring fatigue:
- How feasible is the use of objective measures of fatigue such as pupillometry (Corfitsen, 1993; 1994) and voice stress analysis (Ruiz *et al.*, 1990) for this kind of research?
 - Can objective and subjective measures of fatigue developed for use in sensitive military and national security environments be adapted for use in police work?
- (5) Controlling fatigue:
- Is there a link between fatigue and unscheduled absenteeism (which, of course, can necessitate having others work overtime)?

- To what extent are the effects of fatigue ameliorated/exacerbated by individual characteristics such as physical fitness, problem solving strategies, and attitudes toward the job?
- What role do internal policies play in differences in overtime requirements between similar departments? That is, how much control do different policies provide managers regarding overtime demand?
- How might implementation of compressed work schedules (Pierce and Dunham, 1992) influence officer fatigue in different kinds of policing environments?
- How might provisions for brief naps during prolonged work shifts affect fatigue (e.g. Naitoh *et al.*, 1990)?
- To what extent could technological changes that improve officer efficiency (e.g. laptop computers to speed report writing, streamlined internal procedures, providing beepers to limit court-related overtime) lower fatigue by decreasing demand for overtime?

Policy Recommendations

In our increasingly litigious society, it seems reasonable to institute administrative measures to control fatigue among field police officers given what we know about its general effects on human perception, cognition, decision making, and motor skills. It seems imprudent not to do so once the probable connection between these effects and officer performance, accidents, injuries, and illness has been pointed out. Here are some recommendations for developing policies to help control fatigue in police work.

Expert Panel

A broadly interdisciplinary panel of experts should be convened to assess the need for immediate policy changes and guide the kinds of research advocated here. As Mital and Kumar (1994) remind us, fatigue is a complex problem that requires interdisciplinary study. Therefore, the panel probably should include practitioners such as police managers and leaders of employee organizations; experts in human factors, sleep

medicine, industrial psychology, occupational health, and risk analysis who have studied similar problems in other occupational settings; researchers on police stress, the administration of law enforcement organizations, and public liability issues; representatives from the National Institute of Justice and Bureau of Justice Statistics; and perhaps one or two generalists whose experience overlaps many of these areas. The NASA Ames Fatigue Countermeasures Program reported in Rosekind *et al.* (1994) provides an excellent model for this kind of effort.

Community Policing

Over the long term, the promising shift toward community policing appears likely to moderate the hours worked by patrol officers. The more patrol officers are perceived as part of a community-based effort rather than a “thin blue line” – and the more they see themselves that way – the easier it will be to develop a more reasonable construction of police work. Our communities need calm professional officers, not exhausted crusaders. Over the short term, some departments have experienced an increase in overtime after attempting to overlay community oriented policing programs on top of more traditional enforcement strategies. It would appear important to develop staffing patterns that encourage close bonds between officers and the clients they serve both by matching work hours to community needs and by cultivating personable and approachable officers. Tired cops seem inconsistent with these goals.

Personnel Reliability Programs

Consideration should be given to developing ways to ensure that officers are emotionally and physically fit for duty each time they hit the streets, just as the military ensures the reliability of those who control nuclear weapons. For decades, the military has accomplished this via personnel reliability programs that combine cooperative self-regulation with active monitoring by peers and health care professionals¹⁸. Exhausted or otherwise debilitated officers should be encouraged to excuse themselves from duty. Good cops protect one another. Supervisors and peers need to learn that protection includes convincing impaired officers to stay off the streets. Procedures and programs should be implemented to institutionalize this attitude¹⁹. There are at least two relatively straightforward objective techniques for monitoring fatigue that could be used to assess officers’ fitness for duty. Neither is very

invasive (at least when compared with random drug testing). Pupillometry is a simple measure that provides an objective measurement of tiredness based on pupil size and stability (Corfitsen, 1993; 1994; Pressman, 1993). Voice stress analysis, although more complicated than pupillometry, also can be used to measure fatigue and psychological stress levels (Ruiz *et al.*, 1990). A third method for monitoring officer fitness is to have a trained professional available round-the-clock to assess officer fitness and, if necessary, remove unfit officers from duty (e.g. Scrivner, 1994). The costs associated with personnel reliability programs such as these might be offset at least partially by reducing lawsuits, accidents, injuries, and disability retirements.

Improved Use of Technology

One obvious way to lower demand for overtime is to work smarter rather than harder. Consideration should be given to controlling the demand for overtime by improving the efficiency of officers. The computer capabilities of many departments are backward. With computers less expensive and more powerful than ever, it seems appropriate to rethink the manner in which many police activities are performed. For example, increased use of laptop computers could reduce report writing time. Beepers could be issued to enable officers to be on call for court with less interference in their personal lives than is caused by traditional on-call procedures.

A promising medical technology that is receiving extensive attention from sleep researchers is the oral administration of melatonin, a hormone produced by the pineal gland, to reset the body's circadian rhythms or prevent their disruption following environmental insults such as lengthy overtime assignments or shift changes that disturb sleep patterns. Armstrong and Redman (1993;212-18) provide an overview of research in this area.

Technology includes "software" as well as "hardware". Many times procedural changes can be used to lower overtime demand. One glaring possibility in this regard would be a substantial cooperative reworking of the way police are treated within the court system. If judges, attorneys, and the public were educated as to the counterproductive effects of judicial indifference toward police overtime, they might begin to cooperate out of good will. An alternative would be to charge a portion of court-related police overtime to judicial budgets.

Modified Work Schedules

Compressed work schedules (e.g. four 12-hour work days followed by four days off, four 10-hour work days followed by three days off) are another procedural change that may help meet organizational staffing needs while reducing the biological and social disruption of shift work. Although some researchers have found that the longer work days can increase reported fatigue, others have found that increased time off enables workers to recuperate. Baker *et al.* (1994) discuss these issues for nuclear power plant operators. In one of the rare studies of fatigue in law enforcement, Pierce and Dunham (1992) discuss the use of compressed shifts in a small police department to cover both demand for public services and employee summer vacations. They found a significant reduction in reported fatigue and stress following institution of a 12/4 schedule but were unable to obtain objective fatigue measures.

It is unclear how effective this approach would be in high crime rate urban areas where officers tend to make more arrests and thus are subpoenaed to court more often. The ameliorative effects of more days off might be negated if officers ended up spending yet more off-duty time in court. Another disadvantage of extended shift patterns is that they often conflict with the goals of community oriented policing. The patterns of days off produced by these scheduling practices often make it difficult for members of a community to predict when an individual officer will be available. According to J.E. Brann, director of the U.S. Department of Justice's Office of Community Oriented Policing Services, this makes it difficult for citizens and officers to develop the personal bonds on which this policing strategy relies (personal communication, November 20, 1995).

Brief naps (40 minutes) can provide transient relief from fatigue and enhance alertness, although they do not eliminate the cumulative effects of sleep loss (Mittler *et al.*, 1994; Naitoh *et al.*, 1990). It would be ironic if supervisors began to encourage tired officers to take a nap when the opportunity arose after years of fighting traditional practices like "cooping" (hiding from supervisors to sleep on the job).

Limit Exposure to Intense Patrol Environments

It also may be appropriate to limit the number of years that officers can be assigned to high crime rate urban patrol areas. The obvious downside of this is that, like unconventional shift patterns, it

disrupts many of the important ties officers develop within the communities and neighborhoods they patrol and therefore can diminish their effectiveness. Relative costs and benefits of changes such as these need to be examined carefully.

Resistance to Reform

Many managers and line personnel seem likely to resist limiting overtime. Researchers thus have a duty to take the initiative with sound research and wide dissemination of results to police, the public, and policy makers. Necessary change could be encouraged by making managers accountable for previously hidden costs associated with early retirements, on-duty injuries and civil suits arising from police misbehavior. Morally, police unions would be hard-pressed to avoid supporting safety measures such as these. As a young member of Washington, DC's SWAT team said, "You just have to decide what you want to be ... I mean, do you want to be money-hungry? You want to go all day and night? You'll die of a heart attack. You know what I'm saying? There's more to life than money" (Duggan, 1993:A8).

Dealing with Civil Liability

Civil liability is another potential problem that needs to be acknowledged²⁰. Reform efforts should help limit punitive damages and begin to forestall future liability, past mistakes might be excusable as "customary and acceptable practice" rather than negligence (see Kappeler, 1993:173-85). As knowledge about police fatigue increases, however, it is likely to become increasingly difficult to justify ignoring its detrimental effects on the health and safety of officers and the public.

SUMMARY AND CONCLUSIONS

Research on people in other occupational groups indicates that fatigue tends to decrease alertness, impair performance, and worsen mood, and that sleep loss and circadian disruption are the two principal physiological sources of fatigue. Official statistics, anecdotal evidence, and the pilot survey reported here indicate that excess fatigue may be very prevalent in police work – especially among patrol officers in high

crime rate urban areas. Although we regulate the working hours of truck drivers, pilots, power plant operators, and medical interns, the need to control police fatigue has been ignored. Our traditional indifference toward this problem appears to have been bolstered by the social and economic construction of police work.

Communities and police agencies struggling under budgetary constraints need to recognize that the best interests of their officers, organizations, and communities require that they control the environmental, physiological, and attitudinal factors that seem almost certain to impair performance and contribute to accidents, injuries, and disease among patrol officers.

Researchers frequently are criticized for failing to deal with practical concerns and provide timely public policy guidance (e.g. Reno, 1995). Police fatigue presents a unique opportunity for researchers to help police officers and managers surmount the social and economic barriers that limit their motivation to control police fatigue.

NOTES

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1. Prior to becoming an academic, the author spent 17 years in law enforcement: nine years as a street cop and supervisor in Los Angeles slums and barrios, six years as a police chief helping the emerging nations of Micronesia develop innovative law enforcement strategies, and two years as a federal law enforcement officer in Washington, DC, working on national and international policy issues.

2. Off-duty recreational and family activities also can contribute to officer fatigue. However, I limit the discussion here to job-related causes of fatigue that can be addressed administratively.
3. The LEMAS survey requests information about overtime, only for employees who worked overtime while the mean overtime expenditure per officer is calculated per sworn full-time officer on each department. In most departments, many officers, especially those in administrative and management positions, either do not work overtime or are not paid for it. Thus it is not possible to use the LEMAS data to calculate the mean number of overtime hours worked annually by officers in each agency.
4. Note that the vagaries of combining survey data from two different sources make this a very tentative estimate.
5. The police departments of Los Angeles, Washington, DC, Metro-Dade, Chicago, Baltimore, Detroit, Nassau County (NY), New York City, Suffolk County (NY), Philadelphia, Dallas, and Houston were contacted.
6. These individuals variously were described within their organizations as watch sergeants, shift sergeants, duty sergeants, etc. This group was chosen for respondents because, as line supervisors, they tend to be exceptionally knowledgeable about activities on their shifts and the officers they supervise. And, stereotypically at least, they often seem more likely to describe the blunt facts of a matter than their more politically-sensitive superior officers.
7. Overtime was defined as including both paid overtime and unpaid "comp" overtime for which compensatory time off may be taken in the future.
8. The exceptions were sergeants at the two shifts reporting from one department who said that there was a formal policy setting maximum overtime at 35 hours per week. Two sergeants at another department disagreed, one reported that his department had an overtime policy, but a sergeant on a different shift said there was no policy. For the other eight departments, watch sergeants unanimously reported having no policy regarding maximum work hours.
9. Medical residents traditionally worked 110 or more hours weekly (Kelly *et al.*, 1991:468). Since New York State mandated limits for the work hours of medical resident interns in 1989, many jurisdictions followed suit. This may be considered a worst-case comparison for police work because interns' hours include both instruction and work time, they work them only for six months to four years rather than career-long, and they are provided with sleeping arrangements in the hospital that may be used when the opportunity arises. Under the New York State Health Code (revised Section 405), which has been copied widely (Kelly *et al.*, 1991), residents in emergency departments now are limited to 12-hour shifts. Those in other hospital

departments may not average more than 80 hours per week over a four-week period and they may not work more than 24 hours consecutively, with at least a 24-hour period of non-working time each week (Conigliaro *et al.*, 1993).

10. The report (Lewis, 1985a) commissioned by the Nuclear Regulatory Commission on shift scheduling and overtime provides an excellent critical review of the literature complete with executive summary and annotated bibliography. The volume edited by Scott (1990) provides an excellent technical review of the effects of shift work on performance, health, and safety as well as recommendations for ameliorating many of these problems. See Hockey (1986) for an excellent review of the effects of interactions between environmental stress and fatigue on human performance. Mitler *et al.* (1994) review public health and public policy issues associated with sleepiness. The special issue of *Human Factors* devoted to the topic of fatigue (June 1994) contains articles on diverse aspects of fatigue.
11. Proctor and Van Zandt (1994) provide an excellent description of fatigue's effect on cognition, perception, decision making, learning, and motor activities. Vertzberger (1990:180-6) gives a vivid discussion of the influence of fatigue and other psycho-physiological factors on cognition and decision making.
12. Vila (1992) provides a description of the ways that fatigue can indirectly facilitate misconduct by investing more officers in the code of silence that tends to frustrate reform efforts.
13. This excludes officers killed in traffic pursuits; they are counted as felonious killings.
14. It also hides the fundamental truth that the demands made on combat troops in battle tend to have relatively short duration; never in US history have combat troops stayed on the front lines for five years at a time. Moreover, combat troops almost never have to exercise the restraint or exquisite judgment regularly required of civilian police.
15. Pioneer police stress researcher William Kroes (1985:51-3) discusses the effects on police officers of a common defense attorney ruse: So long as an officer is waiting at court and ready to testify, the attorney will request a continuance. As soon as the officer leaves or schedules a vacation the attorney attempts to get the case dismissed by announcing that she or he is ready for trial. In the course of the telephone survey reported here, a Chicago officer recounted the same tactics.
16. Note that these estimates are provided to illustrate the potential for hidden costs. They should not be construed otherwise, nor should they be used as

the basis for policy without more detailed analysis of costs associated with fatigue.

17. Note, however, that there is substantial variation in police salaries for different sized agencies and in different regions.
18. I have had experience with these types of programs as they relate to national defense and national security activities. I have not, however, been able to locate contemporary unclassified documents that discuss personnel reliability programs *per se*. Majesty (1962) provides a somewhat arcane introduction to personnel reliability as it relates to ballistic missile systems.
19. The Koltz commission provided excellent recommendations for improving deputies' psychological health and ability to manage stress (1992:278-9). The recommendations might provide an even more valuable instrument for reform if they were expanded to encompass problems associated with overwork and fatigue.
20. Barrineau (1987:51-87) reviews issues associated with supervisory and managerial civil liability under 42 USC §1983 and provides suggestions for lawsuit prevention. Mitler *et al.* (1994:457-8) discuss liability and litigation issues associated with sleepiness.

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Appendix

OVERTIME COST ESTIMATION METHODS AND DATA SOURCES

Figures 1 and 2 were estimated by extrapolating from data provided in the LEMAS survey (Reaves, 1992a, Tables 2a, 5a, 6a, 7a) on entry-level police officer salaries and hours devoted to recruit training. Benefits data that had been reported by the largest 12 departments (Los Angeles, Washington, DC, Metro-Dade, Chicago, Baltimore, Boston, Detroit, Nassau County (NY), New York, Suffolk County (NY), Philadelphia, and Houston Police Departments) were obtained directly from the Bureau of Justice Statistics. Costs for hours of work obtained per officer had four components: salary, benefits, training, and overtime. As no data were available on recruitment costs, they were left out of the calculation.

Weekly salary costs for experienced officers (six or more years of service) were estimated as 33.8 percent higher than the average paid to entry-level officers in the 13 largest US municipal police departments. This is consistent with data from other sources for officers in large departments (e.g. Maguire and Flanagan, 1991, Table 1.41; Reaves, 1992b).

Weekly benefits compensation was calculated as 30 percent of weekly salary and wages based on an average of information provided by eight large municipal police agencies (Chicago, Los Angeles, Philadelphia, Houston, Detroit, Dallas, Baltimore, and Milwaukee) to the Bureau of Justice Statistics as part of the 1994 Crime Control Act's Police Hiring Supplement Program (Reaves, personal communication, April 26, 1995).

Weekly training costs were calculated based only on hours of field and classroom training undergone by new recruits. These costs were amortized over a six-year period under the assumption that departments recover their training costs within that amount of time.

Overtime costs in Figure 1 were calculated using a 1.5 multiplier on base salary for hours worked beyond 40 hours for a single officer and beyond 80 hours for two officers. In Figure 2, a progressive overtime multiplier was substituted that added 1.5 percent to the basic overtime rate for each hour worked beyond 40 hours for a single officer and beyond 80 hours for two officers.

Costs per hour of work obtained were calculated on a spreadsheet using the following equations:

Single officer:

At hour 0, cost = {(benefits * weekly salary) +
[(training hours * entry-level wages/hr)/(52 weeks * 6 years)]}

For hours 1 to 40, cost = sum (previous costs from hour 0 onward) +
hourly salary

For hours 41 to 100, cost = sum (previous costs from hour 0 onward) +
(hourly salary * overtime multiplier)

Two officers:

At hour 0, cost = 2 * {(benefits * weekly salary) +
[(training hours * entry-level wages/hr)/(52 weeks * 6 years)]}

For hours 1 to 80, cost = sum (previous costs from hour 0 onward) +
hourly salary

For hours 81 to 100, Cost = sum (previous costs from hour 0 onward) +
(hourly salary * overtime multiplier)