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# POLICY BRIEF

**Felonious Assault and Injury to Law Enforcement: Epidemiology and Spatial Risk Factors**

Phillip Marotta & Joel M. Caplan
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## Executive Summary

This report examines spatial and circumstantial risk factors for various types of felonious assault/battery (herein "assault") and mortality. Review of empirical studies, national and state safety protocols, training manuals, and policy reports revealed several features of the built environment that increase the risk of injury to law enforcement officers. Recommendations for improving police practice are highlighted with a special focus on dispatch, officer deployment, approaching suspects, foot pursuit, reducing suspect injury, and data collection.

**Key Findings: Spatial Risk Factors**

The availability of potential hiding places and the number of known offenders residing are spatial risk factors that cut across all types of calls and situations to elevate risk of injury. Regarding assaults during *traffic stops*, arterial and collector roadways, absence of median dividers and covered roadways are spatial risk factors for violent assaults to officers. Spatial risk factors for assault during foot pursuit include large unlocked buildings, abandoned lots, un-level terrain, tall brush, inclement weather, darkness/reduced visibility, residential yards, poorly lit streets, walls, fences, swimming pools, vicious dogs, clotheslines, sharp turns, and an area that is difficult to construct a perimeter due to open space. Spatial risk factors for felonious assault in domestic disturbances are repeat calls to the same address, secluded homes, and heavily wooded locations.

Mental disturbance calls possess risk for injury that is determined by a unique set of spatial risk factors. Psychiatric emergency rooms, clinics, group homes, shelters, areas with high rates of homelessness, drop-in shelters, illegal drug markets, and alcohol outlets are examples of locations with elevated risk of physical assault or fatality.

Ambush fatalities of law enforcement officers has undergone a steady rise over the past 10 years and remained the leading circumstance behind fatal shooting in 2012. Ambush assaults and fatalities can be either planned or unplanned and also can arrive as a component of any type of violence.

**General Recommendations for Policy & Practice**

When taken together, several cross-cutting recommendations emerge from the findings presented in this report.

- *Improve record keeping of incidents of near miss, felonious assault and death* – to analyze periodically.
- *Keep dispatch up to speed about spatial risk factors in your beat or district* – to inform officers as needed.
- *Calls for service present different levels of risk at certain locations and should not receive the same treatment* – consider response protocols.
- *Collaborate with members of the community who can assist in changing the physical environment to reduce risk of violence* – preemptively mitigate spatial risks to officers.
- *Conduct routine trainings to practice skills of assessing scene safety and known spatial risk factors* - "know before you go".
- *Perform local assessment of data and micro level factors and times that may put officers at risk of violence* – communicate meaningful and actionable info.

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## Full Report

In this report, we review safety protocols and policy research reports developed by law enforcement agencies and experts in the field, as well as the (nearly nonexistent) empirical research relating to the topic of felonious injury and death to law enforcement officers. A background in epidemiology is first provided in order to understand the scope of the problem and its overall health and safety burden in the United States. Second, spatial and circumstantial risk factors for various types of assault are discussed. Finally, recommendations for policy and/or practice are highlighted specifically around dispatch, officer deployment, and data collection.

### Overview of the Problem

Law enforcement officers assume one of the most perilous occupations in the United States. In the line of duty, law enforcement officers perish at a rate 5 times the national average for all occupations (Kercher et al., 2013). With over 640,000 officers involved in approximately 40 million contacts with the general public, risk of injury and mortality is omnipresent. Yet little is known empirically regarding spatial-temporal features of the physical environment that place law enforcement officers at greatest risk of physical harm.

Overall, the rate of officer assault in 2012 was 10.2 per 100 sworn officers (LEOKA, 2012). According to the International Association of Chiefs of Police, from 2000-2009, the average fatality rate (excluding job-related illness and WTC deaths) stood at 15 deaths per 100,000 officers (LaTourrette, 2013). This is higher than the average law enforcement fatality rate from 1992-2002 of 11.8 per 100,000 workers (2,280 deaths) (Tiesman et al., 2010). Of the 52,901 officers assaulted in 2012, 27.7% (14,678) were subjected to injuries that required medical attention (2012 Law Enforcement Officers Killed & Assaulted (LEOKA, 2012). From 2003-2012 581,239 officers were assaulted and 535 were feloniously killed. An average of 58,124 officers were assaulted and 50 deaths occurred per year (LEOKA: 2012).

Regarding circumstances at the scene of the incident, from 2003-2012, most officers were killed responding to arrest, traffic pursuit and disturbance calls (Law Enforcement Officers Killed and Assaulted 2013, Figure 4). In ten years, no officer has been reportedly killed during a civil disorder and only 1.3% (722) have been assaulted (LEOKA, Table, 73). When examining the circumstances surrounding officer assault, disturbance calls, and arrest situation comprise nearly half with assault situations accounting for only .4% of the total distribution of assaults (FBI Figure 4, 2013).

**Disturbance calls and arrest situations comprise nearly half of the circumstances surrounding officer assault.**

Regarding lost time on the job, in 2012, police, sheriffs and patrol officers filed 32,190 cases for days away from work due to injury (BLS, 2012). Of the total cases filed for days away due to injury from work, in 2012, 27% (8691.3 cases) were due to violence inflicted by other persons or animals while in the line of duty (BLS, 2012). In 2012, the incident rate of law enforcement injury was 502 cases per 10,000 full time workers, which totaled 3,540 cases (BLS, 2013). The rates of injury reported to the Federal Bureau of Investigation's Law Enforcement Officers Killed and Assaulted Program (LEOKA) are much higher. In 2012, 14,678 officers

 

reported sustaining injury due to an assault which is nearly double the official (8691) number of cases reported to the Bureau of Labor Statistics for days lost of work. The injury rate calculated by LEOKA is also quite high at 2.8 injuries per 100 officers (LEOKA, 2012).

In 2012, 48 felonious deaths occurred. As of mid-year 2013, the number of law enforcement officer fatalities was 51, indicating that the decline in deaths that occurred in 2012 may be anomalous when compared to trends illustrated in officer deaths from 2002-2011 and preliminary counts from 2013 (NLEOMF, 2013). From 2001-2010, on average, 2,046 law enforcement officers were assaulted with a firearm each year in municipal, county and state jurisdictions (FBI-LEOKA). Felonious assaults and shootings continued to grow (NLEOMF, 2013; Center for the Study of Law Enforcement Officers Killed and Assaulted, 2013). Ambush situations accounted for 21% of all fatalities but only .5% (262 of 52901) of total assaults (LEOKA, 2012 Table 25). Although ambush situations are quite rare, they carry an extremely high potential for fatality. **These data indicate a spike in felonious assaults and deaths despite a general decline in all other causes of officer mortality and assault.**

A well-cited study by Alpert & Dunham (1999) classified officer injury according to type of violence perpetrated by assailant. 44% of injuries involved striking or hitting the officer, 27% involved pushing or pulling the officer, and 20% involved grabbing or holding the officer. Alpert & Dunham identified three types of injury that were sustained by officers: Out of 1,054 police injuries, 10% were felonious assault (small subset of which includes felonious homicide), 39% involved a resisting subject, and 50.4% were characterized as an occupational accident. The most common activities that led to injury incident were controlling or arresting the subject (43%), conducting investigation (15.6), pursuit of fleeing subject (11.6%), lock-up and processing (on department premise) (5.0%), assisting citizen in distress (due to non-crime reasons), vehicle accident, during training, during and post shooting incident, on department premises, and during fire rescue.

Regarding officer characteristics, from 1993-2012 the average age of officers feloniously killed ranged from 36-38 with 10-12 years of service and were more likely to serve in cities (specifically, cities over 250,000 population) (LEOKA, 2012: Officers Assaulted 1993-2012). Officers were more likely to be killed in 1-officer vehicles with nearly an even split between responding alone and with assistance from other officers. For 14 consecutive years, assaults and fatalities occurred most commonly between 12:00AM and 2:00AM and least frequently between the timeframe of 6:01 AM to 8:00AM (LEOKA, 2012: Officers Assaulted).

**In the Study by Alpert & Dunham (1999), the most common activities that led to injury incident were controlling or arresting the subject (43%), conducting investigation (15.6), pursuit of fleeing subject 11.6%, lock-up and processing (on department premise) (5.0%), assisting citizen in distress (due to non-crime reasons), vehicle accident, during training, during and post shooting incident, on department premises, and during fire rescue.**



 

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**Assaults and fatalities occur mostly between 12:00am and 2:00am.**

## Spatial Circumstances of Felonious Assault and Fatality: Associated Risk Factors

### *Traffic Stops/Motor Vehicle*

Traffic and motor vehicle stops are the most common situation that brings citizens in contact with the police. In 2008, 17.7 million citizens reported that their last encounter with law enforcement occurred during a traffic stop (DOJ, Special Report 2008). Incidents involving motor vehicles account for a substantial proportion of total mortality and injury to law enforcement officers. For 13 years, the overall leading cause of death for law enforcement officers was traffic incidents (ICAP, 2011). From 1980-2008, a decline in collision fatalities with other vehicles occurred alongside an increase in fatalities associated with collision with a fixed object (US DOT, 2011).

Spatial roadway related risk factors for officer fatalities consist of arterial (51%) and collector roadways (21.5%) and absence of median dividers (64%) (US DOT, 2011). This illustrates that the ways in which roads are divided place officers at risk of injury. Fatalities were more likely to occur on straight roads (70.4%) than curved roadways (28.9%) (US DOT, 2011). In 2010, 73 officers lost their lives due to accidents related to traffic (ICAP, 2011). For the past 17 years, one officer per month has died due to motorists failing to change lanes and move out of the way of officers engaged in traffic stops (ICAP, 2003).

**Officer fatalities appear to be more likely on straight segments of arterial or collector roadways without median dividers.**

Of all law enforcement officers assaulted and killed from 2003-2012, 10.1% and 17.9% respectively were engaged in a traffic pursuit or stop. In 2012, out of all assaults during traffic stops (4,450), 6.3% of assailants were in possession of a firearm, .8% possessed a knife or other cutting instrument, 34% were attacked with an other dangerous weapon, and 58.2% were assaulted with personal weapons (feet, hands, teeth or knees) (DOJ, 2012). Officers are at greatest risk of physical assault during a suspicious, felony or misdemeanor traffic stop. An officer may deem a traffic stop high risk or suspicious based upon tactical information communicated via radio, civilian witness, or other situational indicators (Borello, 2001). The greatest indicators of a high-risk or felony traffic vehicle stop are active warrants for any passenger or the operator of the vehicle, a fugitive in the vehicle, the vehicle is stolen, refusal to follow commands, and a pronounced threat to officer safety. Departments across the United States vary in the criteria for classifying a traffic stop as high-risk but the threat of injury remains the same.



The most common situational characteristic of injury to officers during traffic stops occurred when the officer approached the vehicle without taking necessary precautions such as doing a visual "pat down" of the interior of the vehicle, requesting the suspect to place his or her hands on the wheel, or when the officer's back was turned walking away from the vehicle. During traffic pursuit, officers are most likely to be killed or injured due to either striking another vehicle or when attempting to stop the vehicle on foot through means such as a spike strip. Regarding traffic stops, a majority of incidents of assault occurred when the officer was less than 10 feet away from the vehicle or while talking face-to-face with the suspect. Kaminski & Sorensen (1995) and Edwards (1995) found injury during traffic stops occurred most often when the suspect was wanted for a felony unbeknownst to the officer, or, when drugs or weapons were concealed in the vehicle.

**Roadways with limited lighting or covered by bridges or tunnels provide suspects with spatial opportunities to resist arrest or plan for violent behavior.**

Risk factors presented by the physical environment exacerbate an already existing threat of injury during both routine and high-risk vehicle stops. Spatial risk factors include, diminished visibility, uneven terrain, and close proximity to acquaintances that could assist in attack or resistance. Roadways with limited lighting, covered by bridges or tunnels provide spatial opportunities of suspects to resist arrest or plan for violent behavior.

*Implications for Practice: Traffic Stops and Pursuits*

In all types of traffic stops, (routine, suspicious and felony) a full assessment of the immediate physical environment is advised prior to initiating the stop or approaching the suspect. Extreme caution should be had when conducting a traffic stop on arterial and collector roadways or in circumstances where a median divider is not present. Due to risk factors presented by limited visibility, make every effort to avoid dimly lit locations when engaging in traffic stops. Avoid obstructions to lighting caused by coverings of bridges, broken streetlights, tall buildings and fences. If possible, instruct drivers to move their vehicles to well lit locations when engaging in stops at night, or to relocate to a safer segment of roadway.

***Foot Pursuit***

In 2011, two of the 50 officers involved in fatal shootings were engaging in active foot pursuit. Although injury statistics are not aggregated by foot pursuit in national figures, several empirical studies reveal that foot pursuits do elevate officer risk of injury and fatality. These findings were supported in studies by Kaminski (2006) (2007) in Richland County, SC that found 10% and 14% of deputies were injured intentionally or accidentally (respectively) over a six-month period during foot pursuits. Another study identified that among suspects who engaged in foot pursuits, 41% were impaired by substances or mental illness and 42% assaulted law enforcement officers (Bohrer et al., 2000). Risk of injury during foot pursuit is best understood when contextualized through use of force. Foot pursuits are situations in which law enforcement officers are at a greater risk of being assaulted as well as using physical force to gain control over



suspects (Kaminski et al, 2004, 2006). Kaminski et al (2004) identified that foot pursuits increased the odds of officers employing physical means of control by 345%. In any context, police officers that employ physical force are placed at higher odds of injury (National Institute of Justice, 2009; Kaminski et al, 2006, 2007, 2012). In circumstances involving foot pursuit, the likelihood of force application is already elevated thus increasing the risk of injury. Foot pursuits are most likely to occur when officers are conducting traffic stops, serving warrants and making arrests (ICAP, 2003).

A study of 214 deputies who engaged in 5,783 foot pursuits in the Richland County Sheriff's Department in South Carolina gives some insight into the environmental features that structure risk for injury during foot pursuit (Kaminsky, 2007). Out of all the pursuits, 55% occurred only on foot, 41% occurred in a vehicle and on foot, and 36% began during a traffic stop. About a third of all officers reported a lifetime incident of intentional injury and 43% reported accidental injury during a foot pursuit while employed as deputies in Richmond Country. Regarding environmental risk factors, nearly half of the officers reported chases that occurred on roads or sidewalks, 59% identified residential yards, 41% identified wooded areas, 15% were in open fields, 10% occurred in tall brush, and 8% were inside of a private or commercial building. These environmental risk factors did not occur in a unitary fashion. Rather, suspects passed through multiple types of terrain during each pursuit.

A review of national and state safety protocols for foot pursuit reveals several spatial risk factors for officer injury. The availability of potential hiding places, large unlocked buildings, abandoned lots, un-level terrain, tall brush, inclement weather, darkness/reduced visibility, residential yards, poorly lit streets, walls, fences, swimming pools, vicious dogs, clotheslines, sharp turns, and an area that is difficult to construct a perimeter due to open space all constitute spatial risk factors for injury during foot pursuit (Detroit Police Department, 2010; IACP, 2003; Tennessee Protocol on Foot Pursuit). Officers are at risk of assault or occupational injury when maneuvering around sharp turns and climbing fences because these actions distract from devoting attention to the suspect's location and affords opportunities for ambush (IACP, 2003).

**Officers are at especially high risk of assault when maneuvering around sharp turns and climbing fences because these actions distract officers from devoting attention to the suspect's location and affords opportunities for ambush.**

**Locations with concentrations of drug distributors or gang members pose an additional and distinctive risk of assault to officers.**

Locations with concentrations of drug distributers or gang members place officers at a distinct strategic disadvantage because suspects in flight may have more opportunities to hide or collude with others to obstruct apprehension efforts (ICAP, 2003). Other situational risk factors of mortality and injury during foot pursuit consist of engaging in a chase alone, pursuit of multiple suspects, being physically unfit, limited forms of communication, and disobeying orders from superiors to stand down (Bohrer et al., 2000; Brandl, 1996; Fielder, 2011). Officers who are unfamiliar with the geographic landscape or who are in pursuit of



individuals with active warrants are also at greater risk of injury. Officers who engage in pursuits during evening hours are most susceptible to injury.

It is also important to note that foot pursuits are a visible form of physical police action. The public knows little about the motivations behind a particular foot pursuit but due to its dramatic nature can form inaccurate perceptions surrounding its cause. It is possible that crowds or bystanders, confused by the commotion caused by pursuit, could present obstacles to visibility, which in turn, creates risk.

*Implications for Practice: Foot Pursuit*

Certain areas heighten risk of injury and are more conducive to encouraging foot pursuits based upon features of the physical environment. In times of calm, officers could mentally take note of potential environmental risks. This includes paying attention to the location of alleyways, potential hiding places, un-level terrain and abandoned lots. Due to the extreme risk of suspect assault during foot pursuits, it is imperative that officers enter into pursuit situations with as much pre-existing spatial knowledge as possible.

Landlords and superintendents of building complexes may be encouraged to keep doors locked, lights maintained, and mirrors installed at sharp turns on the interior and exterior. Identify geographical areas with uneven terrain, swimming pools, or fences to better inform police officers of potential environmental threats. Enforcement of regulations to properly secure abandoned lots, and other property laws, could prevent suspects from drawing officers into areas with potential physical hazards. Lastly, identifying clusters of known gang members and violent offenders could assist officers (in advance) when determining if they are entering into an environment susceptible to potential ambush or collusion.

***Domestic/General Disturbance Incidents***

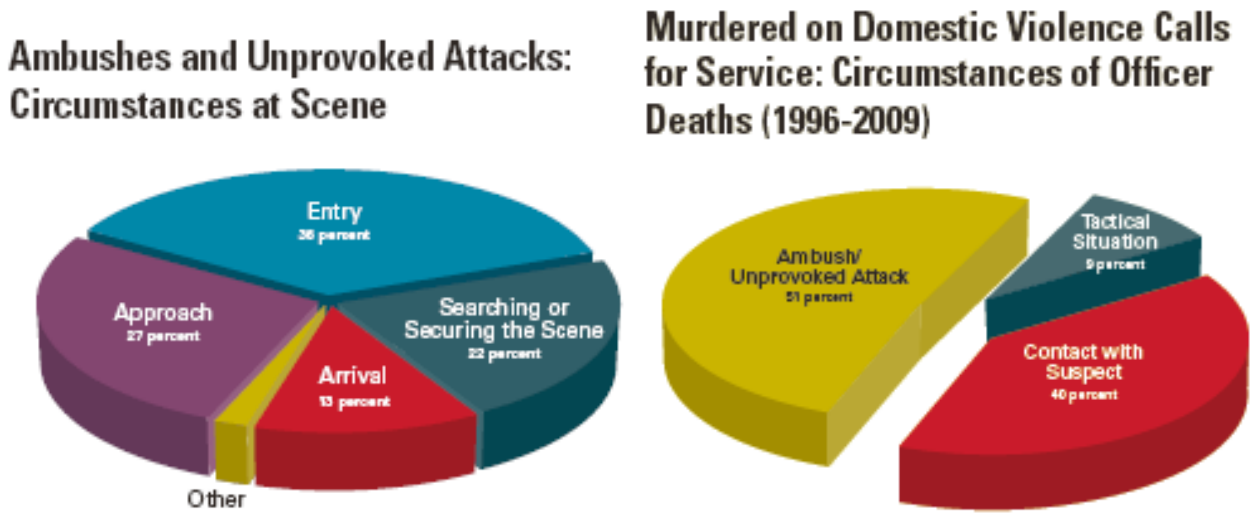
Domestic disturbance calls are the third leading cause of intentional death for law enforcement officers (Kercher et al, 2013). From 1996-2010, 22% of the 796 killings of police officers occurred during responses to disturbance calls (Kercher et al., 2013). Law enforcement officers responding to domestic disturbance calls are requested to intervene in situations involving multiple individuals with heightened states of emotional reactivity. One third of all law enforcement deaths during domestic disturbance emerged out of an officer's attempts to intervene when lethal force was directed toward a spouse or family member of the suspect (Meyer & Carroll, 2013). Domestic disturbance calls pertain not only to disputes involving intimate partners but also refers to conflicts involving any member of a domestic arrangement (Kercher et al, 2013). Nearly 40% of law enforcement fatalities involving disturbance calls were ambushes by suspects (Kercher et al, 2013). Meyer & Carrol (2013) found that 20% of fatalities during domestic disturbance calls involved a barricaded suspect attempting to guard a hostage and obstruct law enforcement entry.

**40% of law enforcement fatalities involving disturbance calls were ambushes.**



The following figures illustrate circumstances at the scene and contact with suspects during ambush attacks on law enforcement officers involved in responding to domestic violence calls.




Meyer & Carroll, 2013

Review of jurisdictional safety protocols surrounding domestic disturbance calls reveals several situational and spatial risk factors for felonious assault. Risk factors during domestic disturbances consist of repeat calls to the same address, existing restraining orders, weapons in the home, injuries to the victims sustained during prior incidents, types and intensity of background noises, and if the suspect knows that the victim contacted the police. Specifically, the most prominent risk factors for felonious assault during domestic disturbance calls revolve around features of the built environment that enable easy barricading of property as well as evasion from the law enforcement officer's line of sight. Residential structures that are detached or secluded in wooded areas can enable suspects to evade police attention and facilitate successful ambush (Ellis et al 1993). Locations in hostile areas with other residents facilitate suspect evasion or ambush. In many cases, officers were shot head-on while making entry into private residences (ICAP, 2011).

**Domestic violence incidents at residential structures that are detached or in wooded areas create a heightened risk of felonious injury to officers.**

*Implications for Practice: Domestic Disturbance Calls*

If the home is located in a secluded place, request further assistance as appropriate. In addition to circumstantial, situational and criminal history questions, dispatchers may ask if the home is located at the end of a street, if there are nearby woods or detached structures, or other spatial questions that may appear relevant based upon the circumstances of the emergency.

*General and Mental Disturbance Calls*

General disturbance calls differ from domestic disturbance calls in the sense that police are elicited to respond to an incident in which an individual is behaving in such a way that disturbs public order. In 2012, homicides and assaults of law enforcement officers during **general disturbance calls** occurred predominately at private residences, nightclubs and bars in circumstances in which officers were attempting to arrest suspects or investigating calls of suspicious activity (LEOKA, 2012; ICAP, 2011).

**Fatalities and assaults to LE during general disturbance calls happened mostly at private residences, nightclubs, or bars.**

Mental disturbance calls consist of requests for service involving individuals who appear to be in an emotional state of crisis or severe substance use intoxication but are not involved directly in the commission of a crime. Although injury and assault rates to law enforcement officers by individuals during mental disturbance calls are relatively low according to the FBI (2.0%), law enforcement officers perceive individuals with mental illness to present substantial risk. A survey of law enforcement officers revealed that 60% of respondents reported that mentally disturbed individuals were a potent risk factor in casualty and injury (Gunning, 2011). Yet only 2.0% of officer assaults involve responding to individuals with mental illness (LEOKA, 2012). This misappropriation of risk can result in greater rates of misuse of force by law enforcement officers toward individuals with chronic mental illness, which could then lead to officer injury.

Areas where mental illness and risky behaviors cluster point to potential spatial risk factors for assault to police officers. Areas with high concentrations of individuals with mental illness or locations of psychiatric and social service provisions comprise environmental risk factors for officer injury. Psychiatric emergency rooms, clinics, group homes, shelters, areas with high rates of homelessness, drop-in shelters, known illegal drug markets, and alcohol outlets are all examples of locations with elevated risk of physical assault or fatality (Cordner, 2006; Gunning 2011, COPS, 2011).

**Psychiatric emergency rooms, clinics, group homes, shelters, areas with high rates of homelessness, drop-in shelters, known illegal drug markets, and alcohol outlets have an elevated risk of physical assault or fatality to police.**

**Risks of officer injury are higher in proximity to these facilities at certain times of the day.**

There is an important temporal factor involved in mental disturbance calls that must be accounted for when examining spatial risk. Populations of individuals with chronic mental illness have high rates of poverty, homeless, and unemployment. Thus they are more likely to depend on specific agencies for services such as treatment, shelter, vocational training, and food. During specific times of the day, certain agencies



may receive an overwhelming number of clients seeking emergency services (Cordner, 2006). Soup kitchens typically serve food at designated times. Emergency homeless shelters generally have a designated time, usually late in the afternoon, in which clients will arrive and enter into a lottery for a bed. Emergency psychiatric departments in some areas experience a surge in chronically mentally ill persons, later in the afternoon, who were turned away from local shelters. Law enforcement officers should remain cognizant of the ebb and flow of clusters of the mentally ill at times in which certain services become available.

*Implications for Policing Practice: General and Mental Disturbance Calls*

Critical Incident Team (CIT) training is the most popular program for equipping law enforcement with the skills necessary to respond to psychiatric emergency. But, even CIT officers should be aware of the spatial factors associated with increased risk of injury to themselves and others. The deployment of well trained, experienced officers to locations in which persons with mental illness cluster at times when risk is elevated is an evidence-based intervention that could reduce the threat of injury presented by mental disturbance calls.

Communication with personnel at service agencies where mental health emergencies are known to cluster is another empirically tested method of reducing potential assault on law enforcement during psychiatric emergencies. For instance, police dispatchers can keep service providers or bystanders who elicit assistance from the police on the phone longer and obtain more detailed and up-to-the-minute information about the suspect's mental state while police are en route to the scene.

***Bars and Liquor Establishments***

Similar to mental disturbance calls, bars and liquor establishments are locations with unique temporal and spatial characteristics known to elevate risk. Due to the volatile nature of liquor consumption, crowd density, and scarcity of agents of control such as bartenders or door guardians, bars are locations where assaultive behaviors are known to cluster (Scott & Dedel, 2001). State laws on closing times and last call announcements structure the temporal relationship of violence and bars. The moments following a bar's closing is particularly volatile and tumultuous. Tense interactions fomenting inside the bar may erupt into violence. Risk factors for violence in and around bars include aggressive bouncers, proportion of young males between 18 and 29, crowding, willingness to serve intoxicated customers, and ratio of patrons to staff members. Whether or not the bar serves food and provides seated dining also structures the risk of violence.

Spatial risk factors include ratio of bars to other entertainment venues, lighting, crime rates around the bar, and type of neighborhood (primarily residential, commercial, or mixed) (Scott & Dedel, 2001). Violence will often occur in close proximity to the bar – in streets, sidewalks, alleys and parking lots, but it is the liquor establishment that is the spatial anchor radiating risk into the immediate surroundings. Unlike other circumstances, violence toward law enforcement at liquor establishments is more likely an unplanned, seemingly spontaneous, act. An officer could succumb to injury while attempting to intervene in fights between citizens, control crowds, or engage disruptive patrons inside of bars. Lastly, it is important to consider other features of the built environment that interact with the additional risk presented by bars and liquor establishments.



*Implications for Practice: Bars and Liquor Establishments*

Several interventions are known to reduce the spatial risk of assault in bars and liquor establishments. Frequent liquor license regulation and monitoring in the form of inspection helps ensure compliance and provide education to venue-owners in areas where violence is known to cluster. Dialogue with employees, managers, and other community members can elicit information about unique spatial risk factors and facilitate a relationship of trust with the general public that cultivates collaboration with the police. Education about over-intoxication and when to cut off patrons from further liquor consumption is an effective preventive method of reducing violence (Scott, 2001). Ensuring that bars discharge patrons through one door onto clearly visible streets with inaccessible alleyways can prevent grudges from erupting into fights during closing time.

***Ambush***

An ambush attack is defined as an act of violence perpetrated without warning with the intention of imposing physical injury or death on a law enforcement officer. Ambush fatalities of law enforcement officers has undergone a steady rise over the past 10 years and remained the leading circumstance behind fatal shootings in 2012. Of all ambush assault situations in 2012 (267), 39% involved a firearm, 4.5% involved a knife or other cutting instrument, 18.0 % involved another dangerous weapon, and 38.6% involved personal weapons (feet, hands, or teeth) (LEOKA, Table 73, 2012). Notably the category of 'ambush' represents calls where the sole criminal activity was violence to law enforcement and has tripled over the past year.

A study conducted by the California Commission on Problem Oriented Policing examined circumstances surrounding 33 felonious murders and 33 accidental deaths of law enforcement officers from 1995-1999 in California. Several key circumstances were identified that facilitated officer mortality (California Commission, 2001). A majority of attacks on officers were spontaneous or ambushes (17), 5 of the suspects were under the influence of alcohol and 4 were under the influence of drugs. Areas with high rates of prior violent crimes, remote or secluded geographic locations, and confined spaces were identified as locations with high risks for assault. Limited visibility due to poorly lit spaces or lack of sunlight contributed to officer risk of assault. In 55% of the felonious deaths the assailant was less than 10 feet away from the officer (California Commission, 2001). In reference to burglary/larceny in progress calls, pawnshops, retail shops, banks, and pharmacies were locations for felonious assaults on law enforcement. In cases of ambush, abandoned vehicles, known residences of gang members, or narcotics distributors were involved in several of the reported cases in 2011. Lastly, 25% of all offenders who killed a law enforcement officer were on probation or parole, indicating that areas with large clusters of prior offenders could function as a spatial risk factor for assault.

**Areas with high violent crime, remote or secluded geographic locations, confined spaces, abandoned vehicles, or known residences of gang members or narcotics distributors pose the highest risk for ambush and officer assaults. Poor lighting aggravates the risk.**

**Burglary/larceny in-progress calls: pawnshops, retail shops, banks and pharmacies have higher likelihood of ambush or felonious assault to police.**



Ambush assaults and fatalities can be either planned or unplanned and also can arrive as a component of any type of violence. For instance, law enforcement officers pursuing a disturbance call are highly susceptible to ambush attack. Police may receive false 911 calls for assistance to lure officers into traps where an attacker lies waiting. There are no clearly outlined data tracking this phenomenon; however, searching news stories and press releases reveals substantial anecdotal evidence. For instance on November 5, 2013, 3 law enforcement officers were shot and injured via a false 911 call in Fresno, CA.

*Implications for Practice: Ambush Attacks*

Ambush attacks are a sudden phenomenon in which officers are afforded a fleeting moment's notice prior to either death or extreme injury. Thus it is critical to identify features of the environment that can either function as warning signs or facilitate the perpetration of an ambush. These risky features and geographies can be mapped for a jurisdiction; any type of call for service in high-risk places could necessitate or inform specific tactical responses. Extreme caution should especially be had in areas where prior ambushes have occurred. Note that a common method of ambush is to use one individual to lure an officer away from his or her patrol car via foot pursuit into an environment advantageous to attack. So, safe (i.e., uneventful) arrival on scene does not mean threats in high-risk areas are unfounded.

Detailed data reporting the spatial and environmental features that might increase an officer's risk of ambush are rare. Research reports, empirical studies and government bulletins either entirely neglect or minimize details surrounding environmental characteristics of incidents involving assault or fatal shootings. Organizations such as the National Law Enforcement Memorial Fund, the Officer Down Memorial Organization, the International Association of Chiefs of Police, and the California Peace Officers Memorial have unanimously called for better data reporting on near miss incidents, officer injury, ambush attacks and officer fatalities.

***Identifying Spatial Risk Factors in a Jurisdiction Can Reduce the Need for Use of Force by Police Officers***

Law enforcement officers are not the only persons who stand to benefit from identifying and mitigating spatial risk factors. Officers who feel threatened, startled or cornered are more likely to apply force to regain control than officers who are empowered with the skills and information to successfully manage spatial risks around a suspect or incident location. This is especially apparent in the CIT model in which officers are trained to consistently maintain effective control over situations without the application of force. Officers who receive training and experience in assessing spatial risk may be better able to secure the scene and improve safety to all parties when faced with potential violence.

***Temporal Influences on Felonious Assault***

A robust temporal relationship exists between spatial risk factors and felonious assault on law enforcement officers. For the past 14 years, assaults and fatalities have occurred most often (15.2%) between 12:00AM and 2:00AM (LEOKA, 2012). Of all assaults that occurred from 2003 to 2012, 41.7% occurred between the hours of 8:00PM and 2:00AM (LEOKA, 2012). The hours of least temporal risk to officers are in the early morning, with a gradual increase in assaults throughout the early afternoon and into the evening.



Circumstances presented by the incident shape the clustering of assaults at different times of the day. Spatial risk is heavily influenced by temporal patterns. For instance, the spatial risk of assault presented by bars is structured by liquor legislation and peak entertainment hours. Domestic disturbance calls are influenced by temporal factors such as hours of employment. Patterns of assault in mental disturbance calls follow closely the hours of operation of service delivery agencies. Times of days that coincide with other criminogenic behavior such as drug distribution, prostitution, gang activity, and theft also structure the temporal risk of assault presented to law enforcement. A foot pursuit occurring during peak hours of drug distribution and gang activity will increase the number of opportunities for ambush, collusion or evasion. Similarly, foot pursuits that occur during busy or heavily populated times of day (e.g., "rush hour") present unique spatial risks of injury to law enforcement officers and lay civilians.

*Implications for Practice: Temporal Clustering of Felonious Assaults*

Careful attention to how police officer assaults and/or high-risk (precursor) call types cluster temporally presents promising avenues to improve officer safety. Even at the most basic level, field officers and crime analysts could make a deliberate effort to assess spatial risks of officer injury at different time periods. In this way, officers who respond to calls for service at "risky" places and at "risky" times of the day can prioritize their risk and prepare for potential threats accordingly. Considering the temporal nature of spatial risks may help to reduce alert fatigue among police officers who are regularly assigned to patrol a generally "high risk" area/sector for long durations. The timing of a call for service at such an area could be the impetus for "high alert", rather than a constant and unsustainable state of alarm.

***Case Study #1 in Felonious Assault: Lincoln Nebraska (Provided by the Lincoln Police Department)***

Through analysis of 826 cases of law enforcement assaults that occurred from January 1, 2001 through October 14, 2013 in Lincoln, Nebraska it is possible to construct a clear temporal and spatial relationship between law enforcement assault and features of the built environment. Out of 826 cases, five institutions comprised 17.8% or 146 of the total cases of assault: 1) Cornhusker Place (a detox center) (8.7%, 72 cases), 2) Bryan LGH West (a hospital), (5%, 42 cases), 3) the county jail (2.3%, 19 cases), 4) Cedars Youth Services a Runaway housing service (.8%, 7 cases), and 5) police headquarters (.7%, 6 cases). Prominent spatial risk factors according to premise type are public streets (21.9% or 181 cases), correctional institutions/treatment centers (9.0%, 75 cases), apartments with 7+ units (11.6%, 96 cases), single family residences (8.9%, 74 cases), sidewalk (5.5% 46 cases), hospitals (5.5% 46 cases), alleys (3.6%, 30 cases), duplexes (3.6, 30 cases), tavern/bar (2.0%, 17), public high schools (2.0%, 17 cases), apartments with 3-6 units (1.8%, 15 cases) grocery store (1.3%, 11 cases) and restaurants (1.2%, 10 cases). Taken together these data indicate that social and psychiatric service facilities, correctional institutions, multiunit apartments and duplexes were the most common places for felonious assault in Lincoln.



***Case Study #2 in Felonious Assault: Cincinnati, Ohio (Provided by the Cincinnati Police Department)***

In a review of 56 felonious assaults in Cincinnati, Ohio from 2010-2013, nearly all (53) occurred within 350 feet from drug arrests, 34% (18) occurred within 350 feet from known gang territory, 15% occurred within 350 feet from a person shot, and 31% (16) occurred within 350 feet from a liquor establishment. 52% (27) of assaults involved a firearm, 32% (17) involved an attack with a vehicle, 13% (7) involved assault with a knife, and 4% (2) involved an attack with personal weapons (feet, teeth or hands). Regarding location type, 62% (33) occurred in the street, 21% (11) occurred in parking lots, and 9% (5) occurred in bars. Less prominent location types were (4) multifamily apartments, (3) yards, (1) a single-family home, and (1) a wooded area. These data provide evidence pointing to liquor stores, drug markets, gang territory and public spaces such as streets and parking lots as the most prominent spatial risk factors for felonious assaults on law enforcement in the city of Cincinnati.

***Discussion***

Several general recommendations emerge from the findings presented in this report, which provides a cogent justification for immediate safety reforms.

Recommendation 1: *Improve record keeping of incidents of near misses, felonious assault and death.* Better record keeping of incidents documenting violence against law enforcement is in order with a broad scope that captures near misses, light physical contact, injury or death, even if criminal charges are not warranted. It is recommended that departments incorporate recording keeping that details physical features of the environment during any instance in which force is used during a police-citizen encounter. For instance, if incidents occur frequently inside a building, careful documentation could reveal common features such as sharp turns, narrow stairwells, or unsecure handrails that will illuminate important information for future training and decision-making. This paper presents a compelling case for including spatial risk factors in data collection endeavors. Features of the physical environment interact with a host of other characteristics to either exacerbate or attenuate the risk of physical harm presented to law enforcement.

Recommendation 2: *Keep dispatch up to speed about spatial risk factors in your beat or district*. Information about circumstances of the physical environment relayed to officers deployed to a potentially dangerous situation enables effective and safer completion of police duties. It is recommended that dispatchers periodically review spatial and situational risk factors for officer injury and relay these risks to officers at the time officers are en route to calls for service at potentially dangerous places.

Recommendation 3: *Not all calls for service are created equal*. The spatial risk factors presented in this report illustrate that the same calls may present substantially different levels of risk of injury or death depending on the incident location. Risk is structured by environmental factors that are different for each incident regardless of whether it is the same type of call. Identifying risk factors for potential violence against police can help dispatchers and patrol officers approach situations with greater caution. Articulable knowledge of risky contexts could inform officers of imminent risks so they can respond to calls and manage scenes



accordingly. For example, certain types of calls at certain places may necessitate particular responses whereas either the place or the call type, alone, would not.

Recommendation 4: *Collaborate with members of the community who can assist in changing the physical environment to reduce risk of injury to police*. Landlords, storeowners and other community members are in control of many features of the physical environment known to elevate risk of injury to law enforcement. Enforce municipal and state regulations regarding building zoning, maintenance and repair to ensure safety in environments prior to an encounter with a potential suspect.

Recommendation 5: *Conduct routine trainings to practice skills of assessing scene safety and known spatial risk factors that are particular to micro places within a jurisdiction.* Refreshers in training about new or chronic environmental hazards to police can complement the discretionary judgment bestowed by years of experience (and "kick in" instinctively during times of crisis or rapid decision-making).

Recommendation 6: *Perform local assessments of data and micro level factors that may put officers at risk of injury.* Prepare and review up-to-date maps of features of the built environment that create unique behavior settings for officer injury. Crime analysts are a vital resource for incorporating spatial risk into the routine practices of policing jurisdictions across the United States. Information about risky places for officer injury should be made available in advance in order to warn or inform police officers responding to calls for service, as needed. On a ride-along during a site visit for one of the author's research projects, a 911-caller reported "shots fired." Police were dispatched to the reported location of this priority call. En route, officers were advised to use caution because call histories and other intel (referenced and analyzed in real-time) suggested that this call might be a "set-up," given its location. Officers responded accordingly.

Recommendation #7: *Connect temporal and spatial risk factors, specific types of calls for service and felonious assault.* At the moment, federal data sources on felonious assault to law enforcement do not connect specific types of calls for service such as domestic disturbance, bar fights, or gang violence to time of day. At the local level, crime analysts and police administrators can link detailed spatial and temporal information with types of calls for service when reporting felonious assault on law enforcement. Furthermore, landlords, superintendents, and business owners are often well versed in the temporal activity that occurs on or around their properties. Active dialogue with these stakeholders can facilitate a better understanding of the temporal clustering of crime and can be used to supplement or contextualize official reports of officer injury. Moving forward, such data and information can assist police personnel in their efforts to prioritize risk in real-time.



*Case Study #3 in Aggravated Assault/Battery: Chicago, IL (Provided by the Chicago Police Department for NIJ project #2012-IJ-CX-0038)*

**Aggravated battery with a weapon (non firearm)** occurred 110 times to Chicago police officers in 2012. A risk terrain model was produced using the RTMDx Utility (rutgerscps.org/software) to diagnose the spatial factors common to all of these incidents. Results indicate that police officers handling calls for service at places within a high density area of apartment complexes (bandwidth = 1 block) have 5.5 times greater risk of battery with a weapon, compared to places absent such concentrations of features. Calls for service located at places with a high density of problem buildings (bandwidth = 2 blocks) have 3.7 times greater likelihood of battery against police officers. Calls for service at places within 3 blocks of gang territory have 3 times greater likelihood of battery against police officers. Places within 2 blocks of liquor stores have 2.8 times greater likelihood of battery against police officers. So, results suggest that apartment complexes, problem buildings, gang territory, and liquor stores are the most prominent spatial risk factors for aggravated battery with a weapon against law enforcement in the City of Chicago (23 total potential risk factors were tested for significance). In areas where the spatial influence of these 4 risk factors co-locate, the expected rate of aggravated battery w/ a weapon to police officers is as much as 174.2 times greater. (See Figure, below)

A second risk terrain model found that places within a dense area of problem buildings (bandwidth = 3 blocks), 3 blocks from gang territory, or within 1 block from a foreclosed property, respectively, more than tripled (3x) the likelihood of **aggravated assault/battery with a gun** (n=76 in 2012) against police officers. The risk to officers is highest where these features co-locate. A third risk terrain modeling found that **serious injury** (n=26 in 2012) to police for all types of aggravated assault/battery incidents occurred near bus stops and problem buildings. The expected rate of serious injury to police officers is 78.6 times higher when calls for service are at places where these two risk factors co-locate.

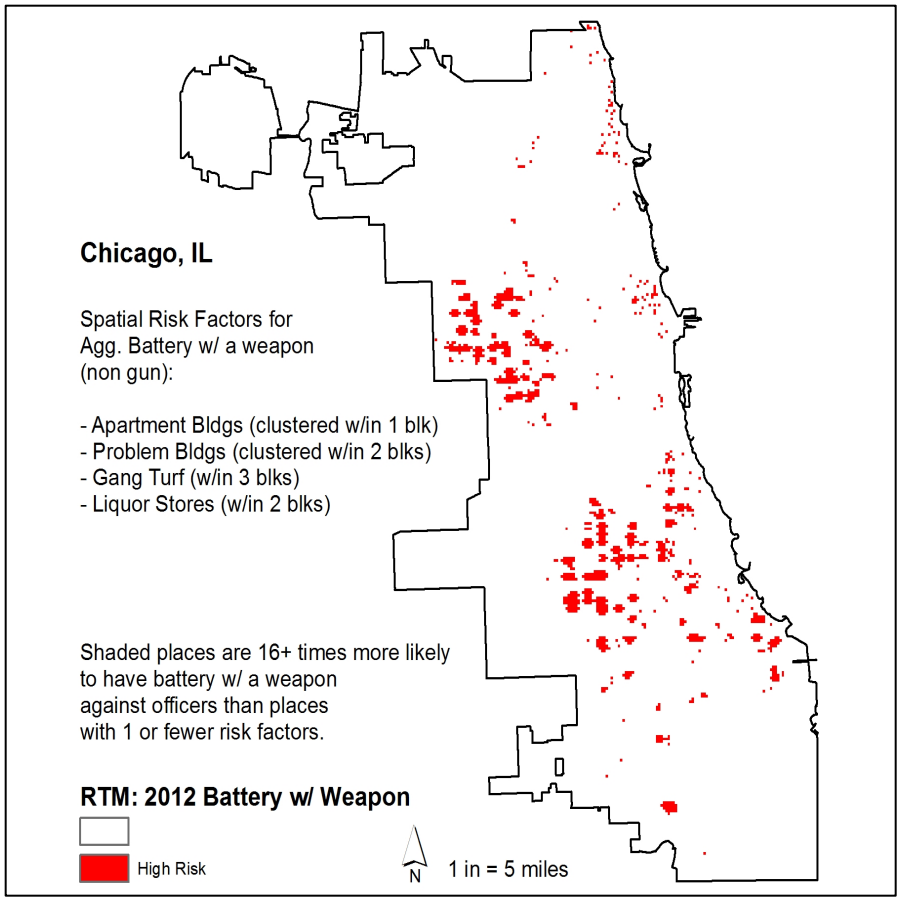



Figure (Right): See Case Study #3



*Conclusion*

This paper sheds insight into factors that place law enforcement officers at risk of fatality and injury due to suspect force. Law enforcement officers routinely encounter situations laden with the possibility of physical harm or death. Several recommendations were discussed with potential to attenuate the threat presented by certain features of the built environment. Spatial risk assessment facilitates a judgment of the degree of threat presented by specific types of calls for service. Adding a temporal element can improve officers' assessments of scene safety. Understanding threats presented by certain features of the built environment empowers emergency dispatchers, patrol officers, and law enforcement administrators with the knowledge to better protect themselves when responding to calls for service in the community.

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**Key Sources of Data**

Law Enforcement Officers Killed In Action: Center for Study of Law Enforcement.
National Law Enforcement Offices Memorial
California Peace Officers Memorial
Force Science
FBI Law Enforcement Officers Killed in Action Statistics
Center for Disease Control Bureau of Injury Prevention

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