"THE PATROL RIFLE/CARBINE"

A MORE SUITABLE PATROL LONG GUN

E.M.U SCHOOL OF POLICE STAFF AND COMMAND

SERGEANT CRAIG BAULDRY
CANTON TOWNSHIP POLICE DEPARTEMENT
CANTON, MI

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ABSTRACT

Currently throughout the United States most police departments carry a 12-gauge pump shotgun in the passenger compartment of most all patrol vehicles. It has historically been law enforcements primary patrol long gun.

In recent years and in several devastating incidents, the shotgun has shown its age. Due to its limitations and lack of versatility, police administrators must consider other weapon systems. The shotgun is becoming an aging technology that can no longer be solely relied upon.

The concept of the patrol rifle/carbine is aggressively gaining popularity amongst police officers. It has few limitations and can be extremely versatile. The purpose of this research project is to show that the patrol rifle/carbine is superior to the shotgun and it should become the primary patrol long-gun. Many police departments are adopting the patrol rifle/carbine, however they are using it in a limited capacity. Most agencies are not carrying the patrol rifle/carbine in the passenger compartment of the patrol vehicle, which presents a problem. The research in this paper will clearly show why the patrol rifle/carbine should be immediately available to patrol officers.

Furthermore, it is imperative for police academies to implement a basic patrol rifle/carbine user and deployment course so recruits can develop basic rifle marksmanship skills and proper training mentality early on in their career. The research in this project will be used to seek patrol rifle/carbine curriculum in Michigan police academies.

Research for this project was derived from experts in the field that have written books and articles on the patrol rifle/carbine. A survey was distributed in the 2003 Eastern University Police Staff & Command School to obtain raw data on the percentage of departments currently carrying the patrol rifle/carbine and in what capacity. The survey also elicits information to determine current deployment capabilities of the shotgun and training/qualification standards. Furthermore, the survey will show knowledge levels pertaining to the patrol rifle/carbine and its capabilities. In addition, questions were asked to determine if the command group felt the patrol rifle/carbine could be used by all patrol officers and if it should also become academy curriculum. Finally, questions were asked to determine how they felt about the shotgun and whether they would give it up for a more suitable alternative such as the patrol rifle/carbine.

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INTRODUCTION

Historically for several decades the shotgun has been the patrol long gun of choice. It is some way or another secured in the passenger compartment of most all patrol vehicles and most all patrol officers receive some training in its use and deployment.

The shotgun is reasonable in price and due to its short- range over- powering multi-projectile capability; the law enforcement community has perceived the shotgun as a weapon that has good stopping power.

Experienced shotgun users and enthusiasts alike may defend the shotgun as most suitable for law enforcement use and be resistant to change just like many who fought to keep the revolver. Nevertheless, in an age where technology grows at a feverish pace, the shotgun in recent years has showed its age in volatile police shootings. As technologies grow, societies will change and in order for police to protect citizens and themselves they must change as well.

The concept of a police patrol rifle/carbin is aggressively gaining popularity amongst police. The .223 caliber bullet fired from the patrol rifle/carbine has few limitations compared to the shotgun and it can be extremely versatile. This versatility comes with a price, as the patrol rifle/carbine is approximately 3-4 times more expensive than a shotgun. Moreover, the patrol rifle/carbine requires more initial familiarity training and sustained training. It will only take attending one police funeral to realize the additional cost and training is well worth it. The purpose of this research paper is to show that the patrol rifle/carbine is superior to the shotgun and it should become the primary patrol long gun. The evidence will show that the patrol rifle/carbine should not be in the SWAT

truck waiting for deployment. Nor should it be in just one specialized vehicle within a police municipalities patrol force. The patrol rifle/carbine needs to be in the passenger compartment of all patrol vehicles. It should be in a gun locking rack that will allow officers immediate access.

The research in this project is a complete examination to show why the patrol rifle/carbine is a superior weapon system to the shotgun and why it must be immediately available to patrol officers. This project is also designed to convince police academies and governing boards why it is critical to implement patrol rifle/carbine training within the academy curriculum.

Results from a survey that was provided to several command officers throughout Michigan will provide raw data showing where the law enforcement community currently is in way of patrol rifle/carbine utilization. Additionally, the survey will show if command officers are knowledgeable in the versatility and capabilities of the patrol rifle/carbine; and whether or not they still believe the myths surrounding the .223 rifle round. The survey also examines the various departments training practices with the shotgun and whether or not it is sufficient in comparison to basic rifle training standards.

The survey also asks questions to determine how attached the command officers are (having been patrol officers) to the shotgun and if they are willing to accept change. Finally, the survey group was asked how they felt about the patrol rifle/carbine becoming academy curriculum and whether or not new recruits could become competent with it.

BACKGROUND AND SIGNIFICANCE

The shotgun has great stopping power and due to its buck shot capability it can fire multiple projectiles, which allows more probability of hits on target at close range. This concept of multiple projectiles and probability of hits might be attractive; but it can also be a double-edge sword as the law enforcement community has adopted the shotgun as a point and shoot weapon system. Many law enforcement agencies receive limited training with the shotgun and some have no qualification program at all. To allow officers to carry such a devastating close quarter weapon, and with minimal to no standards, can have serious consequences in today's sue happy society.

Moreover, a survey identified later in this research paper will show that statistically most police departments in Michigan do not have fixed mounted light systems on their shotguns nor do their shotguns have rifle metallic sights. Additionally, many of the police departments without lights and proper sights also do not receive training on how to hold a flashlight and simultaneously manipulate the pump action on a shotgun. This lack of equipment and/or training can have serious results. Statistically, a high percentage of police shootings occur within dark hours and a point & shoot practice in low-lighting conditions is a recipe for disaster. When you add such variables as moving targets and stress, accuracy can quickly diminish.

Military soldiers in times of war can spray indiscriminate rounds at the enemy. Police Officers are trained from the beginning of their careers to clearly identify a deadly force threat before engaging. Firing multiple indiscriminate rounds is unacceptable. Furthermore, a police officer must also ensure that the backdrop is safe prior to firing.

The media, local prosecutors and the officers department will closely scrutinize incidents where innocent people are shot by a police weapon. Serious criminal and civil consequences can follow--police officers are held to a very high standard.

Although the shotgun historically has been the weapon of choice, influences such as new technology and changes in societal values can cause big changes in the way police do business. Twenty years ago most all police agencies carried six-shot revolvers until the semi-automatic handgun began to make huge technological advancements and caused a revolutionary change in what police officers carry today as their primary on duty weapon. In fact, one of the most popular handguns used today is partially plastic (glock) and caused great debates when first introduced. Nevertheless over time and extensive testing; it proved to be one of the best weapons available and at an excellent price.

More than ever females are choosing police work as a career. Nowadays it is not uncommon to see a female police officer on patrol. The shotgun has harsh recoil and can bruise even the strongest of men. Officers have dislocated their shoulder or have been severely bruised firing the shotgun. Furthermore, the harsh recoil can be distracting and cause one to flinch at the moment the hammer drops. Moreover, the pain and distraction can briefly take one out of the gunfight. The harsh recoil and necessity to use both hands to manipulate the pump shotgun make it non-user friendly.

In the past 25 years, the law enforcement bullet resistance vest has gained amazing technological advancements. The push to invent the best vest has caused many a company to throw their hat in the ring. Although the bullet resistant vest has been a great invention for the police, it has also become a weapon against police, as it is easy nowadays for the bad guy to obtain a vest and a vest that will defeat the 12-gauge

shotgun. Furthermore, vests these days can be undetectable under basic everyday clothing. Unfortunately in 1997 Los Angeles police officers discovered they were ill prepared to deal with 2 bank robbers wearing body armor wielding fully automatic rifles. This incident sparked the debate to deploy alternative weapon systems. In order to deal with more sophisticated criminals and their abilities to access new technology, police thinking had to change.

Even though in recent years the patrol rifle/carbine has gained popularity, the concept is not new. The patrol rifle/carbine has been used in rural patrol areas for years. It was thought of as an excellent alternative in the wide-open rural areas where longer than normal engagements were possible.

Over the years, due to technological advancements and constant improvement in nomenclature and ammunition the patrol rifle/carbine has become a weapon so versatile that it can be used in most all circumstances that a patrol officer could face. There are several patrol rifle/carbines. One that is current and a most popular choice is the AR-15 model. The AR-15 is lightweight, compact and has excellent tactical ergonomics in way of weapon manipulation and maneuverability. It is very accurate and reliable. Three companies are known to make the AR-15, making it easily assessable.

Unfortunately, the patrol rifle/carbine isn't without problems as it is plagued with misconceptions. As Suarez (1999) reported, "There have been many misconceptions about the .223 rifle round in law enforcement. One of these is that such a round is dramatically over-penetrative and likely to traverse several city blocks before stopping." (P. 35)

Even the word “rifle” leads many to believe that such a weapon is for military use only. Unfortunately, many uninformed people have voiced concerns on the police obtaining such equipment. Later in this research project the over penetration myth will be examined more closely.

LITERATURE REVIEW

Many law enforcement articles have been published throughout the country describing the necessity for the .223 carbine. Many of these articles embracing the .223 rifle/carbine round surfaced due to the rise of active shooters. Administrators are beginning to realize that you can’t wait for SWAT when citizens are being murdered. And you can’t send police officers in against heavily armed or armored assailants without a fighting chance. In the past few years, The National Tactical Officers Association has published many articles in their quarterly magazine. Moreover, the Illinois Tactical Officers Association has a large membership and they too publish a quarterly magazine that also has several articles on the patrol rifle/carbine.

In addition, several law enforcement officers that have specialized as sharpshooters or have had prior military experience have stepped forward to publish books on the use and deployment of the patrol carbine. One such Author is Gabriel Suarez, “The Tactical Rifle”. Suarez writes in detail dispelling the myths that surround the patrol rifle/carbine rifle. Suarez’s book is an excellent manual as it relates to this particular rifle. It outlines easy to understand ballistics, rifle marksmanship, weapon manipulation, shooting positions, proper training and qualification procedures.

Richard Fairborne authored a book on Police Rifles in 1994. Two chapters are dedicated to the patrol rifle/carbine and its importance. Fairborne discusses the problems with the shotgun and why it is NOT an ideal second weapon for police agencies.

Lastly, an expert in the field was consulted. Sgt. Jeff Felts is a 12-year veteran of the Plymouth Twp. Police Department. Felts is a former army infantry drill instructor. Felts served 10.5 years with the Western Wayne County Special Operations Unit. Within this unit, he held many rifle assignments: Master Sniper and Sniper Team leader, Special Weapons and Tactics Instructor and tactical rifle instructor. Felts is the President of "Center Mass Inc." Felts has written extensive training manuals and standards for the patrol rifle/carbine. His manuals directly compare the advantages of the patrol rifle/carbine over the shotgun.

PROCEDURE

The purpose of this research project is to clearly convince the law enforcement community that the patrol rifle/carbine should replace the traditional 12 gauge pump shotgun in the passenger compartment of all patrol vehicles and that police officers should receive training on the patrol rifle/carbine as early as the police academy. This research is not designed to eliminate the shotgun all together as it has excellent application as a less-lethal delivery system. The shotgun can also be considered for certain tactical conditions; but the patrol rifle/carbine should be first choice in the passenger compartment allowing officers immediate access.

A survey was sent out to 58 police command officers throughout Michigan. This was accomplished through the 2003 Eastern University Staff & Command School. The

purpose of the survey was to gather data to determine where the law enforcement community currently is in reference to deploying the patrol rifle/carbine within the patrol force. The survey was also designed to illicit information on current shotgun training standard; are officers educated in understanding the true potential of the.223 rifle round; are officers resistant to change; are officers confident that new recruits can learn the weapon system; and are officers ready for a standard academy curriculum. Fifty- eight surveys were distributed and forty-five of the surveys were received. Officer and agency names were not required although some did provide this information. The survey consisted of thirty-six questions. The first twenty-one questions are designed to determine the following: 1.) What the officer's home agency uses in way of a patrol long gun and where in the patrol vehicle is it carried? 2.) Does their patrol long guns have fixed mounted light systems, and if not, do they provide routine training on how to hold a flashlight and manipulate the shotgun? If a shotgun is deployed does it have rifle sights? 3.) What is the agencies standard in way of maintenance training and qualification? Did they receive training in the police academy and was there a qualification standard with the shotgun? And 4.) Does their home agency provide a user course to new employees for the long gun system (s) used?

The remaining questions were designed to assess the officer's knowledge of the patrol rifle/carbine and opinions on both the shotgun and rifle: 1.) Are the officers comfortable and confident with the shotgun? 2.) Do the officers believe for the most part that all officers can use and carry the patrol rifle/carbine or should it only be a specialized piece of equipment? 3.) Can new recruits be trained on the patrol rifle/carbine and be efficient with it? 4.) Should the police academy provide a user patrol rifle/carbine

curriculum? 5.) Does the additional cost of the patrol rifle/carbine outweigh the potential of lives being saved? And 6.) Are the officers so personally attached to the shotgun that they are unwilling to try something different even if it is a better alternative?

The research identified in this project will show that the patrol rifle/carbine is clearly a better and more suitable long gun system then the shotgun. The question then remains, why are the majority of police departments still utilizing the shotgun as the primary patrol long gun? The survey provided facilitates some answers as to why this is occurring.

In order to properly evaluate the patrol rifle/carbine, expert opinions were sought through law enforcement articles published in various magazines. A very popular and well-respected organization is the National Tactical Officers Association. The NTOA publishes a quarterly magazine for its members. The magazine features articles on problems the law enforcement community faces throughout the nation. One current problem that the NTOA has thoroughly discussed is “The active shooter” problem that has plagued the nation. These articles discuss the absolute necessity of the .223 patrol rifle/carbine and why the shotgun falls short of being ideal. These articles and expert opinions will be reviewed in detail.

The patrol rifle/carbine as with all rifles has distinct and specific marksmanship shooting fundamentals. Many experts in the area of rifle marksmanship have written books describing the training methodology necessary to have success with rifle systems in general. Their opinions on what should be required in way of the patrol/rifle carbine, standards, and qualification procedures will be compared to the current accepted shotgun training standards commonly practiced in police departments.

In addition, Felts' training manuals provided extensive information on the actual differences in the patrol rifle/carbine and the shotgun. Felts provided information outlining the strengths and weaknesses of both long-guns.

APPENDIX A

Survey letter and questions

Hello everyone, my name is Craig Bauldry - Police Sergeant with the Canton Police Department. My Staff and Command research paper is on the Patrol Rifle and why it should replace the traditional 12 gauge pump shotgun in patrol vehicles and become the new Law Enforcement "primary" patrol long gun.

Part of my research is to conduct a survey amongst various certified Police employees from several different Police Departments. There can be no greater opportunity than to utilize all of you to assist me with this research endeavor. It will be very important to the accuracy of my research if you answer all the following questions as honestly as possible. Please understand that I will not use your name or your departments name in my research paper. I will strictly use this survey to generate data for my research. In the near future, I may use my research as a means to convince MCOLES that a basic patrol rifle course should be taught to new recruits in the Police Academies.

**If you are not certain as to the answer for the first sixteen questions please consult with a department member to obtain a correct answer. Please answer the remaining questions to the best of your own ability.

Please complete the survey before the end of this week and place in my mailbox.

I would like to thank all of you for your assistance and I wish you all the best with your own research project.

Respectfully,

Sgt. Craig Bauldry

- My department carries a shotgun in the trunk with a patrol rifle in the passenger compartment of most all patrol vehicles. Yes No N/A

- My department carries a patrol rifle in the trunk with the shotgun in the passenger compartment. Yes No N/A

- My department only carries the patrol rifle in the passenger compartment. Yes No N/A

- My department only carries the shotgun in the passenger compartment. Yes No N/A

- My department doesn't carry the shotgun or the patrol rifle in the patrol vehicle. Yes No N/A

- My department carries the shotgun in the passenger compartment of patrol vehicles and deploys a rapid type response patrol vehicle 24/7 which carries patrol rifles and other specialized equipment. Yes No N/A

- Most all shotguns in the passenger compartment of our patrol vehicles have fixed mounted light systems. Yes No N/A

- Most all shotguns in the passenger compartment of our patrol vehicles have rifle metallic night sights. Yes No N/A

- Most all patrol rifles in the passenger compartment of our patrol vehicles have fixed mounted light systems. Yes No N/A

- Most all patrol rifles in the passenger compartment of our patrol vehicles have night sights. Yes No N/A

- My department doesn't have fixed mounted light systems on our shotguns but officers receive regular training on how to hold a flash light and function and fire the shotgun. Yes No N/A

- My department doesn't have fixed mounted lights systems on our patrol rifles but officers receive regular training on how to hold a flashlight and function and fire the patrol rifle. Yes No N/A

- My department carries shotguns in the passenger compartment of patrol vehicles and department policy dictates we <u>train</u>: 1. Annually 2. Bi-annually 3. Quarterly 4. We don't have set training. We periodically demonstrate how to function and fire the weapon 5. N/A

- My department carries shotguns in the passenger compartment of patrol vehicles and department policy dictates we <u>qualify</u>: 1. Annually 2. Bi-

annually 3. Quarterly 4. We don't qualify with the shotgun. We periodically demonstrate that we can function and fire the weapon. 5. N/A.

- My department carries patrol rifles in the passenger compartment of patrol vehicles and department policy dictates we train: 1. Annually 2. Bi-annually 3. Quarterly 4. We don't train with the patrol rifle. We periodically demonstrate that we can function and fire the weapon 5. N/A

- My department carries patrol rifles in the passenger compartment of patrol vehicles and department policy dictates we qualify: 1. Annually 2. Bi-annually 3. Quarterly 4. We don't qualify with the patrol rifle. We periodically demonstrate that we can function and fire the weapon 5. N/A

- When I went through the Police Academy, I received training on use & deployment of the shotgun. Yes No N/A

- When I went through the Police Academy, I had to qualify with the shotgun. Yes No N/A

- My department carries the patrol rifle in the passenger compartment of most all patrol vehicles and all operators must first attend and pass a certified user school instructed by a certified rifle instructor. Yes No N/A

- My department carries the shotgun in the passenger compartment of most all patrol vehicles and all operators must first attend a user school instructed by a certified shotgun instructor. Yes No N/A

- My department carries patrol rifles and other specialized equipment in a 24/7 rapid response type unit and all operators must attend a user school instructed by a certified rifle instructor. Yes No N/A

- My department doesn't carry the patrol rifle on patrol and I believe it is due to the over penetrating and long-range capabilities. Yes No N/A

- My department doesn't carry the patrol rifle on patrol and I believe it is due to the cost and the additional training it would require. Yes No N/A

- I believe academy recruits should receive training and certification on the use and deployment of the patrol rifle. Yes No I'm not sure

- When I was a patrol officer, I never really attained a high level of confidence with the shotgun and therefore I relied on my handgun and did not deploy the shotgun as much as I could have. Yes No N/A

- I believe the shotgun is too big and heavy. Its harsh recoil and pump manipulation can be distracting. I believe there should be something more suitable for Law Enforcement use. Yes No N/A

- I believe that all officers cannot be mandated to use and carry the patrol rifle, as it is complicated and difficult to master. It is a specialized piece of equipment for some but not for all. Yes No N/A

- I am familiar with the patrol rifle and believe if new recruits were trained from the beginning (academy) of their careers, it would simply become another piece of equipment they would become competent and efficient with. Yes No N/A

- The cost of patrol rifles and the cost of additional training are insignificant if it saves the lives of citizens and police officers. Yes NO

- I believe some day the shotgun will be phased out as the primary patrol long gun just as the revolver was years ago. Yes No N/A

- The shotgun is generally used for situations 35 yards and closer where hostages aren't involved. Yes No

- The patrol rifle would generally be used 35 yards and farther as it is not a close quarter combat type weapon. Yes No

- A skilled and trained patrol rifle officer could most likely fire 9 rounds within 3-4 seconds at 12 yards into the center mass torso of a hostile armed gunman. Yes No Not sure

- I'm very familiar, competent and happy with the shotgun but if someone proved to me that there is a better alternative for law enforcement needs, I would give it up. Yes No Never.

- A trained patrol rifle officer could most likely engage the head of a hostile armed gunman at 50 yards. Yes No Not sure

- A trained patrol rifle officer could most likely engage the torso of a hostile armed gunman at 100 yards. Yes No Not sure

APPENDIX B

Survey results listed by Chart number

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chart 1

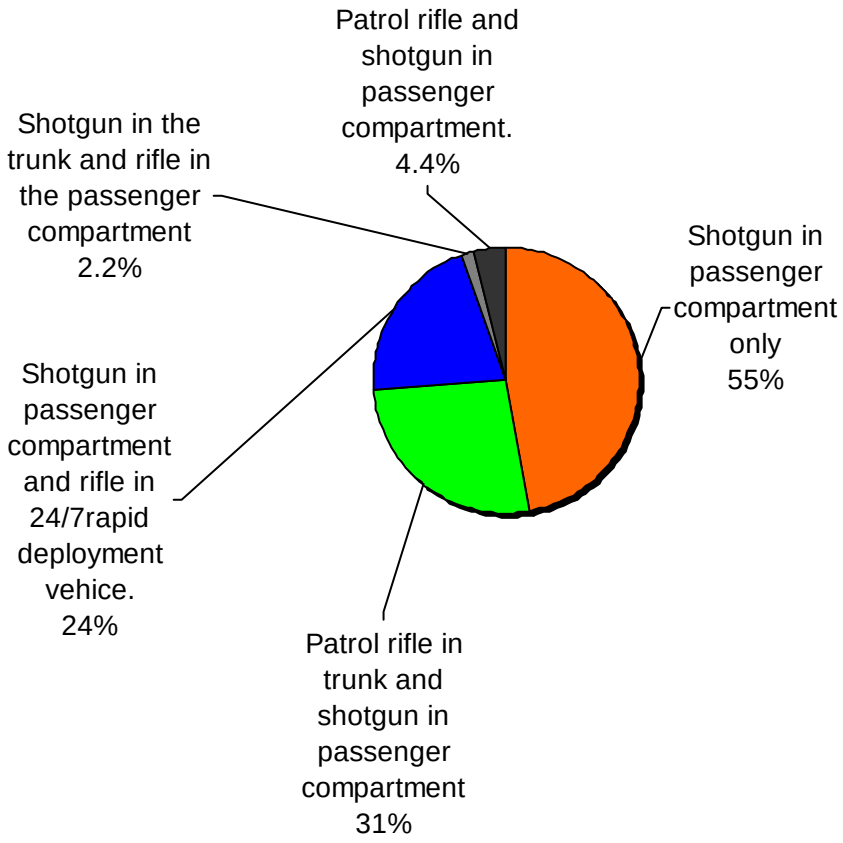

Patrol rifle and shotgun in passenger compartment. 4.4%
Shotgun in the trunk and rifle in the passenger compartment 2.2%
Shotgun in passenger compartment only 55%
Shotgun in passenger compartment and rifle in 24/7rapid deployment vehice. 24%
Patrol rifle in trunk and shotgun in passenger compartment 31%

Chart 2 Shotgun-Fixed mounted light systems.

Chart 3 Shotgun-Rifle night sights.

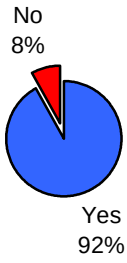


Chart 4 Rifle-fixed mounted light systems.

Chart 5 Rifle-metallic night sights.

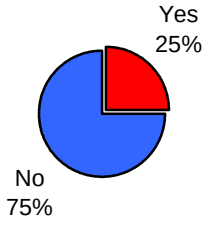


Chart 6 Rifle-do not have fix mounted light system but train regularly with holding flashlight.

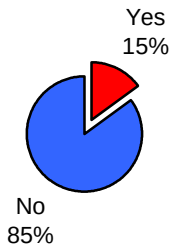


Chart 7 Shotgun-do not have fixed mounted light system but train regularly with holding flashlight.

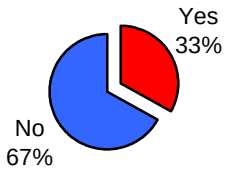


Chart 8 Shotgun training

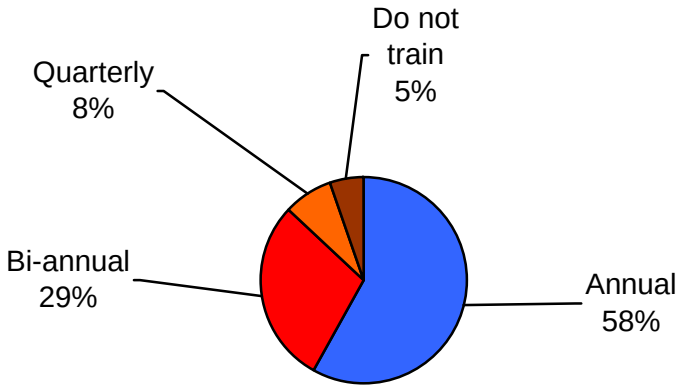


Chart 9 Shotgun qualifications

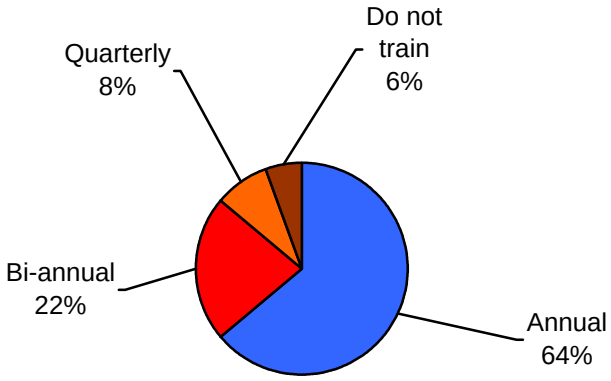


Chart 10 Rifle training

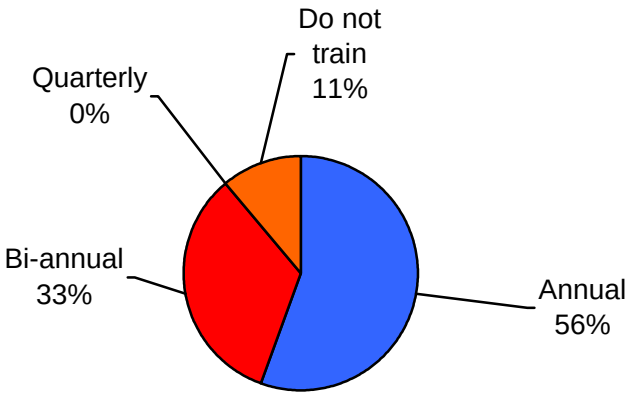


Chart 11Rifle Qualification

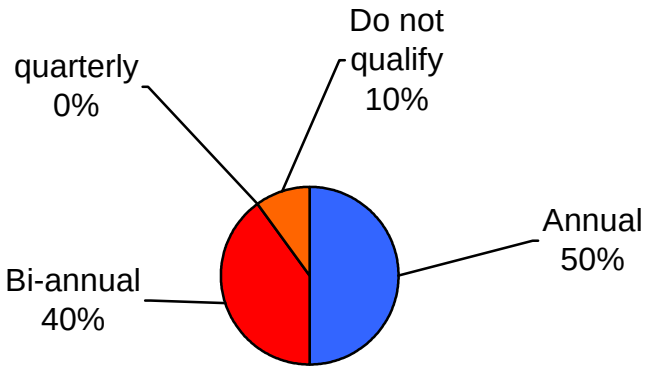


Chart 12 Shotgun-received training with shotgun in the police academy.

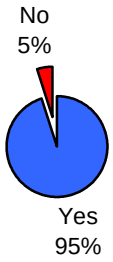


Chart 13 Shotgun –qualified with shotgun in the police academy.

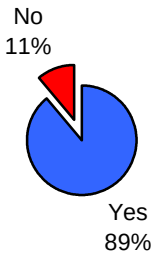


Chart 14 Rifle-carry patrol rifle in patrol vehicle and all operators must attend a user school.

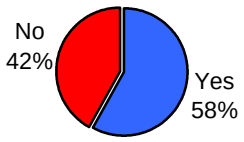


Chart 15 Rifle-carry patrol rifle in 24/7 rapid deployment vehicle and all operators must attend a user school.

Chart 16 Rifle-do not carry patrol rifle due to over penetration and long-range capabilities.

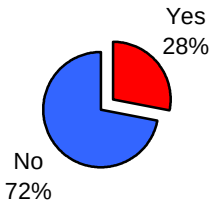


Chart 17 Rifle-do not use due to cost of rifles and training.

Chart 18 Rifle-academy recruits should receive training and certification on the use and deployment of the patrol rifle.

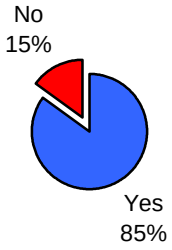


Chart 19 Shotgun-never really attained high level of confidence and most would rely on handgun.

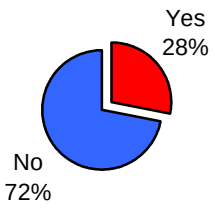


Chart 20 Shotgun-to big and heavy/harsh recoil & pump manipulation is distracting. Should be a better alternative of law enforcement use.

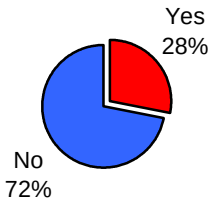


Chart 21 Rifle-can not mandated to use and carry, as it is complicated and difficult to master. It is a specialized piece of equipment for some but not for all.

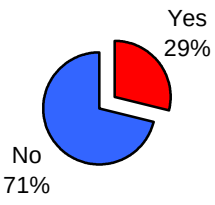


Chart 22 Rifle-if new recruits were trained from the beginning of their careers, it would simply become another piece of equipment they would become competent and efficient with.

Chart 23 Rifle-cost of patrol rifles and training is insignificant if it saves lives.

Chart 24 Shotgun-some day the shotgun will be phased out as the primary patrol long gun just as the revolver was years ago.

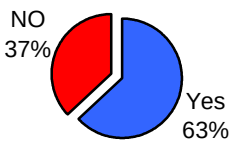


Chart 25 Shotgun-generally used for situations 35 yards and closer where hostages aren't involved.

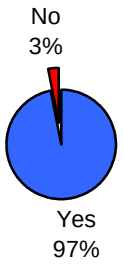


Chart 26 Rifle-generally used 35 yards and farther as it is not a close quarter combat type system.

Chart 27 Rifle-a skilled patrol rifle officer could most likely fire 9 rds. within 3-4 seconds at 12 yards into the center mass torso of a hostile armed gunman.

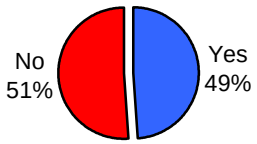


Chart 28 Shotgun-competent and happy with shotgun but if something is proven to be better--would give it up.

Chart 29 Rifle-a patrol rifle officer could most likely engage the head of a hostile armed gunman at 50 yards.

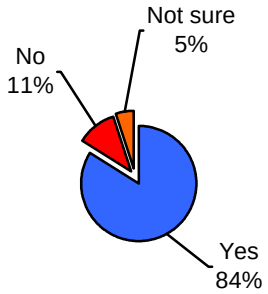
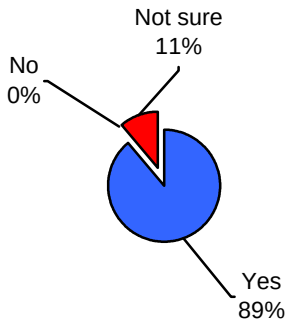


Chart 30 Rifle-a trained patrol rifle officer could most likely engaged the torso of a hostile armed gunman at 100 yards.



RESULTS

In order to understand why the .223 patrol rifle/carbine is most suitable as the primary law enforcement patrol long gun, a thorough examination of its origin and capabilities must be reviewed.

The carbine type rifle was first introduced post World War II. It was designed to be a midrange, semi-automatic, lightweight, and short barrel rifle. Overtime, improvements have refined the carbine into a multi-purpose assault rifle.

Most police agencies deploying a patrol rifle are using the AR-15 model made by Colt, Bushmaster or Armalite. Although there are other .223-chambered carbines, the AR-15 is most accepted. Suarez (1999) believed, “The simplest answer, financially, logistically, educationally, socially and even ballistically, is a version of the U. S. military service rifle” (P. 9)

The current military service rifle is the AR-15/M-16, which was designed by Eugene Stoner for Armalite in the late 1950’s. Armalite sold the manufacturing rights to Colt and in 1962 the U.S. Army Rangers were the first to deploy the AR-15-M16 in Vietnam.

The AR-15/M-16 was designed to be the new, modern military rifle. It was to replace the heavy and big 308 and 30-06 caliber rifles. It is made of light aircraft alloy reducing weight substantially. The magazine well and magazines are designed to be ergonomically correct for rapid reloading. Additionally, it was designed in .223 caliber to allow soldiers to carry more ammo with larger capacity magazines. The AR-15/M-16 proved to be a tremendous military advancement.

The AR-15 is a production sporting model of the original M-16 rifle designed by Eugene Stoner. The current military model is basically the same, only it has a selector position for fully automatic or burst fire.

The AR-15 features a unique gas operating system much different from conventional systems. This system eliminates the necessity of an operating rod used in conventional gas operated rifles. The result is a lighter weapon with reduced maintenance problems.

The AR-15 also features straight-line construction. The barrel, bolt, recoil buffer, and stock are assembled in a straight line. The light recoil of the .223 cartridges, along with the straight back recoil, reduces rifle climb substantially.

The AR-15 features simplicity of operation in any weather condition. The bolt, magazine release button, and selector switch are fingertip operated. The weapon requires a minimum amount of care and can be field striped using a .223 caliber bullet. The corrosion-resistant materials used in the construction of this weapon provide “long parts life” and offers functional reliability with routine care and maintenance.

> Parker (2003) noted, “the Stoner system is found in the patrol vehicles of U.S. Law Enforcement.” Three years into the new millennium, the patrol rifle concept has proven itself to be more than a passing fade. Contrary to the self-anointed “experts” prediction that the police use of the patrol rifle was a knee Jerk reaction to the North Hollywood firefight (Bank of America, Feb. 1977) and that we in law enforcement would soon realize the error of our ways, the
>
> patrol rifle is here to stay. In fact, more and more agencies have concluded this

> by the hard heard lessons of themselves and others. The Bank of America experience was no anomaly of the 1990's and there are many more serious and heavily armed criminals (both foreign and domestic) to be dealt with in the new century. (p. 66)

> Suarez (1999) emphasized, "The .223 rifle offers better opportunity at stopping suspect in comparison to the handgun, submachine gun or shotgun (at greater distances) "Minimum rounds equals minimum force." This is a very attractive concept in our litigious times." (P. 3)

The .223 caliber round will also defeat most body armor and will reduce the probability of an assailant to continue a hostile threat after being hit. Additionally, most light cover objects such as window screen and grass can be penetrated while over penetration through medium barriers such as wallboard doesn't occur. Moreover, missed shots or rounds that traverse suspects are less of a hazard to innocent bystanders than pistol ammunition because of the design of the bullet. Furthermore, officers may not find it necessary to deploy within 25 yards of a hostile situation, as they would have normally with a handgun or shotgun. Suarez (P. 3)

The patrol rifle/carbine has increased accuracy over the handgun and shotgun at close and long range. The patrol rifle/carbine will be the most precise weapon available for first responders. With proper training patrol rifle/carbine officers should be able to engage targets from 100 yards in the prone position, 75 yards in the sitting position, 50 yards kneeling and from 25 yards and closer in the standing position. Furthermore, if a

hostage situation developed officers using the patrol rifle/carbine would have a much better opportunity for success than a handgun or shotgun. Felts (P. 2-4)

The patrol rifle/carbine will penetrate most soft body armor where the shotgun and handgun will not. Shotgun and handgun rounds are larger bullets and the momentums of these bullets are slower than a rifle round. Layered kevlar dissipates the larger rounds energy (size, mass, momentum). Felts (P. 2-4)

The patrol rifle/carbine can enhance an officer's safety. Perimeter positions can be extended while maintaining accuracy. Handgun and shotguns using 00 buck are virtually ineffective beyond 25 yards. High-risk felony stops may be conducted with greater distances between the suspect vehicle and scout cars without reducing accuracy. Additionally, when building clearing or in close quarter combat, officers will find the patrol rifle/carbine easier to maneuver and balance than the 12 gauge shotgun. Furthermore, the semi-automatic patrol rifle/carbine will allow an immediate follow-up shot from any shooting position. Unfortunately an immediate follow-up with the shotgun is delayed due to the pump action being necessary. Moreover, the weapon retention "danger close" corner clearing method is much easier with the patrol rifle/carbine due its smaller size, weight and semi-automatic capabilities. (P. 6)

Chart 26 (Appendix B) shows that 43% of command officers surveyed felt the patrol rifle/carbine is generally suitable for 35 yards and farther as it is not a close quarter combat weapon.

The patrol rifle/carbine increases safety for innocent citizens through its inherent accuracy and superior ballistics reducing the possibility of a down range hazard or over penetration. One round accountability per squeeze versus nine .32 caliber bullets fired

with one trigger squeeze using the shotgun with 00 buck is the better choice. 00 buck will spread approximately 1" for every yard it travels. (20 yards=a 20" shot pattern). On the other hand, the shotgun slug increases range and reduces the number of projectiles to one per shot but over penetration of the human target and intermediate barriers become a probability. (P. 7)

Felts (2003) suggested, "Increased weapon proficiency, bigger ammunition capacity, ease of operation, and less painful to shoot help to increase the officer's confidence, which lead to the probability of success and in return reduce liability." (P. 7)

In connection with Felts (2003) suggestions and in reviewing the survey response, Chart 3 (Appendix B) illustrates that only 8% of the command officers surveyed indicated their shotguns have rifle sights. Therefore, it must be noted here that to have increased accuracy with any rifle slug, it is important to have a rifled barrel and a rifle sight.

Terminal Ballistics

In order to understand the .223 rifle round capability and to dispel the myths that surround it, a basic understanding of ballistics must be reviewed and more specifically terminal ballistics. Many doctors and scientists along with the military and police agencies have conducted extensive research on the topic; and after all the material is reviewed, a clear picture of the .223 caliber round and what happens when the round makes contact with a medium is presented.

Ballistics can be broken down into three segments. The first is internal ballistics, which deals with what occurs from trigger press to the time when the round exits the muzzle. Next is external ballistics, dealing with the flight or the projectile and the environmental effects on the projectile. Finally, we have the study of terminal ballistics. Which deals with what happens when the projectile strikes its intended target and continues its travel until its forward motion stops. In order to dispel the over penetration myth, terminal ballistics will be most discussed.

When a bullet traverses the body, it destroys tissue, blood vessels and may break bones. This creates a permanent wound track, also called a permanent wound cavity. This wound cavity needs to be deep enough to reach vital organs. Three different factors affect the severity of this wound.

The first factor, when a rifle round is fired and the bullet is propelled down the bore, the bore's rifling imparts a gyroscopic spin on the bullet. This spin is required to stabilize the bullet during flight. This spin is not perfect, and most rifle rounds tend to yaw, or deviate slightly from a perfect point-forward position during flight. Suarez (1999) emphasized, "that the round is not "tumbling" in flight. The portrayal of the .223 tumbling end over end in flight is yet another myth." (P. 36) The .223 round will yaw about 1 to 2 degrees, so that its long axis makes a slightly greater angle with the line of travel. But when the bullet strikes a human body, the yaw also creates a greater amount of tissue contact. Only when these bullets strike the body, the yaw may be enhanced as much as 180 degrees as it travels through tissue; sometimes ending up base forward causing a greater circumference of tissue contact.

The second factor; affects the severity of the wound and the ability of a projectile to expand. Expanding projectiles tend to damage more tissue by making a larger orifice. It is important; however, not to choose a round that expands too soon or too much, as this may mitigate penetration. Penetration is vastly more important than expansion when it comes to reaching deeper vital organs. If a bullet expands too quickly, it may never get to anything that resembles a vital organ.

The bullet's pointed shape makes it heavier at its base than at its point, so that its center of gravity is at the rear of the bullet. When the bullet meets resistance, it attempts to rotate 180 degrees around its base to achieve a stable base-forward orientation. The stress of tissue resistance to the bullet's passage often overpowers the physical integrity of the bullet. This may cause the bullet to shed its jacket or bend at the cannelure (the point where it is crimped into the brass case), thereby enhancing the wound channel even more.

The third factor; bullet fragments may come off the projectile itself and move radically away from the line of travel, in turn creating their own wound cavities. The .223 round creates a dramatically large permanent wound cavity due to these dynamics. Suarez (P. 37)

Suarez (1999) observed testing conducted by Bill Jeans and published in The Tactical Edge magazine NTOA, the only calibers that did not exit a "house" (as simulated for the test), were .223 softpoint and hollowpoint bullets. Moreover, the full-metal jacket (FMJ) M-193 bullets showed no more penetration than the standard pistol bullets in service (9mm, .40 S & W, and .45 ACP) (P. 37)

Suarez (1999) consulted with other testing conducted by the FBI. The FBI shot heavy clothing, steel plates, wallboard, plywood, light clothing, automobile glass, interior and exterior walls, as well as body armor. Their findings indicate the following: 1.) Soft body armor is no barrier against .223 bullets. 2.) With the exception of a full metal jacket bullet; it is not a good idea to select the .223 for vehicular assaults as its penetratation against automobile safety glass is generally poor, and only slightly better than on sheet metal, and 3.) Common barriers found in a residence, such as wallboard, plywood, or internal/external walls, are more easily penetrated by pistol calibers or large-bore rifle calibers such as the .308 (even in cases where such barriers have been penetrated, the wounding potential of the rounds is greatly reduced when compared to pistol calibers). These tests also indicate that the high velocity .223 round may shatter if it strikes a hard object that offers strong resistance, such as concrete or brick. In such cases, since the bullets tend to break-up ricochets are generally less hazardous. This means that concerns about over penetration and the danger to the populace presented by missing rounds have been greatly exaggerated, and that the 5.56mm/.223 is relatively safer than pistol bullets for everyone in the close-quarter battle (CQB) application. (P.38)

Moreover, testing conducted by the Snohomish County Sheriffs' office, which showed that after exiting similar walls, the .223 bullets would only penetrate 5 ½ inches of gelatin, compared to nearly 20 inches for pistol bullets! Apparently, when the .223 was shot through a wall it began to break up and fragment, which reduced its penetrative characteristics. Suarez (P. 38)

Chudwin (2001) noted, others argue that rifle cartridges are too dangerous in the urban environment because of distance the bullet can travel. Consider

> the maximum range of the following rounds as listed in the Winchester ballistics tables: .223 Remington/8300 feet, .357 mag/7100 feet, 9mm/6800 feet, 12 Ga. 00 buck and 12 Ga. 1 oz. Slug/1830 feet. While the rifle round has a potentially greater range, al projectiles fired from any type of police firearm will travel more than a third of a mile. Any stray round is a hazard, and it is illogical to claim that one type firearm is more or less dangerous than another based only on the maximum range of the round fired from it. The key issue is, what is the penetration and ricochet potential for the bullet type and caliber in a residential area? Against all common folklore, the .223 Rem. cartridge loaded with hollow point or soft point bullets, penetrates significantly less against residential wall construction, and poses far less ricochet problems than does typical law enforcement pistol and shotgun rounds. (P. 19)

Barrel length and proper ammunition is key to the amount of penetration desired. If velocity is decreased, bullet fragmentation will be reduced thereby reducing wound severity. Rifles will exhibit this performance if impact velocity is a least 2,700 feet per second (fps). This means that such performance may be expected with 20-inch-barreled rifles out to 150 yards, and with 14-to-16-inch-barreled rifles out to 775 yards. If the impact velocity decreased to less than 2,700 fps (about 200 yards for the 20-inch barrel, and 150 yards for the 14-to-16-inch barrel), the bullet may break at the cannelure, but no fragmentation will occur. This will decrease the effectiveness of the round. Below 2,500 fps, i.e., beyond 200 yards for the 20-inch barrel, or 150 yards for the 14-to-16-inch

barrel, there will not be any break-up, or fragmentation, and the wound will not be as dramatic. Suarez (P. 39)

> Chudwin (1999) explains, there are differences of opinion as to the effectiveness of bullets that do not penetrate at least 12 inches of gelatin. This penetration depth is considered necessary by some very knowledgeable experts due to thick body mass of offenders or angle shots through the extremities into the torso. It is argued that bullets must reach sufficient depth to strike vital organs and blood vessels. When a round fails to make such depth of penetration, it is considered lacking in terminal performance. To be most effective, a bullet must retain its weight, without the jacket and core separating. However, there is no one .223 bullet that penetrates barriers and tissue, maintains weight, does not separate core and jacket, and still poses a low level of hazard due to ricochet or excess penetration. Bullets of standard construction penetrate shorter distance into gelatin, are more frangible, and generally shatter on impact with hard surfaces. (P. 38)

Chudwin (1999) conducted tests, which showed that bullets of standard construction penetrate shorter distances into gelatin, are more frangible, and generally shatter on impact with hard surfaces. The 55-grain Federal Tactical round penetrated the required 12 inches of gelatin but in respect to wall penetration, the Federal Tactical round is similar to all handgun ammunition and shotgun slugs or buckshot. This may not be the choice for officers making an entry into a residential home but may be the answer for

routine patrol duties so that barriers such as automobile glass or metal can be penetrated. (P. 38)

Chudwin also conducted tests with the Remington 55 grain pointed soft point or the Hornady Police Tactical Application Police round (TAP) which penetrated the wall board, but shattered in the process. Gelatin behind the wallboard was penetrated less than 5 inches with fragments of the bullet. (P. 38) Due to different penetration desire, two different bullet types may be needed for street use. The Federal Tactical round can be the primary patrol magazine with a second magazine of Remington 55 grain PSP or similar bullet is available for heavily populated operational areas or entries into residential dwellings. The REDI-MAG pouch can be attached to the left side of the firearm, which will allow for quick magazine changes. Chudwin (P. 39)

Chudwin (1999) emphasized, “There is always a difference of opinion. My decision is based on testing and comparison. It does not fit all criteria for all purposes. Whatever ammunition an officer must choose that, decision should be based on realistic testing and evaluation.” (P. 39)

Chart 16 (Appendix B) shows that 28% of command officers felt their department did not carry the patrol rifle/carbine due to the over penetration and long-range capabilities.

Training

The primary goal of any police agency is to “Protect and to Serve” the citizens of the community. To “Protect and to serve” is in every police oath across the nation.

In order to protect others, police officers must receive adequate training.

> Chudwin (2000) explains, as in all firearms training, the more frequent the training, the greater the expectation of increases ability. Many training programs require officers to fire less than 25 rounds of 12-gauge slug annually. If the 12-gauge slug gun is to be the designated long gun, frequent and comprehensive training is vital. Once year shotgun training with a handful of slugs is wholly inadequate and, legally, would be very difficult to defend. (P. 13)

> Fairborne (1994) reported, many feel the shotgun is at its best when used at close ranges with coarse shot. Most police agencies use either 00 or No. 4 buck-shot loads for this role. Unfortunately, most police shotguns have a maximum effective range of 25 to 35 yards with buckshot, and precision is virtually impossible with these loads. Others use their shotguns with slugs, feeling they perform best as short-range rifles. Here again, the shotgun comes up short. while a well-trained shooter can center a man-sized target to 100 yards or more with a sighted shotgun, the average police officer/shotgun combination is better

> suited to a maximum range of 50 yards with slug ammunition. (P. 39)

In reviewing the survey, Chart 8 (Appendix B) shows that 58% of command officers surveyed indicated their department conducts shotgun training only once a year. 21% train twice per year, 8% train 4 times per year and 5% don't train at all. Furthermore,

Chart 3 (Appendix B) shows that 92% of command officers surveyed do not utilize rifle sights on their shotguns.

The handgun of course is the primary weapon of the patrol officer. The officer needs the handgun on his person for immediate protection of self and others. However, when an officer responds to a potentially dangerous call such as someone holding a deadly weapon--maintaining distance may be crucial. Those that only train with the shotgun in close quarter combat mode will need to be close to be effective. The idea of having a patrol long gun is to hold a tactical advantage. When involved in a gunfight at close range, regardless of what weapon system used there is a stronger possibility of taking hits. One advantage with the patrol rifle/carbine is the officer can stand a distance away, sight the offender, and fire on the offender without sustaining personal injury.

> Fairborne (1994) reasoned, the shotgun, despite its long history of use in the United States is not an ideal second weapon for police agencies. Many agencies Are finding that officers do not perform well with shotguns, despite the weapon's substantial advantages. As police agencies become more sensitive to the liability aspects of police firarms training, specifically the lack of such training, the rifle or carbine becomes more attractive. Officers are more comfortable with a rifle since it allows more precision and metes out less abuse. The comfort factor promotes increased training and familiarity, which, in turn increases confidence. And being confidant with one's weapon is the secret of effective use. (P. 39)

Chart 19 (Appendix B) shows 28 % of the command officers surveyed honestly admitted that they have never felt confident with the shotgun and therefore relied on their handgun more than they should have. Charts 20 (Appendix B) shows 28% of the command officers surveyed believed the shotgun is too big and heavy. Its harsh recoil and pump manipulation can be distracting. Further, they felt there should be something more suitable for law enforcement. Chart 28 (Appendix B) shows that 48% of command officers were competent and happy with the shotgun but would give it up if a better alternative were available.

Rifle shooting involves fine motor skills and to properly program students, Fairborn recommends no less than 24 hours in a basic training program. Furthermore, periodic in-service training and qualification must follow up the basic training. Periodic training four times per year with two qualification courses of fire would be a good sustainment program. Fairborn, (P. 62)

Felts (2003) believed, in addition to Fairborne's recommendation, officers should attend at least one advancement school per year as well. (P. 13)

Chart 12 (Appendix B) shows that the command officers indicated that those departments that do utilize the patrol rifle/carbine indicated 56% train annually, 33% bi-annually and 11 % don't train at all. Chart 13 (Appendix B) shows command officers indicated 50% qualify annually, 40% biannually and 10% do not qualify at all.

In reviewing the survey, yearly sustainment training and qualification standards for those departments utilizing the patrol rifle/carbine is substantially lower than what experts recommend. Chart 17 (Appendix B) answers shows that 40% of command

officers surveyed believe their police department doesn't use the patrol rifle due to cost and training.

Additionally, the command officers surveyed were asked if their shotguns have fixed mounted light systems and Chart 2 (Appendix B) shows that 92% do not. Moreover, the command group was asked if regular training was introduced on how to hold a flashlight and manipulate and fire a pump action shotgun. Sixty-seven percent have not received training with this technique. Statistically most police shootings occur in dark hours. Utilization of the shotgun in a point and shoot method during nighttime hours can lead to potential errant rounds.

Ironically, command officers that do utilize the patrol rifle/carbine were asked if their rifles have a fixed mounted light system and the survey revealed 90 % do not—Chart 4 (Appendix B).

In addition, the command officers were asked if their department members receive regular training on how to hold a flashlight and operate the rifle and 85% indicated they do not—Chart 6 (Appendix B).

Suarez (2000) The Tactical Edge-NTOA explains, "Aimed fire, or as some call it. "Instinctive" shooting is not new. The question of which is better for combat, however, continuously surfaces." (P.57) Point shooting was around for many years up until the late 1970s. Statistically, officers did not fair well with this technique so a better method was developed. Suarez argued, "If this technique was adequate why was an alternative method designed." (P. 58) Simply put too many officers were shot by suspects due to officers missing by point and shoot methods at close range. The failure of the point and

shoot method led to the adoption of the Jeff Cooper system, (sight-only system) or one of its equivalents. One such agency was the Los Angeles Police Department.

The LAPD abandoned the point and shoot technique, adopted the cooper system and made it work. Hit rates in police shootings went up significantly. In the 70s, the percentage of hits was minimal. In 1991 after utilizing the Cooper sight-only system for several years the hit rate went up 56%. In 1996, it was 70% and continues to grow higher each year. Suarez (P. 57)

Police officers can be trained to keep cool guaranteeing shots by using the sights. Training will substantially lower stress. The list of successful officers is long and distinguished. Missed shots will give the suspect a chance to kill, "who?" Only hits count. Point shooting in a dynamic environment with moving targets will inevitably lead to miss shots. "who?" can get lucky (or unlucky)? Officers should seek to win by design, not by default. (P. 58)

The sights must be used for all shooting, except situations where one is so close that a standard firing position would allow the adversary an opportunity to grab or deflect the gun. This doesn't mean that you spend seconds trying to acquire a perfect sight picture. The degree of precision in sight alignment and the resulting sight picture greatly depends on size of the target, distance, and the difficulty of the shot. (P. 58)

Patrol rifle/carbine officers must learn during training what there limitations are. Realistic expectations are critical and must be instituted during training. Qualification courses should run parallel with the expectations of what the officer should be capable of in a real shooting incident. For example, one advantage of the patrol rifle/carbine is the ability to engage targets at extended distances. A police officer after completing a 24-

hour basic user school should have the ability to engage head size targets out to 50 yards and body size targets out of 100 yards. The patrol rifle/carbine shooter has the weapon and marksmanship training to engage much further away than a shotgun-armed patrol officer. Fairborne (P. 62) Chart 29 (Appendix B) of the survey results shows 84% of command officers surveyed felt the patrol rifle officers would be able to engage head targets out to 50 yards. 11% said no and 5% were not sure. Chart 30 (Appendix B) indicated 89% felt the patrol rifle officer could engage body size targets out to 100 yards while 11% were not sure.

With any type of weapon system deployed, understanding limitations and capabilities are critical and should be thoroughly covered in training. Due to the capabilities of the patrol rifle/carbine, officers are able to learn advanced techniques. Techniques that would save lives immediately verses waiting for an advanced tactical team to arrive. The patrol rifle/carbine can be used for dynamic emergency rescues. The purpose of a downed victim rescue is to move an injured victim from a hostile environment to a safe location where medical aid can be rendered. In addition, it may be necessary to remove a victim who is not injured but in a location where he/she is vulnerable to hostile gunfire. A team of patrol rifle/carbine officers could deliver suppression fire towards the suspect while moving into position to extract the victim. Furthermore, training in various movement formations should be covered in detail. When officers have to advance into hostile territory to rescue victims or stop an active shooter all angles must be covered. Hubbs (P. 64)

As with any weapon system, regular training and training relevance is critical. The earlier an officer receives training in his/her career the better he/she will be in weapons

marksmanship, understanding what is capable with the chosen weapon system, and knowing what their own strengths and limitations are. This explains why police recruits receive training with the handgun and shotgun in the police academy. Fairborne (1994) observed, "While all agencies or academies train with side arms and shotguns, very few teach the rifle to recruits." (P. 11) In reviewing the survey results, Chart 22 (Appendix B) shows that 83% of command officers surveyed felt that if new police recruits were trained with the patrol rifle from the beginning (academy) of their careers, it would simply become another piece of equipment they would be efficient and competent with. Chart 18 (Appendix B) shows that 85% of command officers felt that police recruits in the academy should receive training and certification on use and deployment of the patrol rifle.

The active shooter and incident examples

Hubbs (2000) wrote, "Active shooter" can be defined as one or more subjects who participate in a random or systematic shooting spree, demonstrating their intent to continuously harm others." (P. 63)

> McCarthy (2000) expressed, active shooter events have been around for decades but have increased with some regularity for the past 10 years. These incidents are usually perpetrated by an angry suicidal suspect (s). Their intention is to kill as many people as possible and often anticipate being killed by responding officers. Bases upon studies and research, we know that 28 percent of all police shootings are suicidal subjects that orchestrate a situation to end in

deadly Force. (P. 12)

The L.A. bank robbery and the Columbine high school incidents were the most highly publicized on T.V. First responders found themselves poorly equipped to handle these incidents. In the L.A. bank robbery, the suspects were armed with fully automatic long guns with body armor covering their torso and extremities. The suspects and police officers fired hundreds of rounds. Multiple citizens and officers were injured. One suspect committed suicide and the other suspect was stopped by a SWAT officer. In reviewing the incident, video footage shows the suspects never took up their sights. The hundreds of rounds were fired sporadically in the direction of scout cars and offices. Had these me took up their sights and used marksmanship skills the outset may have been dramatically worse.

In Littleton Colorado, two teenage boys armed with several guns and numerous homemade bombs, shot and killed 12 classmates and a teacher, and wounded 20. First responders on scene found their handguns and training wholly inadequate to deal with the incident. Chudwin (2001) emphasized, “Officers arriving on scene, during in- progress violent incidents must have the means and ability to respond effectively.” (P. 18)

Chudwin (2001) wrote, a sailor noted that Naval Regulations are written in blood. Injuries and death led the way to change. Law enforcement is little different. It has only been after disasters that a shift in thinking has taken

> place. New equipment, training, and policy came about through tragedies in Austin, Norco, Miami, and Los Angeles to name a few. The deaths of good law enforcement officers have proven the sailor's point. (P. 18)

The following is only some active shooter incidents, which were provided in the NTOA Tactical Edge Magazine, summer 2000 issue:

- Aug. 1, 1966, Austin, Tex.: Texas Tower incident. For over an hour, Charles Whitman fired on University of Austin students, some over 500 yards away. He killed 14 and wounded 30.
- Oct. 29, 1979, San Diego, Calif: Two San Diego police officers were shot and bled to death in the driveway of a barricaded suspect. Suspect fired on arriving officers and SWAT for 40 minutes until being killed by a SWAT sniper.
- July 18, 1984, San Diego, Calif.: James Huberty walked into the San Ysidro McDonald's Restaurant and opened fire. Twenty-one dead, 19 wounded. Huberty was killed by a SWAT sniper.
- Aug. 20, 1986, Edmond Okla.: Postal worker Patrick Sherill Killed 14 and wounded six co-workers.
- Jan. 1, 1989, Stockton, Cal.: Patrick Purdy firebombed his car and entered a school playground armed with a Chinese-made assault rifle and 9mm pistol. He killed five children, wounded 29 additional children and a teacher, and then killed himself.

- Dec. 18, 1989, University of Montreal: Over the course of 20 minutes, Marc Lepne methodically stalked the cafeteria classrooms and corridors of the school. In four separate locations scattered around three floors of a six-story structure, he gunned down a total of 27 people, leaving 14 of them dead. Finally, he turned his weapon against himself.
- Oct. 16, 1991, Kileen, Texas.: George Hennard rammed his pickup truck through a plate glass window of Luby's Restaurant then opened fire with two pistols. Twenty-three killed, 24 wounded.
- May 1, 1992, Olivehurst, Calif.: Eric Houston, 20, killed four people and wounded 10 in an armed siege in his former high school. Prosecutors said the attack was in retribution for a failing grade. Houston was convicted and given a death sentence.
- Jan. 18 1993, Grayson, Ky.: Scott Pennington, 17, walked into Deanna McDavid's seventh-period English class at East Carter High School and shot her in the head. He then shot janitor Marvin Hicks in the abdomen. Pennington was sentenced to life without parole.
- Jan. 24, 1996, Portland, Ore.: A deliveryman recently fired over remarks he made to some women, armed himself with an AK-47 a 100-round drum magazine, a shotgun, a pistol, then entered a high rise office building and opened fire.
- Feb. 2, 1996, Moses Lake, Wash.: 14 year old Barry Loukaitis shot and killed three, wounds a fourth at his middle school.

- Feb. 19, 1997, Bethel, Alaska: A 16-year-old student opened fire with a shotgun in a common area at the high school. Killed are school principal Ron Edwards and classmate Josh Palacious. Two students are wounded. Authorities later accuse two other students of knowing that the shootings would take place. Evan Ramsey was sentenced to two 99-year terms.
- Oct. 1, 1997, Pearl, Miss.: A 16-year-old student is accused of killing his mother, then going to school and shooting nine students, two fatally.
- Dec. 1, 1997, Paducah, Ky.: Three students are killed and five others wounded at high school. A 14-year-old boy pleads guilty.
- March 24, 1998, Jonesboro, Ark.: Four girls and a teacher are shot to death when two boys, ages 11 and 13, activated a fire alarm then opened fire on the exiting students.
- April 24, 1998, Edinboro, Pa.: A 15-year-old student shot to death a science teacher at an eighth-grade graduation dance.
- May 21, 1998, Springfield, Ore.: Two students are killed and more than 20 wounded when a 15-year-old boy opened fire. His parents are later found slain at their home.
- Nov. 19, 1998, San Diego, Calif.: A man upset over marital problems entered a child care center and shot two woman, one fatally. Suspect killed by police.
- April 16, 1999, Notus, Ind.: A sophomore at Notus Junior-senior high school allegedly took his grandfather's shotgun to school and fired two blasts, one narrowly missing a group of students.

- April 20, 1999, Littleton, Colo.: Two teenage boys armed with several guns and numerous homemade bombs, shot and killed 12 classmates and a teacher and wounded 20.

Conley (2000) explains, active shooter incidents have been stereotyped and Repeated excessively in both rural and urban environments. As a result of This, law enforcement administrators must accept the possibility of an active Shooter incident occurring in their jurisdiction, and be prepared to respond. It is the responsibility of the agency to train and equip their officers to succeed, especially in their most important function, which is to protect life. (P. 10)

Many police departments are adopting policies and training to deal with active shooter incidents. The failure to respond appropriately and within a reasonable time may subject police departments and their administrators to civil liability and negative criticism. The purpose of the policy is to provide officers with guidelines in dealing with an active shooter situation. It should be noted that these policies do not mention the SWAT team as the first responders for several reasons: 1.) Most active shooter situations are concluded prior to the arrival of SWAT. Though, the SWAT team should be immediately summoned at the onset of such an incident. 2.) Many small agencies do not have their own SWAT. 3.) Waiting for the arrival of SWAT could result in the loss of more lives. Conley (P. 11)

Officers are now being trained to immediately establish an Emergency Response Team (ERT) when an active shooter situation occurs. Such training is nothing new;

SWAT teams have considered this as “contingency planning”. The idea is to have a team of officers ready and prepared to take immediate action if citizens or hostages are being murdered. The ERT can exist with 3 members but 5 are optimum if effective equipment and officers are available. Shaver (P. n/a)

Hubbs (2000) insisted, “If there exist within our community a post office, public school, library, office building, fast food restaurant, or any other location where people come together, an active shooter incident could occur within your area” (P. 64)

In order to be successful in responding to an active shooter situation, officers must receive training on how an ERT deploys and functions as a team unit. The officers must have immediate access to firearms capable of delivering accurate fire at greater distances. Schools have long hallways, large auditoriums and gymnasiums. Factories have long corridors and large open areas. Furthermore, any of these people populated areas could turn into hostage rescue situations where accuracy will be critical. Many active shooters deploy assault rifles and some have had fully automatic weapons. When police arrive on scene they should always have one up on an assailant or in other words a bigger gun. Chudwin and Kulovitz (P. 12)

Some police agencies have established special vehicles that are on the road 24/7. These vehicles carry equipment such as heavy ballistic vest, shields and helmets. These vehicles may also be equipped with rifles and less lethal munitions. Generally the operator of the vehicle has training with the weapon systems carried within the vehicle. Most importantly, the operator of the vehicle responds immediately to a hostile situation where other patrol officers will meet with him, retrieve equipment from the vehicle and prepare for what lies ahead. Chart 1 (appendix B) shows that 24% of command officers

utilize the patrol rifle/carbine within their department and deploy it in a rapid response type vehicle.

Although a specialized unit containing additional equipment is better than nothing, it is still "placing all your eggs in one basket" which is the same as SWAT. Many problems can occur to one vehicle prohibiting a timely response.

Police officers responding in vehicles carrying patrol rifles can arrive sooner and prepare quicker. Most all police officers will already have a vest on and a helmet can be carried in the trunk of every police vehicle. When citizens are being murdered, officers must strike a balance between waiting for specialized equipment verses an immediate response to save as many lives as possible.

DISCUSSION

Historically, the rifle was the primary fighting weapon of Sheriffs, Marshals, and other law enforcement officials. Early western pictures show these crime fighters holding their lever action rifles. Chudwin (2001) writes, "Given his choice, a knowing man didn't go into harms way armed with a handgun." (P. 18)

The law enforcement force continuum is based on good old fashion common sense. Even the earliest law enforcement officials of the country had enough sense to use the proper tools to win.

The United States constitution affords citizens the right to bear arms. This right extends to everything from handguns to rifles. Though recent legislative law have made it more difficult to purchase weapons, it is still relatively easy for an adult to purchase a gun. To not have rifle systems available for patrol officers goes against the force

continuum model. To achieve a successful outcome, police officers need to have the right and ability to escalate to a higher degree of force when necessary. Since all types of guns are so easily attainable within this country, rifles and high training standards will afford officers a higher probability to save innocent citizens and go home at the end of the day.

The intention of this research project was to prove that the current long gun mostly accepted within the law enforcement community is not the best choice. Furthermore, the training commitment and method of utilization is sub-standard. The survey results show for the most part that the shotgun is being utilized for close quarter combat only. Exchanging rounds at close distances is not tactically desired. Rifle trained officers have the option to not only use distance to their advantage but can also get into a different shooting platform such as kneeling or even prone. These different platforms not only increase accuracy but also make for a smaller target.

Most shotguns have no light system or rifle sight and only a small percentage of departments train officers how to hold a flashlight and manipulate the shotgun. As stated in this project, shotgun rounds can travel 1,875 feet, which is over 6 football fields. In addition, over penetration with a shotgun round is much more than a .223 carbine round. 00 buck shotgun rounds have 9 bullets that with distance can have a devastating spread range.

In reviewing the survey, current training standards show that minimum sustainment training with those utilizing the patrol rifle/carbine is lower than what the experts recommend. In addition, the survey showed that most of the departments with rifles don't have fixed mounted light systems. Even though the survey results show that the

shotgun and the patrol rifle/carbine have a low percentage of fixed light systems, the patrol rifle with its engrained marksmanship for accuracy in utilization of the sights will yield better results than the shotguns point and shoot method.

The survey results show high percentages in favor of rifle utilization for all officers. In addition, a high percentage agreed that the patrol rifle/carbine should be routine academy curriculum. Teaching academy students the patrol rifle early in their careers will help to develop the mindset of accuracy and the tactical advantage of distance. This will help to change the current unconscious reaction to get within 25 yards of the threat in order to return fire.

Furthermore, some police veterans who have utilized the shotgun for several years may fight change. If given the choice, some veterans may pass on rifle training and continue to use old tactics with the shotgun. A steady influx of academy recruits trained in the patrol rifle can help to bring about change. In addition, police administrators will need to encourage senior officers to accept change and mandate patrol rifle training to all officers.

Due to constant advancements in technology--societies and behavior will change. Police agencies must accept new technology and change as well. Most all police agencies have a mission statement, which asserts the commitment to be proactive. To be proactive, police administrators must teach their personnel to understand that the equipment and training used today may not be the same tomorrow.

The patrol rifle/carbine is the equipment of today. It provides tactical advantages and contrary to popular belief it will also reduce liability. Chart 28 (Appendix B) shows that 57% of the command officers would give up the shotgun if something better was

available. Chart 23 (Appendix B) 93% of the command officers felt the cost of rifles and training is insignificant if it saves lives.

RECOMMENDATIONS

Police administrators should move to obtain patrol rifle/carbines for street use as soon as possible. Ideally, every patrol officer would be assigned a patrol rifle/carbine just as they are assigned a handgun. Officers that are assigned their own patrol rifles will be able to make fine adjustments (tweak) allowing for more accuracy.

The purchase of patrol rifle/carbines for all patrol officers can be a huge expense--severely straining a police budget. Police administrators that are unable to bear the burden of such an expense will need to be creative in finding the monies. It is possible to make the purchase over a period of years with a planned deadline to achieve total transition. Police departments can begin by deploying the 24/7 rapid response vehicle (equipment vehicle) containing patrol rifles. As more money is obtained, patrol rifles can begin to move into the passenger compartment of patrol vehicles. With a timed deadline all patrol officers can have an assigned patrol rifle/carbine.

Those departments that initially cannot make the total transition for all patrol officers to have their own patrol rifle/carbines must develop a system where trained patrol rifle officers will qualify with certain rifles and deploy those same rifles in the field.

Police academies that institute a patrol rifle/carbine curriculum and certification program would be providing an invaluable service to the law enforcement profession. Officers certified in patrol rifle use within the academy would develop an instinctive mindset to utilize distance and accuracy (when appropriate and possible) early within

their career. Additionally, recruits hired by police departments would be able to deploy the patrol rifle/carbine without the department being burdened with initial orientation training.

**A meeting with Schoolcraft Police Academy Coordinator Dan Antieau proved to be very beneficial. Mr. Antieau a retired police officer and certified in the use of the patrol rifle agreed that the academy should institute such a program. Mr. Antieau was provided with a copy of this research project and he agreed to present an implementation proposal to the Schoolcraft Police Academy Board of Directors. In addition, Mr. Antieau suggested he will seek a pilot course through MCOLES.

REFERENCES

Chudwin, J. (1999- Summer) .223 for the street. *ITOA News* pp. 37-39

Chudwin, J. & Kulovitz A. (2000-Spring) Rapid response training and firearms selection. *ITOA News* pp. 12-13

Chudwin, J. (2001- Spring) Establishing a police rifle/carbine program. *ITOA News pp. 18-21*

Conley J. (2000-Summer) Active Shooter incidents. *ITOA News* pp. 10-16

Fairburn, R. (1994) Police Rifles-Selecting the right rifle for street patrol and special tactical Situations. Boulder, Colorado: Paladin Press

Felts, J. (2003) Law Enforcement Patrol Rifle/Carbine-Policy, training & operational considerations. pp.150

Felts, J. (2003-June) Law Enforcement patrol rifle seminar. pp.1-7

Hubbs, K. (2000-Summer) Dynamic Emergency Rescues-some thoughts after Littleton. *The Tactical Edge.* pp. 62-66

McCarthy, R. (2000-Spring) Special Feature-Procedures and tactics for patrol and swat in response to active shooters. *The Tactical Edge.* pp.12-15

Mohn, E. (Fall-2000) The patrol tactical support officer. *ITOA News.* pp. 4-5

Parker, R. (2003-Summer) Counter Measures. *The Tactical Edge* pp. 66-68.

Shaver, T. (2000-Summer) Waiting for SWAT- a patrolman's duties. *The Tactical Edge* pp. n/a

Suarez, G. (1999) The tactical edge-the precision tool for urban police operations. Boulder, Colorado: Paladin Press.

Suarez, G. (2000-Winter) Point shoot or use the sights. *The Tactical Edge.* pp. 57-59

Ammunition for the Patrol Carbine

ABSTRACT

As law enforcement agencies increasingly begin to see the importance of patrol carbines in the hands of peace officers, the long argued point of ammunition choice is once again heard. That is, What is the right bullet for a patrol carbine? All of the usual arguments relating to handgun bullet choice, plus some new ones come up again when making this choice. By using a casual comparative approach to look at the available data on this subject, the answer to this problem becomes clear. Some key questions have been answered in this paper such as, How well does the bullet penetrate and effect a human target? How well does the bullet defeat intermediate barriers and What is the bullets proven one shot stop percentile. It was hypothesized that a jacketed hollow point (JHP) or even a jacketed soft point (JSP) rifle bullet would be the best choice. This is a logical conclusion because the JHP pistol bullet has served so well in law enforcement pistols. The results here indicate that the full metal jacket (FMJ) bullet best meets the needs of law enforcement when in patrol carbines. The recommendation here is that law enforcement agencies convert their shotguns to less than lethal use only and replace them with patrol carbines as the lethal force shoulder fired support weapon loaded with the 55grain FMJ 5.56X45mm bullet.

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INTRODUCTION

In recent years Law enforcement agencies across the United States have begun to see the value of the rifle and carbine in the hands of patrol officers. The use of rifles and carbines by police specialty units like SWAT has long been accepted and the type of ammunition used by SWAT officers has never been a point of contention due to the specific police mission they are assigned to. A SWAT officer would more likely than not have the opportunity to choose the type of ammunition that would be best suited for the mission at hand. A police officer on routine patrol duties with access to a patrol carbine or rifle would not have this luxury and would require a general purpose round that would be able to perform sufficiently in a variety of applications.

The problem then is: What would be the best ammunition type for a police officer to carry in his patrol carbine?

Conventional wisdom from a law enforcement perspective would say that like a hand gun bullet, the jacketed hollow point carbine bullet would be the best rifle bullet to use in police applications. By comparing statistical information from ballistics tests conducted by the FBI and the Federal Ammunition Company in conjunction with data from studies on this topic the research presented here will provide law enforcement administrators with the information needed to make a sound decision in choosing the right type of ammunition for their police officers to use in their patrol rifles/carbines.

BACKGROUND & SIGNIFICANCE

Law enforcement officers through out this countries past have utilized rifles and carbines as a shoulder fired support weapon for over a hundred years. By late the1800's situations were additional firepower or range was needed, the law men of the day used the venerable lever action rifles by Winchester and Henry to complete the police mission at hand. The weapon systems used by law enforcement officers in the recent past were military surplus weapons in the .30cal range, mostly M-14 rifles and M-1 carbines. In the past twenty years this now includes the M-16 and all weapons systems in the M-16 family of rifles and carbines. Except in wide open and rural locals, recent law enforcement use of these weapons was restricted to SWAT type police units. Only as late as the 1990's was there a slow change in the thinking with in the law enforcement community regarding patrol officers routinely carrying rifles or carbines with them while on patrol. This thinking was reinforced in the mid 1990's by a number of high profile criminal incidents, most notably the bank robbery in North Hollywood California where two men wearing body armor and armed with automatic rifles engaged the responding patrol officers in a fierce gun battle.

Many forward thinking police agencies in America today have traded in their 12 gauge shotguns for patrol rifles and carbines chambered in the caliber 5.56mm/.223 cal. Both designations are for the same caliber of bullet and will be used interchangeably depending on the type of bullet being discussed. The only reason for the difference being semantics, the military uses the 5.56mm nomenclature and the civilian market the .223 cal. designation.

The 5.56mm rifle bullet in general has proven ballistic characteristics that make it the

best all round caliber of bullet for police carbine applications. Rifles and carbines chambered in the .30 caliber range (7.62mm/.308cal) tend to have an extremely high probability of over penetrating the intended targets and surrounding barriers in the event of a miss. Additionally bullets from the .30 cal M-1 carbine had similar over penetration characteristics of the 7.62mm but could not reliably penetrate a bullet proof vest at 75 yards. Some police administrators in an attempt to economize the situation have adopted carbine weapon systems that fire the same caliber bullet as the officers semi-automatic duty pistols. At first glance this may seem like a reasonable solution. The problem is that handgun ammunition does not perform well after 25 yards even when fired through a carbine with a barrel length of 16 inches. A handgun bullet cannot penetrate a ballistic vest and relies heavily on penetration to vital organs and expansion to rapidly incapacitate a person. Thus it is widely accepted that for police applications, patrol carbines should be chambered in the 5.56mm caliber. The 5.56mm bullet works well in a variety of weapon systems commonly chambered in that caliber and used by law enforcement. Regardless of the weapon system that any given law enforcement agency has chosen, putting the best 5.56mm bullet in the firearm is important to the individual officers survivability and confidence.

LITERATURE REVIEW

Ballistics Testing and Scientific Research Justifies the 5.56mm for Police Use

The field of wound ballistics is terribly complicated and not well understood. Comprehensive models do not exist for predicting the extent of the wounds produced by projectiles as a function of the full range of velocities, projectile diameters, projectile

terminal performance characteristics (which includes deformation, yawing of elongated non-deforming projectiles, and fragmentation) and finally the characteristics of the target in tissue/simulant. [1]

The 5.56x45mm (.223cal Rem.) bullet.

The US armed force's first generation small caliber bullet was the US M193 5.56x45mm. This cartridge was designed for the M-16 weapon system still used by the US armed forces today. This bullet and its updated version the M855 both produce surprisingly large permanent wound cavities for the size of the bullet. See Appendix C. Originally the massive injuries caused by this bullet was not clear until the importance of bullet fragmentation was established. With FMJ (full metal jacket bullets) like the M193 and the M855 the bullet travels approx. 4.5 inches before the tip of the bullet begins to tumble or yaw approx. 90 degrees and begin to flatten. This is caused by the bullet trying to keep ballistic stability when the lighter point of the bullet slows faster that the heavier rear of the bullet. At some point in the yaw the bullet will then break in two at the mid section of the bullet. This break wither by design or not occurs at a grooved section of the bullet called the connelure. This groove is made into the circumference of the bullet by the crimping of the case to secure the bullet to the casing. When the top half of the bullet breaks off it maintains about 60 per cent of the bullets total weight. The bottom portion of the bullet then fragments. These fragments penetrate approx. 3 more inches and perforate through out the temporary wound cavity created by the stretching of the

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[1] (Geoff Kotzar) gmk@falstaff.mae.cwru.edu

surrounding tissue. Even though the human body is remarkably elastic, the energy placed on a human body by a high velocity bullet causes more stretching then surrounding tissue can tolerate. This works in conjunction with the fragmenting bullet. These fragments perforate and tear away body tissue regardless of its elasticity. The result is a large permanent wound cavity which is a key element in causing rapid incapacitation of a suspect. The amount of fragmentation decreases as bullet velocities decrease, that is to say at greater shooting distances.

The above terminal ballistics characteristics are very consistent at shooting distances of 100 yards or less which is generally accepted as the maximum range for engagement of a suspect with a patrol carbine or rifle. Another factor effecting bullet velocity is the length of the weapon system's barrel. To achieve the needed velocity for a FMJ bullet to perform most effectively weapons with barrels no shorter than 16 inches should be used.

The rifling twist rate in the barrel of patrol rifles and carbines does not appreciably effect bullet velocity, but may effect the accuracy of the bullet fired. The weapon systems chambered for the .223 cal that would be used in patrol applications have twist rates from 1 in 7" to 1 in 12". 5.56mm bullets in the 55 grain weight work well in all of the common twist rates. Heavier bullets which tend to be longer should not be used in carbines or rifles with twist rates slower than 1 in 9". When fired through a barrel with a twist rate slower than 1 in 9" the heavier bullets will begin to yaw in flight in some cases up top 70 degrees, potentially effecting accuracy even at a distance of 100yrads.

Expanding Rifle Bullets.

Hollow point and soft point rifle bullets have far more energy available than pistol rounds so mushrooming tends to be more reliable. The large quantities of energy that can

be transferred into a target by rifle bullets often causes the stretch cavity to cause permanent damage. [2]

Jacketed Hollow Points (JHP) and Jacketed Soft Points (JSP) are also bullets to be considered in Choosing the proper 5.56mm bullet for police use in patrol carbines. JHP and JSP bullets create similar looking wounds in ballistic gelatin as the FMJ bullets do. The JHP and the JSP bullets cause injury through high velocity energy and bullet expansion. Both bullets fragment to some degree, stretch tissue beyond its elasticity and thus create tissue fragmentation resulting in a large permanent wound cavity. Unlike a FMJ bullet the JHP and JSP bullets do not penetrate as deeply into a target. As such, JHP and JSP bullets have a very low chance of over penetrating a suspect who has been shot with such a bullet.

Incapacitation.

When it comes to the application of lethal force by a police officer the main factor to be considered is incapacitation, that is to say quickly stopping a suspect from doing what ever it was that made the officer shoot him in the first place. There are five factors that effect a bullets ability to incapacitate a person.

Placement. This means more than just hitting your intended target at center mass. The target must be hit in a vital organ and damage or injure that vital organ to such an extent that rapid incapacitation is the result. The best target for incapacitating a human target would be a shot to the central nervous system (CNS). Primarily shots that injure

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[2] anglefire.com

the brain or the spinal column will result in immediate incapacitation. Shots to the CNS are generally speaking not dependant on the caliber or type of bullet so long as there is sufficient penetration to reach and damage the CNS. Injury to other vital organs or blood vessels such as the heart, lung or liver may be fatal but may not have been sufficiently damaged or penetrated to cause rapid incapacitation.

Penetration. In order to reach the CNS or any other vital organ a bullet must have sufficient penetration to pas through bone and tissue. Other than being shot in the CNS the main reason for people to lay down after they have been shot is that they do not feel good anymore. In order for this to happen quickly the bullet must cause sufficient injury to a vital organ or blood vessel to cause a sudden drop in blood pressure. The average human torso is approx. 9 inches thick. Shots fired at a person in combat may have to penetrate the persons arm before reaching the torso. Thus the depth of penetration that is generally excepted as being sufficient to reach vital organs and blood vessels is 12 to 15 inches.

Physical Injury. Penetration alone can only be counted for quick incapacitation in CNS hits. Many violent suspects have been fatally shot, but were not quickly incapacitated because the bullet that penetrated to the vital organ or blood vessel did not sufficiently damage the organ and cause rapid loss of blood. The key here is creating a permanent wound channel at the vital organ or blood vessel. This is created by the fragmenting, mushrooming, and tumbling of the bullet as it crushes and tears the tissue it passes through.

Power/Energy. The final thing that a bullet must do once it has hit a person to cause

rapid incapacitation is utilize the energy that it brings with it efficiently. This energy is what causes the bullet to mushroom, tumble and fragment. As is the case with rifle bullets they generally have sufficient energy to overcome the incredible elasticity of the human body.

Psychology. The final factor in a bullets ability to incapacitate a person has nothing to do with the bullet at all. A suspects mental state of mind maybe such that a minor wound produces incapacitation without serious injury. While another suspect may maybe fatally wounded but so enraged that they keep fighting longer than would logically be expected.

Rifle Ammunition for Law Enforcement

.223 Remington Caliber: (5.56 x 45 mm NATO)
One Shot Stopping Success: 93-100% (Actual)
Recommended Cartridges:

Remington	JHP	60 grains	100%
Winchester "Match"	JHP-BT	69 grains	100%
Federal	JHP	40 grains	99%
Winchester	JSP	55 grains	96%
Winchester	FMJ	55 grains	96%
Federal	JHP	55 grains	95%
Remington	FMJ	55 grains	95%
Federal	JHP	62 grains	94%
Remington	JSP	55 grains	94%
Federal	FMJ-BT	55 grains	93%

The .223 caliber cartridge is the standard NATO rifle round. It is also the best choice for self defense. Essentially all configurations of the .223 bullet provide excellent one shot stopping ability. [3]

Similar results were found in a study conducted by Evan P. Marshal and published in a April 2001 Gun World article titled: "One Shot Stops II: Rifles, Shotguns and Compacts. In Marshall's study five factors were taken into account. Barring in mind that the criteria used by Marshall in his study are arguably too broad or too narrow the test as published showed the results from 15 different 5.56mm bullets. In Marshall's study he only considered hits in torso area, and disregarded multiple hits. His definition of a "stop" was more or less what any police officer would consider a "stop". In his study Marshall included only bullets that were involved in a minimum of ten shootings. Finally Marshall compiled his data from information in police, evidence technician and medical examiner reports, as well as interviews with police officers, witnesses, and victims. Marshall's study was very consistent with that reported at internetarmory.com.

In June 2002 article for Law an Order Magazine entitled: "Ballistic Testing Justifies the .223 Caliber Carbine" David Sparks points out the effectiveness of the 5.56mm bullet in law enforcement use. In his article David Sparks utilizes test results conducted by ballistics expert Clarence Kropp conducted in 1999. In Kropp's tests he fired two types of .223 caliber bullets and two types of .40cal S&W bullets into barriers that law

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[3] internetarmory.com

enforcement officers may commonly encounter. These tests were similar to the tests that the FBI had conducted in the 1990's.

The results of the testing proved that the .223 caliber cartridge is the most suitable cartridge for law enforcement carbine deployment in an urban/suburban environment. The Remington UMC.223 caliber 55-grain FMJ cartridge had the least chance of over penetration compared to the .40caliber JHP and FMJ bullets, the .223 caliber bonded JSP bullets and the 12 gauge rifled slugs. [4] From 1993 to 1996 the Federal Bureau of Investigation conducted tests on several types of .223cal bullets to determine a suitable round for law enforcement use. The results of these tests are provided in Appendix A. Similar results were shown in a more recent set of test published by Federal Ammunition Co. See Appendix B.

When choosing a .223 cal bullet for patrol carbine use the variety of intermediate barriers that police officer may encounter should be considered. The first and most important barrier that any 5.56mm bullet should be able to penetrate is soft body armor. All 5.56mm bullets available to law enforcement are able to defeat soft body armor up to threat level III. As with any barrier be it soft body armor, window glass, or a car door once the bullet has penetrated the barrier is should still be able to inflict sufficient injury to the suspect to stop him. All of the 5.56mm bullets looked at in this paper have strengths and weaknesses in police applications. The Idea is to find the bullet that best fits an individual agencies needs. This would be a general purpose bullet that does all of

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[4] David Sparks

the things needed reasonably well.

In the Fall of 2000, The Woodhaven Police Department was preparing to train its patrol officers with M-16/AR-15 patrol carbines and rifles. Sgt. Graham of the Woodhaven Police Department had the opportunity to speak by telephone with Clarence Kropp regarding rifle ammunition for duty use by the Woodhaven Police Department. Kropp was informed that the City of Woodhaven is a sub-urban bedroom community with single and multi-family dwellings and a mixture of heavy and light industry. In the conversation Kropp recommended the 55gr .223cal FMJ bullet as the best general purpose bullet for the Woodhaven Police Department's patrol carbines and rifles. He mentioned that bonded tactical bullets offered by Federal Ammunition were ideal for penetrating heavy barriers such as car doors and thick window glass. These bullets however did not tumble or fragment like other 5.56mm bullets in ballistic gelatin. This in Kropp's opinion would mean a greater likely hood of extreme over penetration of a human target. Though not mentioned, it could also be assumed that such a bullet would not create a large permanent wound channel as other 5.56mm bullets have been shown to do. Kropp also indicted that JHP and JSP bullets in .223cal cannot consistently create incapacitating wounds after penetrating common barriers.

PROCEDURES

In compiling the data for this paper several sources were referenced. The reputation of any one of the sources could arguably be challenged. Taken as a whole, however the information contained in the sources used directly or indirectly supported each other in many ways contributing to the validity of all of the sources.

Sources of data were obtained from three areas. Official tests conducted by the Federal Bureau of Investigation were obtained from a neighboring agency. Another source was magazine articles, including the reputable law enforcement magazine Law and Order. Finally the internet provided valuable information from related web sites. This information was reviewed and compared extensively. In the reviewing process it was deemed important to identify consistent information from all of the sources. This consistency is what allows for result that can be backed up from the data.

RESULTS

It was hypothesized that as with jacketed hollow point pistol bullets, the JHP.223 caliber rifle bullet would be the best choice for law enforcement use in a patrol carbine. Clearly this was proven incorrect by the data when taken as a whole. The terminal ballistics of a rifle bullet are completely different than those of a handgun bullet. Because a handgun bullet travels at such a lower speed than a rifle bullet, the pistol bullet uses its slower speed and grater mass to expand and mushroom in order to create a needed permanent wound channel. All of the .223 cal bullets studied showed that the contributing factor in their wounding ability was the tearing of tissue as a result of being hit by a high velocity bullet. This tearing was not a function of the bullet mushrooming as with a handgun bullet, but of the effected tissues inability to stretch with out tearing when exposed to the high energy and fragmentation of the rifle bullet. This is what crates the permanent wound cavity that is so crucial to quickly incapacitating a person.

JHP and JSP rifle bullets however do not reliably penetrate deeply enough to vital

organs, blood vessels or the central nervous system. This penetration issue is further complicated when barriers such as soft body armor, window glass and car doors is included. This was demonstrated in the tests provided by the FBI and Federal Ammunition Inc. The FMJ .223 cal rifle bullets appeared to have a better all round performance with a better than 90 % one shot stop history. These points are confirmed in studies conducted by Clarence Kropp. With all of this information taken as a whole the results of this study point to the 55gr 5.56mm FMJ bullet as the best general purpose bullet to be used in patrol carbines for law enforcement.

DISCUSSION

When a law enforcement agency considers issuing patrol carbines to its police officers for routine patrol use the concept of firing a military style bullet through a military style weapon does not sit well with department heads. But, times have changed and with it the cultural and criminal environment that peace officers must work in have changed with the times. Legally police departments are much more responsible for every shot fired by its officers than in the past. This change is slowly working against the venerable 12gauge shotgun in favor of the patrol carbine for law enforcement use. The inherent randomness of nine projectiles fired with one shot from a shotgun compared to the control of one projectile per shot from a carbine is beginning to look good to forward thinking police administrators. Criminals too have become more sophisticated, primarily in the use of body armor, weapons and tactics. Once again, this consideration leads to the adaptation of the patrol carbine to everyday use by police officers as their primary shoulder fired support weapon. A patrol carbine weapon system in the tried and proven

caliber of 5.56mm allows first responding patrol officers the ability to engage this new breed of very dangerous criminal from a safer distance.

With the establishment of a need for the patrol carbine having been made, the appropriate round of ammunition for that weapon system is vital. This paper has shown that a military style bullet is the best all round bullet for law enforcement use in patrol carbines. Generally speaking this means any of the FMJ bullets in .223 cal and particularly the 55grain FMJ 5.56X45mm bullet. Studies by the FBI, and Federal Ammunition Co. show that the 55grain FMJ bullet achieves the best results over a wide range of variables. Other studies have shown that the .223cal FMJ bullet consistently produces one shot stops in the mid 90% range, a very desirable thing in law enforcement applications. Finally, the work from a reputable ballistics expert such as Clarence Kropp replicates these results, or confirms them. The research in this paper then concludes that for agencies either using, or considering the use of patrol carbines they would best be served by the 55grain FMJ .223 cal bullet in their carbines and rifles.

RECOMMENDATIONS

My recommendation for police departments would be to convert their 12gauge shotguns to less than lethal ammunition use only. A reliable patrol carbine weapon system chambered in the 5.56X45mm should then be used to replace the shotgun ad the primary shoulder fired support weapon for lethal force.

The best ammunition for the patrol carbine has been discussed here in this paper. In deciding what would be the best bullet for the patrol carbine data from the FBI and the Federal Ammunition company was reviewed along with a recommendation from a noted

ballistics expert. Based on this research, I would recommend that the best 5.56X45mm/.223 cal bullet for law enforcement use in patrol carbines is the 55 grain FMJ bullet.

BIBLIOGRAPHY

Roy Huntington & Gene Wolberg. Police Technology Magazine. "Stopping Power: Myth, Magic or Fact?" October 1990.

Evan Marshall. Gun World Magazine. "One Shot Stops II: Rifles, Shotguns and Compacts". April 2001.

David Sparks. Law and Order Magazine. "Ballistics Testing Justifies .223 Caliber Carbine". June 2002.

Terminal Ballistics of Common Military Rifle Rounds.[Online] At http://www.anglefire.com August 2003.

Ballistics of Modern Firearms [Online] At http://www.engrwp.usc.edu August 2003.

Wound Ballistics [Online] At http://.www.firearmstactical.com August 2003.

Terminal Ballistics "Wound Ballistics" [Online] At http://www.bobtuley.com August 2003.

Rifle Ammunition for Self Defense [Online] At http://www.internetarmory.com August 203.

APPENDIX A

PREPARED BY
ENGINEERING TECHNICIAN
(BALLISTICS)
T.L. HOLLABAUGH

FBI
AMMUNITION & WEAPON
RESEARCH FACILITY

FIREARMS TRAINING UNIT
FBI ACADEMY
QUANTICO, VA. 22135

APPENDIX B

BALLISTICS TESTS

PUBLISHED BY

FEDERAL AMMUNITION CO.

LAW ENFORCEMENT

APPENDIX C

TERMINAL BALLISTICS TESTS

IN BALLISTIC GELATIN

FOR

5.56MM RIFLE BULLETS

55GR FMJ M193

62GR FMJ M855

50GR JSP .223 CAL

U. S. Department of Justice
Federal Bureau of Investigation

HANDGUN WOUNDING FACTORS AND EFFECTIVENESS

FBI ACADEMY
FIREARMS TRAINING UNIT

FOR LAW ENFORCEMENT DISSEMINATION ONLY

Handgun Wounding Factors and Effectiveness

Special Agent UREY W. PATRICK

FIREARMS TRAINING UNIT
FBI ACADEMY
QUANTICO, VIRGINIA
July 14, 1989

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FORWARD

The selection of effective handgun ammunition for law enforcement is a critical and complex issue. It is critical because of that which is at stake when an officer is required to use his handgun to protect his own life or that of another. It is complex because of the target, a human being, is amazingly endurable and capable of sustaining phenomenal punishment while persisting in a determined course of action. The issue is made even more complex by the dearth of credible research and the wealth of uninformed opinion regarding what is commonly referred to as "stopping power".

In reality, few people have conducted relevant research in this area, and fewer still have produced credible information that is useful for law enforcement agencies in making informed decisions.

This article brings together what is believed to be the most credible information regarding wound ballistics. It cuts through the haze and confusion, and provides common-sense, scientifically supportable, principles by which the effectiveness of law enforcement ammunition may be measured. It is written clearly and concisely. The content is credible and practical. The information contained in this article is not offered as the final word on wound ballistics. It is, however, an important contribution to what should be an ongoing discussion of this most important of issues.

John C. Hall
Unit Chief
Firearms Training Unit

The handgun is the primary weapon in law enforcement. It is the one weapon any officer or agent can be expected to have available whenever needed. Its purpose is to apply deadly force to not only protect the life of the officer and the lives of others, but to prevent serious physical harm to them as well.[1] When an officer shoots a subject, it is done with the explicit intention of immediately incapacitating that subject in order to stop whatever threat to life or physical safety is posed by the subject. Immediate incapacitation is defined as the sudden[2] physical or mental inability to pose any further risk or injury to others.

The concept of immediate incapacitation is the only goal of any law enforcement shooting and is the underlying rationale for decisions regarding weapons, ammunition, calibers and training. While this concept is subject to conflicting theories, widely held misconceptions, and varied opinions generally distorted by personal experiences, it is critical to the analysis and selection of weapons, ammunition and calibers for use by law enforcement officers.[3, 4]

1 FBI Deadly Force Policy.
2 Ideally, immediate incapacitation occurs instantaneously.
3 Fackler, M.L., MD: "What's Wrong with the Wound Ballistics Literature, and Why", Letterman Army Institute of Research, Presidio of San Francisco, CA, Report No. 239, July, 1987.
4 Fackler, M.L., M.D., Director, Wound Ballistics Laboratory, Letterman Army Institute of Research, Presidio of San Francisco, CA, letter: "Bullet Performance Misconceptions", International Defense Review 3; 369-370, 1987.

TACTICAL REALITIES

Shot placement is an important, and often cited, consideration regarding the suitability of weapons and ammunition. However, considerations of caliber are equally important and cannot be ignored. For example, a bullet through the central nervous system with any caliber of ammunition is likely to be immediately incapacitating.[5] Even a .22 rimfire penetrating the brain will cause immediate incapacitation in most cases. Obviously, this does not mean the law enforcement agency should issue .22 rimfires and train for head shots as the primary target. The realities of shooting incidents prohibit such a solution.

Few, if any, shooting incidents will present the officer with an opportunity to take a careful, precisely aimed shot at the subject's head. Rather, shootings are characterized by their sudden, unexpected occurrence; by rapid and unpredictable movement of both officer and adversary; by limited and partial target opportunities; by poor light and unforeseen obstacles; and by the life or death stress of sudden, close, personal violence. Training is quite properly oriented towards "center of mass" shooting. That is to say, the officer is trained to shoot at the center of whatever is presented for a target. Proper shot placement is a hit in the center of that part of the adversary which is presented, regardless of anatomy or angle.

A review of law enforcement shootings clearly suggests that regardless of the number of rounds fired in a shooting, most of the time only one or two solid torso hits on the adversary can be expected. This expectation is realistic because of the nature of shooting incidents and the extreme difficulty of shooting a handgun with precision under such dire conditions. The probability of multiple hits with a handgun is not high. Experienced officers implicitly recognize that fact, and when potential violence is reasonably anticipated, their preparations are characterized by obtaining as many shoulder weapons as possible. Since most shootings are not anticipated, the officer involved cannot be prepared in advance with heavier armament. As a corollary tactical principle, no law enforcement officer should ever plan to meet an expected attack armed only with a handgun.

The handgun is the primary weapon for defense against unexpected attack. Nevertheless, a majority of shootings occur in manners and circumstances in which the officer either does not have any other weapon available, or cannot get to it. The handgun must be relied upon, and must prevail. Given the idea that one or two torso hits can be reasonably expected in a handgun shooting incident, the ammunition used must maximize the likelihood of immediate incapacitation.

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[5] Wound Ballistic Workshop: "9mm vs. .45 Auto", FBI Academy, Quantico, VA, September, 1987. Conclusion of the Workshop.

MECHANICS OF PROJECTILE WOUNDING

In order to predict the likelihood of incapacitation with any handgun round, an understanding of the mechanics of wounding is necessary. There are four components of projectile wounding.[6] Not all of these components relate to incapacitation, but each of them must be considered. They are:

(1) Penetration. The tissue through which the projectile passes, and which it disrupts or destroys.

(2) Permanent Cavity. The volume of space once occupied by tissue that has been destroyed by the passage of the projectile. This is a function of penetration and the frontal area of the projectile. Quite simply, it is the hole left by the passage of the bullet.

(3) Temporary Cavity. The expansion of the permanent cavity by stretching due to the transfer of kinetic energy during the projectile's passage.

(4) Fragmentation. Projectile pieces or secondary fragments of bone which are impelled outward from the permanent cavity and may sever muscle tissues, blood vessels, etc., apart from the permanent cavity.[7, 8] Fragmentation is not necessarily present in every projectile wound. It may, or may not, occur and can be considered a secondary effect.[9]

Projectiles incapacitate by damaging or destroying the central nervous system, or by causing lethal blood loss. To the extent the wound components cause or increase the effects of these two mechanisms, the likelihood of incapacitation increases. Because of the impracticality of training for head shots, this examination of handgun wounding relative to law enforcement use is focused upon torso wounds and the probable results.

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6 Josselson, A., MD, Armed Forces Institute of Pathology, Walter Reed Army Medical Center, Washington, D.C., lecture series to FBI National Academy students, 1982-1983.

7 DiMaio, V.J.M.: Gunshot Wounds, Elsevier Science Publishing Company, New York, NY, 1987: Chapter 3, Wound Ballistics: 41-49.

8 Fackler, M.L., Malinowski, J.A.: "The Wound Profile: A Visual Method for Quantifying Gunshot Wound Components", Journal of Trauma 25, 522-529, 1985.

9 Fackler, M.L., MD: "Missile Caused Wounds", Letterman Army Institute of Research, Presidio of San Francisco, CA, Report No. 231, April 1987.

MECHANICS OF HANDGUN WOUNDING

All handgun wounds will combine the components of penetration, permanent cavity, and temporary cavity to a greater or lesser degree. Fragmentation, on the other hand, does not reliably occur in handgun wounds due to the relatively low velocities of handgun bullets. Fragmentation occurs reliably in high velocity projectile wounds (impact velocity in excess of 2000 feet per second) inflicted by soft or hollow point bullets.[10] In such a case, the permanent cavity is stretched so far, and so fast, that tearing and rupturing can occur in tissues surrounding the wound channel which were weakened by fragmentation damage.[11, 12] It can significantly increase damage[13] in rifle bullet wounds.

Since the highest handgun velocities generally do not exceed 1400-1500 feet per second (fps) at the muzzle, reliable fragmentation could only be achieved by constructing a bullet so frangible as to eliminate any reasonable penetration. Unfortunately, such a bullet will break up too fast to penetrate to vital organs. The best example is the Glaser Safety Slug, a projectile designed to break up on impact and generate a large but shallow temporary cavity. Fackler, when asked to estimate the survival time of someone shot in the front mid-abdomen with a Glaser slug, responded, "About three days, and the cause of death would be peritonitis."[14]

In cases where some fragmentation has occurred in handgun wounds, the bullet fragments are generally found within one centimeter of the permanent cavity. "The velocity of pistol bullets, even of the new high-velocity loadings, is insufficient to cause the shedding of lead fragments seen with rifle bullets."[15] It is obvious that any additional wounding effect caused by such fragmentation in a handgun wound is inconsequential.

Of the remaining factors, temporary cavity is frequently, and grossly, overrated as a wounding factor when analyzing wounds.[16] Nevertheless, historically it has been used in some cases as the primary means of assessing the wounding effectiveness of bullets.

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[10] Josselson, A., MD, Armed Forces Institute of Pathology, Walter Reed Army Medical Center, Washington, D.C., lecture series to FBI National Academy students, 1982-1983.

[11] Fackler, M.L., MD: "Ballistic Injury", Annals of Emergency Medicine 15: 12 December 1986.

[12] Fackler, M.L., Surinchak, J.S., Malinowski, J.A.; et.al.: "Bullet Fragmentation: A Major Cause of Tissue Disruption", Journal of Trauma 24: 35-39, 1984.

[13] Fragmenting rifle bullets in some of Fackler's experiments have caused damage 9 centimeters from the permanent cavity. Such remote damage is not found in handgun wounds. Fackler stated at the Workshop that when a handgun bullet does fragment the pieces typically are found within one centimeter of the wound track.

[14] Fackler, M.L., M.D., Director, Wound Ballistics Laboratory, Letterman Army Institute of Research, Presidio of San Francisco, CA, letter: "Bullet Performance Misconceptions", International Defense Review 3; 369-370, 1987.

[15] DiMaio, V.J.M.: Gunshot Wounds, Elsevier Science Publishing Company, New York, NY 1987, page 47.

[16] Lindsay, Douglas, MD: "The Idolatry of Velocity, or Lies, Damn Lies, and Ballistics", Journal of Trauma 20: 1068-1069, 1980.

The most notable example is the Relative Incapacitation Index (RII) which resulted from a study of handgun effectiveness sponsored by the Law Enforcement Assistance Administration (LEAA). In this study, the assumption was made that the greater the temporary cavity, the greater the wounding effect of the round. This assumption was based on a prior assumption that the tissue bounded by the temporary cavity was damaged or destroyed.[17]

In the LEAA study, virtually every handgun round available to law enforcement was tested. The temporary cavity was measured, and the rounds were ranked based on the results. The depth of penetration and the permanent cavity were ignored. The result according to the RII is that a bullet which causes a large but shallow temporary cavity is a better incapacitater than a bullet which causes a smaller temporary cavity with deep penetration.

Such conclusions ignore the factors of penetration and permanent cavity. Since vital organs are located deep within the body, it should be obvious that to ignore penetration and permanent cavity is to ignore the only proven means of damaging or disrupting vital organs.

Further, the temporary cavity is caused by the tissue being stretched away from the permanent cavity, not being destroyed. By definition, a cavity is a space[18] in which nothing exists. A temporary cavity is only a temporary space caused by tissue being pushed aside. That same space then disappears when the tissue returns to its original configuration.

Frequently, forensic pathologists cannot distinguish the wound track caused by a hollow point bullet (large temporary cavity) from that caused by a solid bullet (very small temporary cavity). There may be no physical difference in the wounds. If there is no fragmentation, remote damage due to temporary cavitation may be minor even with high velocity rifle projectiles.[19] Even those who have espoused the significance of temporary cavity agree that it is not a factor in handgun wounds:

> "In the case of low-velocity missiles, e.g., pistol bullets, the bullet produces a direct path of destruction with very little lateral extension within the surrounding tissues. Only a small temporary cavity is produced. To cause significant injuries to a structure, a pistol bullet must strike that structure directly. The amount of kinetic energy lost in tissue by a pistol bullet is insufficient to cause remote injuries produced by a high velocity rifle bullet."[20]

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17 Bruchey, W.J., Frank, D.E.: Police Handgun Ammunition Incapacitation Effects, National Institute of Justice Report 100-83. Washington, D.C., U.S. Government Printing Office, 1984, Vol. 1: Evaluation.

18 Webster's Ninth New Collegiate Dictionary, Merriam-Webster Inc., Springfield MA, 1986: "An unfilled space within a mass."

19 Fackler, M.L., Surinchak, J.S., Malinowski, J.A.; et.al.: "Bullet Fragmentation: A Major Cause of Tissue Disruption", Journal of Trauma 24: 35-39, 1984.

20 DiMaio, V.J.M.: Gunshot Wounds, Elsevier Science Publishing Company, New York, NY 1987, page 42.

The reason is that most tissue in the human target is elastic in nature. Muscle, blood vessels, lung, bowels, all are capable of substantial stretching with minimal damage. Studies have shown that the outward velocity of the tissues in which the temporary cavity forms is no more than one tenth of the velocity of the projectile.[21] This is well within the elasticity limits of tissue such as muscle, blood vessels, and lungs, Only inelastic tissue like liver, or the extremely fragile tissues of the brain, would show significant damage due to temporary cavitation.[22]

The tissue disruption caused by a handgun bullet is limited to two mechanisms. The first, or crush mechanism is the hole the bullet makes passing through the tissue. The second, or stretch mechanism is the temporary cavity formed by the tissues being driven outward in a radial direction away from the path of the bullet. Of the two, the crush mechanism, the result of penetration and permanent cavity, is the only handgun wounding mechanism which damages tissue.[23] To cause significant injuries to a structure within the body using a handgun, the bullet must penetrate the structure. Temporary cavity has no reliable wounding effect in elastic body tissues. Temporary cavitation is nothing more than a stretch of the tissues, generally no larger than 10 times the bullet diameter (in handgun calibers), and elastic tissues sustain little, if any, residual damage.[24, 25, 26]

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21 Fackler, M.L., Surinchak, J.S., Malinowski, J.A.; et.al.: "Bullet Fragmentation: A Major Cause of Tissue Disruption", Journal of Trauma 24: 35-39, 1984.

22 Fackler, M.L., MD: "Ballistic Injury", Annals of Emergency Medicine 15: 12 December 1986.

23 Wound Ballistic Workshop: "9mm vs. .45 Auto", FBI Academy, Quantico, VA, September, 1987. Conclusion of the Workshop.

24 Fackler, M.L., MD: "Ballistic Injury", Annals of Emergency Medicine 15: 12 December 1986.

25 Fackler, M.L., Malinowski, J.A.: "The Wound Profile: A Visual Method for Quantifying Gunshot Wound Components", Journal of Trauma 25: 522-529, 1985.

26 Lindsay, Douglas, MD: "The Idolatry of Velocity, or Lies, Damn Lies, and Ballistics", Journal of Trauma 20: 1068-1069, 1980.

THE HUMAN TARGET

With the exceptions of hits to the brain or upper spinal cord, the concept of reliable and reproducible immediate incapacitation of the human target by gunshot wounds to the torso is a myth.[27] The human target is a complex and durable one. A wide variety of psychological, physical, and physiological factors exist, all of them pertinent to the probability of incapacitation. However, except for the location of the wound and the amount of tissue destroyed, none of the factors are within the control of the law enforcement officer.

Physiologically, a determined adversary can be stopped reliably and immediately only by a shot that disrupts the brain or upper spinal cord. Failing a hit to the central nervous system, massive bleeding from holes in the heart or major blood vessels of the torso causing circulatory collapse is the only other way to force incapacitation upon an adversary, and this takes time. For example, there is sufficient oxygen within the brain to support full, voluntary action for 10-15 seconds after the heart has been destroyed.[28]

In fact, physiological factors may actually play a relatively minor role in achieving rapid incapacitation. Barring central nervous system hits, there is no physiological reason for an individual to be incapacitated by even a fatal wound, until blood loss is sufficient to drop blood pressure and/or the brain is deprived of oxygen. The effects of pain, which could contribute greatly to incapacitation, are commonly delayed in the aftermath of serious injury such as a gunshot wound. The body engages survival patterns, the well known "fight or flight" syndrome. Pain is irrelevant to survival and is commonly suppressed until some time later. In order to be a factor, pain must first be perceived, and second must cause an emotional response. In many individuals, pain is ignored even when perceived, or the response is anger and increased resistance, not surrender.

Psychological factors are probably the most important relative to achieving rapid incapacitation from a gunshot wound to the torso. Awareness of the injury (often delayed by the suppression of pain); fear of injury, death, blood, or pain; intimidation by the weapon or the act of being shot; preconceived notions of what people do when they are shot; or the simple desire to quit can all lead to rapid incapacitation even from minor wounds. However, psychological factors are also the primary cause of incapacitation failures.

The individual may be unaware of the wound and thus has no stimuli to force a reaction. Strong will, survival instinct, or sheer emotion such as rage or hate can keep a grievously injured individual fighting, as is common on the battlefield and in the street. The effects of chemicals can be powerful stimuli preventing incapacitation. Adrenaline alone can be sufficient to keep a mortally wounded adversary functioning. Stimulants, anesthetics, pain killers, or tranquilizers can all prevent incapacitation by suppressing pain, awareness of the injury, or eliminating any concerns over the injury. Drugs such as cocaine, PCP, and heroin are disassociative in nature. One of their effects is that the individual "exists" outside of his body. He sees and experiences what happens to his body, but as an outside observer who can be unaffected by it yet continue to use the body as a tool for fighting or resisting.

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[27] Wound Ballistic Workshop: "9mm vs. .45 Auto", FBI Academy, Quantico, VA, September 1987. Conclusion of the Workshop.

[28] Wound Ballistic Workshop: "9mm vs. .45 Auto", FBI Academy, Quantico, VA, September 1987. Conclusion of the Workshop.

Psychological factors such as energy deposit, momentum transfer, size of temporary cavity or calculations such as the RII are irrelevant or erroneous. The impact of the bullet upon the body is no more than the recoil of the weapon. The ratio of bullet mass to target mass is too extreme.

The often referred to "knock-down power" implies the ability of a bullet to move its target. This is nothing more than momentum of the bullet. It is the transfer of momentum that will cause a target to move in response to the blow received. "Isaac Newton proved this to be the case mathematically in the 17th Century, and Benjamin Robins verified it experimentally through the invention and use of the ballistic pendulum to determine muzzle velocity by measurement of the pendulum motion."[29]

Goddard amply proves the fallacy of "knock-down power" by calculating the heights (and resultant velocities) from which a one pound weight and a ten pound weight must be dropped to equal the momentum of 9mm and .45ACP projectiles at muzzle velocities, respectively. The results are revealing. In order to equal the impact of a 9mm bullet at its muzzle velocity, a one pound weight must be dropped from a height of 5.96 feet, achieving a velocity of 19.6 fps. To equal the impact of a .45ACP bullet, the one pound weight needs a velocity of 27.1 fps and must be dropped from a height of 11.4 feet. A ten pound weight equals the impact of a 9mm bullet when dropped from a height of 0.72 inches (velocity attained is 1.96 fps), and equals the impact of a .45 when dropped from 1.37 inches (achieving a velocity of 2.71 fps).[30]

A bullet simply cannot knock a man down. If it had the energy to do so, then equal energy would be applied against the shooter and he too would be knocked down. This is simple physics, and has been known for hundreds of years.[31] The amount of energy deposited in the body by a bullet is approximately equivalent to being hit with a baseball.[32] Tissue damage is the only physical link to incapacitation within the desired time frame, i.e., instantaneously.

The human target can be reliably incapacitated only by disrupting or destroying the brain or upper spinal cord. Absent that, incapacitation is subject to a host of variables, the most important of which are beyond the control of the shooter. Incapacitation becomes an eventual event, not necessarily an immediate one. If the psychological factors which can contribute to incapacitation are present, even a minor wound can be immediately incapacitating. If they are not present, incapacitation can be significantly delayed even with major, unsurvivable wounds.

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[29] Goddard, Stanley: "Some Issues for Consideration in Choosing Between 9mm and .45ACP Handguns", Battelle Labs, Ballistic Sciences, Ordnance Systems and Technology Section, Columbus, OH, presented to the FBI Academy, 2/16/88, pages 3-4.

[30] Goddard, Stanley: "Some Issues for Consideration in Choosing Between 9mm and .45ACP Handguns", Battelle Labs, Ballistic Sciences, Ordnance Systems and Technology Section, Columbus, OH, presented to the FBI Academy, 2/16/88, pages 3-4.

[31] Newton, Sir Isaac, Principia Mathematica, 1687, in which are stated Newton's Laws of Motion. The Second Law of Motion states that a body will accelerate, or change its speed, at a rate that is proportional to the force acting upon it. In simpler terms, for every action there is an equal but opposite reaction. The acceleration will of course be in inverse proportion to the mass of the body. For example, the same force acting upon a body of twice the mass will produce exactly half the acceleration.

[32] Lindsay, Douglas, MD, presentation to the Wound Ballistics Workshop, Quantico, VA, 1987.

Field results are a collection of individualistic reactions on the part of each person shot which can be analyzed and reported as percentages. However, no individual responds as a percentage, but as an all or none phenomenon which the officer cannot possibly predict, and which may provide misleading data upon which to predict ammunition performance.

AMMUNITION SELECTION CRITERIA

The critical wounding components for handgun ammunition, in order of importance, are penetration and permanent cavity.[33] The bullet must penetrate sufficiently to pass through vital organs and be able to do so from less than optimal angles. For example, a shot from the side through an arm must penetrate at least 10-12 inches to pass through the heart. A bullet fired from the front through the abdomen must penetrate about 7 inches in a slender adult just to reach the major blood vessels in the back of the abdominal cavity. Penetration must be sufficiently deep to reach and pass through vital organs, and the permanent cavity must be large enough to maximize tissue destruction and consequent hemorrhaging.

Several design approaches have been made in handgun ammunition which are intended to increase the wounding effectiveness of the bullet. Most notable of these is the use of a hollow point bullet designed to expand on impact.

Expansion accomplishes several things. On the positive side, it increases the frontal area of the bullet and thereby increases the amount of tissue disintegrated in the bullet's path. On the negative side, expansion limits penetration. It can prevent the bullet from penetrating to vital organs, especially if the projectile is of relatively light mass and the penetration must be through several inches of fat, muscle, or clothing.[34]

Increased bullet mass will increase penetration. Increased velocity will increase penetration but only until the bullet begins to deform, at which point increased velocity decreases penetration. Permanent cavity can be increased by the use of expanding bullets, and/or larger diameter bullets, which have adequate penetration. However, in no case should selection of a bullet be made where bullet expansion is necessary to achieve desired performance.[35] Handgun bullets expand in the human target only 60-70% of the time at best. Damage to the hollow point by hitting bone, glass, or other intervening obstacles can prevent expansion. Clothing fibers can wrap the nose of the bullet in a cocoon like manner and prevent expansion. Insufficient impact velocity caused by short barrels and/or longer range will prevent expansion, as will simple manufacturing variations. Expansion must never be the basis for bullet selection, but considered a bonus when, and if, it occurs. Bullet selection should be determined based on penetration first, and the unexpanded diameter of the bullet second, as that is all the shooter can reliably expect.

It is essential to bear in mind that the single most critical factor remains penetration. While penetration up to 18 inches is preferable, a handgun bullet MUST reliably penetrate 12 inches of soft body tissue at a minimum, regardless of whether it expands or not. If the bullet does not reliably penetrate to these depths, it is not an effective bullet for law enforcement use.[36]

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[33] Wound Ballistic Workshop: "9mm vs. .45 Auto", FBI Academy, Quantico, VA, September, 1987. Conclusion of the Workshop.

[34] Jones, J.A.: Police Handgun Ammunition. Southwestern Institute of Forensic Sciences at Dallas, 523D Medical Center Drive, Dallas, TX, 1985.

[35] Wound Ballistic Workshop: "9mm vs. .45 Auto", FBI Academy, Quantico, VA, September, 1987. Conclusion of the Workshop.

[36] Wound Ballistic Workshop: "9mm vs. .45 Auto", FBI Academy, Quantico, VA, September 1987. Conclusion of the Workshop.

Given adequate penetration, a larger diameter bullet will have an edge in wounding effectiveness. It will damage a blood vessel the smaller projectile barely misses. The larger permanent cavity may lead to faster blood loss. Although such an edge clearly exists, its significance cannot be quantified.

An issue that must be addressed is the fear of over penetration widely expressed on the part of law enforcement. The concern that a bullet would pass through the body of a subject and injure an innocent bystander is clearly exaggerated. Any review of law enforcement shootings will reveal that the great majority of shots fired by officers do not hit any subjects at all. It should be obvious that the relatively few shots that do hit a subject are not somehow more dangerous to bystanders than the shots that miss the subject entirely.

Also, a bullet that completely penetrates a subject will give up a great deal of energy doing so. The skin on the exit side of the body is tough and flexible. Experiments have shown that it has the same resistance to bullet passage as approximately four inches of muscle tissue.[37]

Choosing a bullet because of relatively shallow penetration will seriously compromise weapon effectiveness, and needlessly endanger the lives of the law enforcement officers using it. No law enforcement officer has lost his life because a bullet over penetrated his adversary, and virtually none have ever been sued for hitting an innocent bystander through an adversary. On the other hand, tragically large numbers of officers have been killed because their bullets did not penetrate deeply enough.

[37] Fackler, M.L., M.D., Director, Wound Ballistics Laboratory, Letterman Army Institute of Research, Presidio of San Francisco, CA, letter: "Bullet Performance Misconceptions", International Defense Review 3; 369-370, 1987.

THE ALLURE OF SHOOTING INCIDENT ANALYSES

There is no valid, scientific analysis of actual shooting results in existence, or being pursued to date. It is an unfortunate vacuum because a wealth of data exists, and new data is being sadly generated every day. There are some well publicized, so called analyses of shooting incidents being promoted, however, they are greatly flawed. Conclusions are reached based on samples so small that they are meaningless. The author of one, for example, extols the virtues of his favorite cartridge because he has collected ten cases of one shot stops with it.[38] Preconceived notions are made the basic assumptions on which shootings are categorized. Shooting incidents are selectively added to the "data base" with no indication of how many may have been passed over or why. There is no correlation between hits, results, and the location of the hits upon vital organs.

It would be interesting to trace a life-sized anatomical drawing on the back of a target, fire 20 rounds at the "center of mass" of the front, then count how many of these optimal, center of mass hits actually struck the heart, aorta, vena cava, or liver.[39] It is rapid hemorrhage from these organs that will best increase the likelihood of incapacitation. Yet nowhere in the popular press extolling these studies of real shootings are we told what the bullets hit.

These so called studies are further promoted as being somehow better and more valid than the work being done by trained researchers, surgeons and forensic labs. They disparage laboratory stuff, claiming that the "street" is the real laboratory and their collection of results from the street is the real measure of caliber effectiveness, as interpreted by them, of course. Yet their data from the street is collected haphazardly, lacking scientific method and controls, with no noticeable attempt to verify the less than reliable accounts of the participants with actual investigative or forensic reports. Cases are subjectively selected (how many are not included because they do not fit the assumptions made?). The numbers of cases cited are statistically meaningless, and the underlying assumptions upon which the collection of information and its interpretation are based are themselves based on myths such as knock-down power, energy transfer, hydrostatic shock, or the temporary cavity methodology of flawed work such as RII.

Further, it appears that many people are predisposed to fall down when shot. This phenomenon is independent of caliber, bullet, or hit location, and is beyond the control of the shooter. It can only be proven in the act, not predicted. It requires only two factors to be effected: a shot and cognition of being shot by the target. Lacking either one, people are not at all predisposed to fall down and don't. Given this predisposition, the choice of caliber and bullet is essentially irrelevant. People largely fall down when shot, and the apparent predisposition to do so exists with equal force among the good guys as among the bad. The causative factors are most likely psychological in origin. Thousands of books, movies and television shows have educated the general population that when shot, one is supposed to fall down.

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[38] He defines a one shot stop as one in which the subject dropped, gave up, or did not run more than 10 feet.

[39] This exercise was suggested by Dr. Martin L. Fackler, U.S. Army Wound Ballistics Laboratory, Letterman Army Institute of Research, San Francisco, California, as a way to demonstrate the problematical results of even the best results sought in training, i.e., shots to the center of mass of a target. It illustrates the very small actually critical areas within the relatively vast mass of the human target.

The problem, and the reason for seeking a better cartridge for incapacitation, is that individual who is not predisposed to fall down. Or the one who is simply unaware of having been shot by virtue of alcohol, adrenaline, narcotics, or the simple fact that in most cases of grievous injury the body suppresses pain for a period of time. Lacking pain, there may be no physiological effect of being shot that can make one aware of the wound. Thus the real problem: if such an individual is threatening one's life, how best to compel him to stop by shooting him?

The factors governing incapacitation of the human target are many, and variable. The actual destruction caused by any small arms projectile is too small in magnitude relative to the mass and complexity of the target. If a bullet destroys about 2 ounces of tissue in its passage through the body, that represents 0.07 of one percent of the mass of a 180 pound man. Unless the tissue destroyed is located within the critical areas of the central nervous system, it is physiologically insufficient to force incapacitation upon the unwilling target. It may certainly prove to be lethal, but a body count is no evidence of incapacitation. Probably more people in this country have been killed by .22 rimfires than all other calibers combined, which, based on body count, would compel the use of .22's for self-defense. The more important question, which is sadly seldom asked, is what did the individual do when hit?

There is a problem in trying to assess calibers by small numbers of shootings. For example, as has been done, if a number of shootings were collected in which only one hit was attained and the percentage of one shot stops was then calculated, it would appear to be a valid system. However, if a large number of people are predisposed to fall down, the actual caliber and bullet are irrelevant. What percentage of those stops were thus preordained by the target? How many of those targets were not at all disposed to fall down? How many multiple shot failures to stop occurred? What is the definition of a stop? What did the successful bullets hit and what did the unsuccessful bullets hit? How many failures were in the vital organs, and how many were not? How many of the successes? What is the number of the sample? How were the cases collected? What verifications were made to validate the information? How can the verifications be checked by independent investigation?

Because of the extreme number of variables within the human target, and within shooting situations in general, even a hundred shootings is statistically insignificant. If anything can happen, then anything will happen, and it is just as likely to occur in your ten shootings as in ten shootings spread over a thousand incidents. Large sample populations are absolutely necessary.

Here is an example that illustrates how erroneous small samples can be. I flipped a penny 20 times. It came up heads five times. A nickel flipped 20 times showed heads 8 times. A dime came up heads 10 times and a quarter 15 times. That means if heads is the desired result, a penny will give it to you 25% of the time, and nickel 40% of the time, a dime 50% of the time and a quarter 75% of the time. If you want heads, flip a quarter. If you want tails, flip a penny. But then I flipped the quarter another 20 times and it showed heads 9 times - 45% of the time. Now this "study" would tell you that perhaps a dime was better for flipping heads. The whole thing is obviously wrong, but shows how small numbers lead to statistical lies. We know the odds of getting a head or tail are 50%, and larger numbers tend to prove it. Calculating the results for all 100 flips regardless of the coin used shows heads came up 48% of the time.

The greater the number and complexity of the variables, the greater the sample needed to give meaningful information, and a coin toss has only one simple variable – it can land heads or it can land tails. The coin population is not complicated by a predisposition to fall one way or the other, by chemical stimuli, psychological factors, shot placement, bone or obstructive obstacles, etc.; all of which require even larger numbers to evidence real differences in effects.

Although no cartridge is certain to work all the time, surely some will work more often than others, and any edge is desirable in one's self defense. This is simple logic. The incidence of failure to incapacitate will vary with the severity of the wound inflicted.[40] It is safe to assume that if a target is always 100% destroyed, then incapacitation will also occur 100% of the time. If 50% of the target is destroyed, incapacitation will occur less reliably. Failure to incapacitate is rare in such a case, but it can happen, and in fact has happened on the battlefield. Incapacitation is still less rare if 25% of the target is destroyed. Now the magnitude of bullet destruction is far less (less than 1% of the target) but the relationship is unavoidable. The round which destroys 0.07% of the target will incapacitate more often than the one which destroys 0.04%. However, only very large numbers of shooting incidents will prove it. The difference may be only 10 out of a thousand, but that difference is an edge, and that edge should be on the officer's side because one of those ten may be the subject trying to kill him.

To judge a caliber's effectiveness, consider how many people hit with it failed to fall down and look at where they were hit. Of the successes and failures, analyze how many were hit in vital organs, rather than how many were killed or not, and correlate that with an account of exactly what they did when they were hit. Did they fall down, or did they run, fight, shoot, hide, crawl, stare, shrug, give up and surrender? ONLY falling down is good. All other reactions are failures to incapacitate, evidencing the ability to act with volition, and thus able to choose to continue to try to inflict harm.

Those who disparage science and laboratory methods are either too short sighted or too bound by preconceived (or perhaps proprietary) notions to see the truth. The labs and scientists do not offer sure things. They offer a means of indexing the damage done by a bullet, understanding of the mechanics of damage caused by bullets and the actual effects on the body, and the basis for making an informed choice based on objective criteria and significant statistics.

The differences between bullets may be small, but science can give us the means of identifying that difference. The result is the edge all of law enforcement should be looking for. It is true that the streets are the proving ground, but give me an idea of what you want to prove and I will give you ten shootings from the street to prove it. That is both easy, and irrelevant. If it can happen, it will happen.

Any shooting incident is a unique event, unconstrained by any natural law or physical order to follow a predetermined sequence of events or end in predetermined results. What is needed is an edge that makes the good result more probable than the bad. Science will quantify the information needed to make the choice to gain that edge. Large numbers (thousands or more) from the street will provide the answer to the question "How much of an edge?".[41] Even if that edge is only 1%, it is not insignificant because the guy trying to kill you could be in that 1%, and you won't know it until it is too late.

[40] Severity is a function of location, depth, and amount of tissue destroyed.

[41] The numbers can be held down to reasonable limits by a scientific approach that collects objective information from investigative and forensic sources and sorts it by vital organs struck and target reactions to being hit. The critical questions are what damage was done and what was the reaction of the adversary.

CONCLUSIONS

Physiologically, no caliber or bullet is certain to incapacitate any individual unless the brain is hit. Psychologically, some individuals can be incapacitated by minor or small caliber wounds. Those individuals who are stimulated by fear, adrenaline, drugs, alcohol, and/or sheer will and survival determination may not be incapacitated even if mortally wounded.

The will to survive and to fight despite horrific damage to the body is commonplace on the battlefield, and on the street. Barring a hit to the brain, the only way to force incapacitation is to cause sufficient blood loss that the subject can no longer function, and that takes time. Even if the heart is instantly destroyed, there is sufficient oxygen in the brain to support full and complete voluntary action for 10-15 seconds.

Kinetic energy does not wound. Temporary cavity does not wound. The much discussed "shock" of bullet impact is a fable and "knock down" power is a myth. The critical element is penetration. The bullet must pass through the large, blood bearing organs and be of sufficient diameter to promote rapid bleeding. Penetration less than 12 inches is too little, and, in the words of two of the participants in the 1987 Wound Ballistics Workshop, "too little penetration will get you killed."[42, 43] Given desirable and reliable penetration, the only way to increase bullet effectiveness is to increase the severity of the wound by increasing the size of hole made by the bullet. Any bullet which will not penetrate through vital organs from less than optimal angles is not acceptable. Of those that will penetrate, the edge is always with the bigger bullet.[44]

[42] Fackler, M.L., MD, presentation to the Wound Ballistics Workshop, Quantico, VA, 1987.
[43] Smith, O'Brien C., MD, presentation to the Wound Ballistics Workshop, Quantico, VA, 1987.
[44] Fackler, M.L., MD, presentation to the Wound Ballistics Workshop, Quantico, VA, 1987.

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Armed self defense: the Canadian case*

by

Gary A. Mauser, Ph D
Institute of Canadian Urban Research Studies and
Faculty of Business Administration
Simon Fraser University
Burnaby, B.C. CANADA
V5A 1S6

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Armed self defense: the Canadian case

Abstract

There is a vigorous debate over the frequency with which private citizens resort to the use of firearms for self defense. No information has been previously available about how often firearms are used defensively outside of the United States. This paper estimates the frequency with which firearms are used for self protection by analyzing three telephone surveys of the general public in Canada and a fourth survey of the general public in the United States. Canadians report using firearms to protect themselves between 60,000 and 80,000 times per year from dangerous people or animals. More importantly, between 19,000 and 37,500 of these incidents involve defense against human threats. The results of the American survey confirm estimates about the frequency firearms are used for self protection in the United States (Kleck 1988, 1991). In comparison with the number of households with firearms, the frequency with which Canadians use firearms to defend themselves against human threats is somewhat less than that of Americans. Policy makers in both the United States and in Canada should be aware the private ownership of firearms has benefits as well as costs for society. Firearms bans may cost more lives than they save.

Self defense is a troublesome right. On the one hand, it would seem obvious that all people have -- or should have -- the inherent right to use physical force to defend themselves from assault. Not surprisingly, the criminal codes of many countries includes self defense as a legitimate justification for the use of deadly force. On the other hand, the right of self defense threatens our faith in the rule of law. It is too easy for revenge or even aggression to be confused with legitimate self defense. The intensity of this debate increases when the use of firearms in self defense is considered.

Self defense can be distinguished from all other reasons for using force, such as revenge. Self defense entails those acts intended to protect one's physical safety or property, or to protect the safety or property of others. Clearly, one is morally and legally justified to use force to protect oneself, or one's family, from dangerous animals, such as grizzly bears. As well, it is morally and legally proper to use physical force, even deadly force under certain conditions, in order to protect oneself, one's family, or one's property from criminal aggression. Revenge, however, involves retribution, or an attempt to punish an offender. The desire to punish, or to revenge oneself against a criminal, is not a legal reason for the use of force, of any degree, especially not deadly force. Certainly in a given incident, elements of vengeance might be mixed with a concern with self defense, but logically, retribution is not necessarily involved in self defense.

Criminologists have tended to ignore self defense, possibly because of its ethical ambiguity, and have preferred to view victims as either sharing culpability or as being passive targets for criminal aggression. Many scholars view victims as involved in "mutual combat" and therefore as blameworthy as the offender (Wolfgang 1958). Other scholars reject the "mutual combat" model, at least for family violence, rape, or violence against children (Berk et al 1983). In this perspective, a women being attacked by a rapist is seen as a passive target for the rapist, but most male-on-male violence would be viewed as "mutual combat." Despite the ethical ambiguity of self defense, it is not difficult to find exceptions to the "mutual combat" model. For example, women may legitimately use violence to resist becoming a rape victim, store owners (men or women) may legitimately use violence to avoid being robbed or killed by an armed robber, or anyone may use force to resist attack by a stranger.

As a consequence, criminologists have begun to expand the model of moral inequality to include situations where the victim is not passive, but instead takes forceful actions that are largely defensive (Kleck 1988).

The question of the defensive use of firearms has recently attracted the interest of criminologists. A hot debate has arisen over the frequency with which citizens use firearms to defend themselves or their families. Kleck (1988, 1991) estimated that between 700,000 and 1,000,000 people in the United States use a firearm in self protection each year. After making a number of methodological improvements, this estimate was later increased to between 2.1 million and 2.5 million defensive gun uses annually (Kleck and Gertz 1995). An alternative estimate is that there are about 80,000 to 82,000 uses annually (Cook 1991). Differences in methodology account for this enormous discrepancy. Cook's estimate is based upon the prestigious National Crime Victimization Survey (NCVS), which involved interviews with 59,000 households, while Kleck's earlier analysis was based upon a collection of thirteen representative surveys of the general public. The surveys used by Kleck were conducted by a variety of professional survey organizations for diverse clients. These clients range from Handgun Control Inc to the NRA and include media and independent academics. Kleck and Gertz (1995) argue that the NCVS is unsuited to estimate defensive gun use because it is a non-anonymous survey conducted by a branch of the federal government and was not designed to sample people who use firearms to resist criminal violence. First, it is easy to withhold information about a defensive gun use in the NCVS. Not only are R's screened for victimhood before they are asked if they did anything to protect themselves, but R's are never directly asked if they used a firearm to defend themselves. Second, because a defensive gun use is legally controversial, even under the best circumstances, many respondents would be expected to be afraid of admitting to an employee of the U.S. Department of Justice that they may have committed an illegal act, or that they may be in possession of an illegal gun.

The debate over the use of firearms in self protection has been almost entirely restricted to the United States. In Canada, for example, the prevailing attitude appears to be that there is no need for

self defense (Friedland 1984). Not only do the police actively discourage self defense in general, but armed self defense is widely considered to be illegal. Exceptionally few Canadian organizations argue that citizens have the right to defend themselves with weapons.[1] The most dramatic illustration of the official discouragement of armed self defense is the recent passage of an omnibus bill by the Canadian Parliament that, among other provisions, prohibits and confiscates without compensation, over half of all legally owned handguns in Canada on the grounds that they are small and so might be used for self defense.[2]

This lack of debate is particularly surprising because Canada and the United States "... probably resemble each other more than any other two countries on earth" (Lipset 1985, p 109). Both countries were former British colonies; both have had a "frontier experience," and both have shared similar waves of immigration (Lipset 1985; Tonso 1982). Almost a third of Canadian households (30 percent) have firearms as compared with half of households in the United States, and the violent crime rate in Canada (1,132 per 100,000) is apparently higher than that in the United States (746 per 100,000) in 1993 (Mauser and Margolis 1992; Statistics Canada 1994; FBI, 1994).[3] Despite the strong similarities, Canada differs in many ways from the United States. Some scholars have even argued that the United States is unique in the world, particularly with respect to its gun culture (Hofstadter 1970; Friedland 1984). Canada has long had much stricter firearms laws than the United States. Handguns have been registered since 1934, and a police permit has been required to purchase a firearm since 1978 (Hawley 1988). Unfortunately, little is known about how often Canadians use weapons to defend themselves from criminal violence. Although a few studies have investigated the carrying of weapons by Canadians (Sacco 1995; Kong 1994), and others have examined attitudes towards the use of firearms in self defense (Mauser 1990; Mauser and Margolis 1992), there are virtually no published studies that estimate the frequency with which firearms are used in self defense in Canada.[4] It is possible that Canada's "gun culture" resembles the United States more than has been assumed.

This paper examines the extent to which firearms are used in self defense in Canada, and compares these estimates with the available estimates of how often Americans use firearms to protect

themselves. In view of the similarities between the two countries, it is argued here that Canadians do not differ from Americans as much as has been thought with respect to the defensive use of firearms. The first section of the paper briefly compares the two countries, the legal situation, the nature of violent crime, and the sociology of firearms ownership. The main section of the paper estimates the frequency with which Canadians use firearms in self defense and compares these rates with those in the United States. The approach taken is based upon questions that have been asked by other researchers so that the results are comparable with similar studies in the United States (Kleck, 1988, 1991).

The Canadian situation

Unlike the United States, the Canadian constitution, in Section 92(14), mandates that the federal government is responsible for enacting criminal law and that the provinces are principally responsible for enforcement (Hogg 1992). Some variability inevitably arises across the country, but there is a high degree of national uniformity because there are frequent conferences among the provincial attorneys general, and most provinces rely upon the RCMP to act as the local police force. Despite disavowals by police officials, the Canadian criminal code does include the right of citizens to use deadly force to protect themselves (sections 34, 35, and 37). The key provision in the Canadian criminal code (§34) is that, no one may use "more force than is necessary" and then only when "he believes on reasonable grounds that he can not otherwise preserve himself from death or grievous bodily harm." In section 35, the code goes on to require that one must show that "he declined further conflict and quitted or retreated from it (the assault) as far as it was feasible to do so before the necessity of preserving himself ... arose." Moreover, the right to use physical force to defend non-family members is more limited than it is in many states, as are the Canadians' rights to repulse trespassers on their own property, or to use force to stop the commission of serious or violent crimes (Viz. sections 24, 40, and 41).

Self defense is also circumscribed in Canada by more conditions than are typically found in the United States. A wide range of self defensive weapons (e.g., Mace, pepper spray, small handguns) are

prohibited.[5] Ownership of any of these weapons is punishable by up to ten years imprisonment. For all practical purposes, it has been impossible to own a handgun for self protection since 1977.[6] Recent firearms legislation now requires firearms to not only be unloaded when stored in one's residence but must also be put under lock and key (Section 86 (3) of the Canadian Criminal Code).[7]

Another important difference between the United States and Canada is enforcement. Judging from newspaper reports, anyone who uses a weapon in self defense is much more likely to be charged in Canada than would be the case in the United States. Even if the attacker is not injured seriously. The charges may be "possession of a prohibited weapon," "careless use," or "unsafe storage of a firearm," rather than "assault" or "attempted murder." Apparently, the Crown is determined to discourage people from using "violence" to defend themselves.[8] Anyone who uses a firearm to defend him or herself must be financially able to prove in court that he or she acted in self defense.

The murder rate is typically much higher in the United States than in Canada. In Canada, the murder rate in 1993 was two per 100,000 residents; this is only one-fifth of the murder rate in the United States that year, where it was almost ten per 100,000. Despite the existence of "violent crime rate" indices, the murder rate is perhaps the best way to compare the two countries. This is due to the exceptional reliability of homicide statistics as well as the ambiguity of indices of "violent crime."

A few crime rates are higher in Canada than in the United States. In 1993, the burglary rate in Canada, at 1,414 per 100,000, was almost 50 percent higher than the US rate of 1,099 per 100,000. Even more striking is the comparison between the two countries in sexual assault. The Canadian 'forcible rape' rate, at 121 per 100,000, is much higher than the rate in the United States, forty-one per 100,000. However, this may be artificially high due to the difficulty of estimating 'forcible rape' from Canadian crime data. There is no category identical to 'forcible rape' in the Canadian criminal code, so it has had to be approximated, and therefore the comparison may be too inclusive.[9] The burglary comparison is more trustworthy than rape, as burglary is defined the virtually same way in both countries. Nevertheless, international comparisons are always problematic as there may be differences in the reliability of the police reports.

Despite the generally lower crime rate in Canada, intensive media coverage of brutal crimes has frightened the general public. This concern is reflected in the results of various surveys. The 1993 General Social Survey found that 25 percent of Canadians age fifteen years or older say that they feel somewhat or very unsafe walking alone in their neighborhood after dark.[10] Women are four times as likely as men to say that they feel somewhat or very unsafe walking alone in their neighborhood after dark (Sacco 1995). A related question generated a similar response. One in four Canadians reported feeling very or somewhat worried when alone in their homes at night. Again, women said they were more worried than did men (Sacco 1995).

Self defense courses for women are available at many Canadian universities and community centers. Many women's groups encourage women to learn how to protect themselves against rapists. The market for self defense items (e.g., dogs, martial arts courses, bear spray and personal alarms) is estimated to be $11 - 15 million annually in British Columbia alone, Canada's Westernmost province (Lai 1994). Although it is a prohibited weapon, "bear spray" is widely sold by women's groups.[11] Surprisingly, a nationally recognized columnist recently called for women to arm for self defense (Amiel 1995).

Before examining firearms use in Canada and the United States, it is important to compare the ownership and use of firearms in the two countries. Substantially fewer Canadians have firearms than Americans. Between 28 percent and one-third of Canadian households have one or more firearms, while between 45 and 50 percent of households in the United States do so. Canadians have almost as many rifles (29%) as Americans (32%), but they have far fewer handguns. Estimates range between 3 percent and 7 percent of Canadian households have one or more handguns, while between 22 percent and 27 percent of households in the US do so (Mauser and Margolis 1992; Mauser and Buckner in press). For the most part, Canadians own firearms for the same reasons that Americans do. The principal reason given for owning firearms in either country is "hunting." Between 5 percent and 10 percent of Canadians as well as Americans are cite "target shooting" or "part of a gun collection." as their primary reason for firearms ownership. The principal difference has to do with self defense.

Canadians are much less likely (5 percent) than Americans (22 percent) to volunteer "self defense" as their main reason for owning a firearm.

Methods

This paper is based upon three telephone surveys of the general public in Canada and a fourth survey of the general public in the United States, all of which have been conducted under the direction of the author during the past decade (See Table 1). All four surveys involved professional survey firms and random digit dialing methods to generate representative samples of the general public. All R's were interviewed over the telephone by professional interviewers. The most recent survey was conducted by Canadian Facts (CF), between January 18 and 23, 1995 and used stratified random sampling methods to interview 1,505 R's, eighteen years of age or older, in all ten provinces, but not in either of the territories (Mauser and Buckner in press).[12] Canadian Facts is one of the largest private survey companies in Canada.

Table 1 about here

Early in 1990, a survey of the general public in the United States was undertaken simultaneously with a survey of the Canadian general public (Mauser & Margolis 1992). Both of these surveys were conducted by the Center for Social and Urban Research (CSUR) at the University of Pittsburgh.[13] Representative samples of adult residents, eighteen years of age or older, were drawn using stratified random sampling methods to ensure adequate representation from both countries. Professional interviewers completed 393 telephone interviews in all Canadian provinces (including ninety-three interviews of residents in Quebec conducted in French), but not in either of the territories, and 344 in the United States during the period of March 20 through April 10, 1990. The target population in the United States included all states, except Hawaii and Alaska, and the District of Columbia.

A third survey of the general public in Canada was conducted by Sowden Research between April 5-9, 1988 (Mauser 1990). Sowden Research is a professional survey research firm in British Columbia.[14] In this study, a representative sample of adult residents, eighteen years of age or older, was drawn using stratified random sampling methods to ensure adequate representation of all households in British Columbia. Professional interviewers completed 403 interviews over the telephone with throughout BC.

Although none of these studies had self defense as its principal focus, each study included a short series of questions about the use of firearms for self protection. These questions were based upon Kleck's analysis of a similar series of questions originally used in the 1981 Hart Poll (Kleck 1988, 1991). Nearly identical questions were asked in both the CSUR and CF studies. In the CF study, respondents were first asked: "Within the past five years, have you yourself, or another member of your household used a gun, even if it was not fired, for self-protection, or for protection of property at home, at work, or elsewhere? Please do not include military service, police work, or work as a security guard." If the respondent answered, "yes," he or she was then asked, "Was this to protect against an animal or a person (or both)." The questions used in the CSUR study were almost identical. Respondents in both Canada and the US were first asked: "Aside from military service or police work, in the past five years, have you yourself, or a member of your household, used a gun for self-protection, or for protection of property at home, at work, or elsewhere, even if it wasn't fired?" If the respondent answered, "yes," he or she was then asked, "Was this to protect against an animal or a person (or both)."

Despite the small differences among these questions, the formulation used in these surveys is superior to the original 1981 Hart question. First, this version asks about the defensive use of <u>all types of guns</u>, not just handguns. Second, it is more precise because it asks about a specific time period rather than the vague "have you ever used a gun." Third, it asks about the self defense of people as well as the protection of property. Fourth, it excludes the defensive uses of firearms as part of military and police duties. Finally, it distinguishes between defensive uses against animal threats and human

threats. However, both the Hart and the Mauser questions ask about firearms use by anyone in the family, not just those of the respondent. As others have shown, this leads to substantial underreporting of the defensive firearms uses of other household members (Kleck and Gertz 1995). It is preferable to rely upon the experiences of the Rs themselves.

The CF study also included two further follow-up questions, "Did this incident or any of these incidents happen in the past twelve months?" and, "Was it you who used a gun defensively or did someone else in your household do this?" The first question facilitates annual estimates of firearms use, and the second question, by identifying how many (if any) of the incidents involved the R, helps to increase confidence in the analysis.

The question used in the 1988 Sowden study differed the most from the other studies in that it asked if respondents had "ever" used a firearm for self protection, rather than asking if they had used a firearm for self protection "in the past five years." (See Table 1 for a comparison of the question wordings). It is preferable to ask about a fixed time period rather than leaving it open because problems with memory loss have been found to increase with the use of longer periods of recall (Sudman and Bradburn 1973). Since relatively few people use their firearms in self protection, it was felt that a relatively long time period was required. Therefore, it was decided to use a five-year period. In hindsight, a one-year time period would have been better. In all surveys, R's were asked these questions without screening for gun ownership or for prior victimization. This point is important because some R's may not have firearms now, but may have used firearms defensively when they did have access to firearms. Similarly with screening for victimhood: R's may not report being a victim because they do not consider themselves a victim, having successfully frightened off the attacker with a firearm.

The similarity of the questions used in these Canadian surveys permits greater confidence in comparing the Canadian results with those conducted in the United States. The CSUR study is particularly important in this regard. In this study, surveys were conducted simultaneously of the

general publics in both the US and in Canada. A number of surveys of the general adult population in the United States have used basically similar questions.[15]

The use of firearms in self defense

This section estimates how often Canadians use firearms to defend themselves, and compares these estimates with how often Americans are estimated to use firearms to protect themselves. For purposes of estimation, the two best surveys were the CSUR and CF studies because they were based upon nationwide samples and the question was limited to a five-year period. Table 2 presents the percentages from each of the four surveys and estimates the numbers of people who used firearms to protect themselves against human or animal threats or both. In the CF survey, 2.1 percent of R's report that someone in their household had used a firearm for self protection during the past five years, and in the CSUR survey, 3.1 percent of R's report having done so. The Sowden survey estimated that 4.0 percent of R's reported that someone in their household had used a firearm for self protection during the past five years. These are very small percentages, but, when it is realized that there were 10,079,442 households in Canada in 1991, they translate into surprisingly large numbers of Canadians.

Table 2 about here

The three Canadian survey results are quite similar and mutually reinforcing. The Canadian Facts survey, with a sample size of 1,505, has the smallest random sampling error. The 95% confidence interval estimate for the CF survey is plus or minus 0.7 percentage points for the five-year estimate. The confidence interval estimates for the other two surveys are larger because the sample sizes are smaller. The 95% confidence interval estimate for the CSUR survey is 1.7 percentage points for the five-year estimate, and it is 1.9 percentage points for the Sowden survey.

In order to estimate annual frequencies, three simple and logical steps were taken. First, it was conservatively assumed that only one person in the household had used a firearm for self protection

during this time period, and had done so only once. This is very conservative because it has been found that more than one member of a household have used a firearm in self defense and that household members typically have used a firearm in self defense more than once (Kleck and Gertz 1995). Second, it was assumed, when other information was lacking, that the probability of use was the same for each of the years during this time period, thus, the total was simply divided by five. Given that there is a greater likelihood of forgetting incidents the earlier the event occurred, this probably underestimates the frequency with which firearms were used during the past twelve months. Third, this percentage was multiplied by the number of households in the 1991 Canadian census.

In the 1995 CF survey, it was not necessary to divide the five-year reports by five, because 32 percent of R's reported that some of these incidents had occurred during the past twelve months. Thus it is possible to know that 0.67 percent of the total sample used a firearm for self protection at least once during the past twelve months. If it is conservatively assumed that only one such incident occurred during the this period, to only one individual in a household, then this implies some 66,000 individuals used a firearm for self protection during the past twelve months. In the 1990 CSUR survey, no follow-up question was included, so it is unknown how many of the reported incidents occurred during the past twelve months. Thus, to estimate annual frequencies, it was necessary to assume that R's were equally likely to have used a firearm in self protection throughout the five-year period. If only one such incident occurred during the past five years, then this implies that approximately 0.62 percent or R's, or 62,500 individuals, used a firearm during the past twelve-month period. (These calculations are shown in Table 2).

The 1988 Sowden survey, while still useful, is less satisfactory than either the CF or CSUR surveys. First, the target population was the general public in British Columbia, not the Canadian general public, so, strictly speaking, the results may only be generalized to BC. Despite this limitation, the BC results have been extrapolated to Canada in order to compare them with the two national results by simply multiplying the percentage of households that report using firearms in self defense by the number of households in Canada. This is not unreasonable as BC has the same

percentage of households with firearms as the Canadian national average. Second, the question asked R's in the BC study if they had "ever" used a firearm for self protection, rather than asking if they had used a firearm for self protection "within the past five years," as in both the CSUR and CF studies. Despite these limitations, these results are still indicative. In the Sowden survey, 8.0 percent of R's reported that at least one person in their household had "ever" used a firearm in self protection. In order to approximate the frequency with which firearms were used during the previous five years, the estimates generated by the Sowden study were divided in half to give 4.0 percent. Due to memory loss, R's would be expected to have forgotten a greater percentage of earlier events. A review of previous surveys shows that this is a conservative correction, and it gives a proportion more in line with the findings of the other two surveys in this study.[16] These percentages were then projected to the national level, as has been done with the CSUR and CF surveys, giving an estimate of 80,000 defensive uses of firearms during the past 12 months. Despite the limitations, this survey estimate, while somewhat higher than the two national estimates, still falls within the limits of sampling error.

In summary, Canadians reported using firearms between 62,500 and 80,000 times per year to protect themselves from wild animals or criminal violence. The best estimate is that firearms are used defensively around 66,000 times per year. The three surveys agree that most of these defensive uses of firearms were to protect against wild animals. The Canadian Facts survey found that 1.6 percent of Rs reported that someone in their household had used a firearm to protect him or herself against animal threats during the past five years. The CSUR Canadian survey found a nearly identical percentage (1.8%), and the Sowden survey found that 2.6 percent of Rs reported using a firearm to protect themselves against threats from wild animals. This contrasts starkly with the CSUR American survey which found that only 0.6 percent of Rs reporting using a firearm to protect against animal threats during the past five years. The findings of the CSUR American survey is consistent with other American surveys (Kleck 1991).

Perhaps the most controversial question is how often do Canadians report using firearms to protect themselves against human threats. Based upon the three representative surveys described in this paper, the best estimate is that Canadians use firearms against human threats about 30,000 times per year. The two best surveys methodologically were the 1995 Canadian Facts survey and the 1990 CSUR survey. The CF survey found that firearms were used against human threats around 19,000 annually, and the CSUR survey estimated that over 32,000 Canadians did so. The Sowden survey, as expected, had the highest estimate, 37,500 incidents annually.

How do these results compare with what is known about the frequency with which firearms are reported to have been used in self defense in the United States? The best point of comparison are the two CSUR surveys, because they involved identically worded questions and were conducted simultaneously in both the United States and Canada by the same professional interviewers. Table 2 shows the frequency with which firearms are used in self defense in the United States. According to the CSUR survey, conducted in 1990, firearms are used in self defense over 750,000 times per year in the United States. The bulk of these defensive uses of firearms, approximately 700,000 uses, are to repel human threats. The remaining defensive uses of firearms deal with animal threats. As reported elsewhere, these results are consistent with Kleck's estimates that between 700,000 and 1,000,000 Americans used firearms defensively against human threats each year during this time period (Kleck 1991, pp 104-111). Kleck's estimates are based upon thirteen surveys that were methodologically quite similar to the surveys presented in this paper. Although not directly comparable due to methodological improvements, Kleck and Gertz (1995) sharply increased the estimate of Americans who use firearms annually to protect themselves from human threats to between 2.1 million and 2.5 million.

How does Canada compare the United States in the extent to which firearms are used to defend against human threats? As may be seen in Table 2, 1.6 percent of the Canadian sample reported using firearms against human threats during the past five years, while 3.8 percent of the American sample did so. In other words, Canadians use firearms against human threats around 30,000 times per year,

while an estimated 700,000 Americans do so each year. Since Canada has roughly 10 percent of the adult population of the United States, Canadians use firearms to repel human threats less than half as often as do Americans. This lower level may be due to the smaller percentage of Canadians who are firearms owners, since fewer Canadian households have firearms than do than American households, as well as to the lower level of violent crime in Canada.

How plausible are these estimates for Canadian using firearms in self defense? While at first they may seem surprising, these estimates are not out of line with the number of gun owners in Canada. Surveys show that between 28 percent and one-third of all households in Canada have at least one firearm (Mauser and Margolis 1992). Thus, given that there were just over ten million households in 1991 in Canada, an estimate of 30,000 defensive uses of firearms implies that between 0.9 percent and 1.1 percent of these households use firearms for defensive purposes in any given year. In the US, in the same year there were 97.1 million households, an estimated 49 percent, or 47.6 million, households with firearms, and an estimated 700,000 minimum defensive uses of firearms per year.[17] This yields 1.6 percent of American households that use firearms for defensive purposes in any given year. Thus the Canadian rate is hardly implausible, as it is between one-half and three-quarters of the rate in the United States.

But would Canadians use firearms to defend themselves? Surveys show that over half (60 percent) of Canadians report that, if they had a firearm, they would use it to protect themselves or their families (Mauser and Buckner in press). Unsurprisingly, firearms-owners report they are more willing to use a firearm to protect themselves or their families than are other Canadians (67 percent vs. 59 percent).

The percentages of Canadians found to use firearms in self protection are not out of line with the other steps Canadians are taking to protect themselves from criminal violence. The 1993 General Social Survey found that 12 percent Canadians reported that they carry something routinely to protect themselves from victimization. Women report taking greater precautions than do men: 17 percent of women report carrying something routinely for protection, while only 7 percent of men report doing so

(Sacco 1995). The GSS also found that 32 percent of Canadians fifteen years of age or older reported they had installed new locks, 15 percent reported they had installed a burglar alarm, 12 percent had obtained a dog, 10 percent had taken a self-defense course, and (2 percent) reported they had obtained a gun (Sacco 1995). The finding that (2 percent) of the Canadian population reported they had ever "obtained a gun" to protect themselves or their property from crime provides additional confirmation of the findings of this study. However, the GSS offers only indirect support for the findings of this study because the questions asked in the GSS differs importantly from those asked here. The GSS asked if the R "obtained a gun," while the question in this study concerned "using a gun." Also, the GSS question was limited to human threats, but the question asked in this study involved both animal as well as human threats. Furthermore, the GSS question did not include a specific time frame, while here the question focused upon the past five years. In the light of these results, it should not be too surprising that 3 percent of the adult population report having actually used a firearm for self protection during the past five years.

How could so many Canadians use firearms in self defense without it having become common knowledge before this? The answer is that self defense activity is basically invisible to government. First, there is no reason to report it, such as there is with property crimes or with crimes involving serious victimization. As well, both the defender and aggressor may have strong reason not to report the incident, given the moral ambiguity of the act. If the defender used a firearm (or any other weapon) to defend him or herself, there is a strong possibility that s/he would face legal charges. Finally, even though medical doctors are required to report gun-shot wounds, the available statistics suggest that self defense uses of firearms rarely result in serious physical injury to either participant, so that in the vast bulk of the cases there is no injury that would require reporting (Kleck, 1991).

The survey estimates presented here of the number of people who use firearms in self defense are, if anything, probably too low. The underestimate is probably most severe for the defense use of firearms against human threats. Given the sensitive nature of defensive use of firearms, it is possible that many respondents have concealed actual incidents so the true number is quite likely much higher

than reported here. A number of criminologists have shown that survey estimates of criminal and defensive gun uses have been underestimated. Cook (1985) has shown that NCVS estimates of woundings with firearms are too low. Other researchers have argued that survey estimates of a large range of violent events have been under-reported. For example, Loftin and MacKenzie (1990) have speculated that spousal violence and rapes might be many times more than reported in NCVS. An unknown number of defensive gun incidents would be expected to involve violent criminals defending themselves against other criminals (Wright and Rossi 1986). Such incidents would not be expected to be reported in telephone surveys. Due to their high mobility, low income, and probable reticence to be interviewed, criminals are among the least likely persons to be interviewed in surveys of the general population (Cook 1985; Kleck 1991). This implies that a sample bias exists that underestimates the total number of people who use firearms to protect themselves against human threats.

Undoubtedly, some R's may have included the 'carrying,' or the merely 'having' the firearm available in case of an attack, as an example of "use. However, there is ample evidence in criminological surveys that improvements in the measurement procedures yields higher estimates of controversial behaviors. Kleck and Gertz (1995) found that the estimated number of defensive uses of firearms in the US more than doubled when they improved the measurement procedures. Contrary to what some researchers have speculated, a large number of respondents were not found to have invented or exaggerated defensive gun use incidents. In their study, Kleck and Gertz found that by using a shorter time-period (one year rather than five years), and by interviewing the family member who had been involved in the self-defense incident, rather than relying upon a family informant, the problem of forgetting about incidents that had happened years earlier was considerably reduced. As has often been the case in criminology, better measurement procedures has increased the estimate of the controversial behavior (Hindelang et al 1981).

Conclusions

The survey results reported here show that firearms are used in Canada more often than many had believed in the defense of people and property. Canadians were found to use firearms about 30,000

times per year against human threats, compared with around 700,000 Americans estimated to do so each year. Compared to the number of households with firearms, Canadians use firearms to protect themselves against human threats between one-half and three-quarters as often as Americans. These findings suggest that Canada is more similar to the United States than had been thought by some scholars. The lower proportion of firearms owners who do so in Canada than in the US may however reflect the lower rate of criminal violence in Canada.

This paper also estimated the number of Americans who used firearms to protect themselves or their families. The CSUR survey of the general public in the United States paper estimated that approximately 700,000 Americans use firearms defensively against human threats annually. This estimate is consistent with other survey estimates and it confirms Kleck's original estimate in 1988 (Kleck 1988, 1991). These CSUR results constitute yet another independent survey that differs dramatically from estimates based upon the National Crime Victimization Survey.

This study provides the best available estimate of the frequency with which Canadians use firearms for self protection and it has significant implications for public policy. These estimates are only approximate, given the small sample sizes and the small incidence rates. However, the high level of agreement among the three samples of the general public provide strong support that firearms are used in Canada to protect people against violence. Since firearms are used in Canada around 66,000 times each year to defend against either human or animal threats, and more importantly, approximately 30,000 times annually to protect against criminal violence, this implies that the private ownership of firearms contributes significantly to public safety. It is unknown how many lives are actually saved, but if a life were saved in only 5 percent of these incidents, then the private ownership of firearms would save more than 3,300 lives annually in Canada. To put this in perspective, it should be noted that firearms are involved in the deaths of around 1,400 people annually in Canada (about 1,100 of these are suicides). While the exact number may be debatable, the results of these three survey studies makes it plausible that the private ownership of firearms saves some Canadian lives.

The results of this study support the responsible ownership of firearms. These findings are consistent with moderate firearms regulations but not with efforts to prohibit the private ownership of firearms. Given that firearms are potentially dangerous, laws or regulations are highly desirable that encourage responsible firearms ownership, such as background checks by the police, safety training, or safe-storage of firearms. Moreover, it is reasonable to pass legislation in order to keep firearms out of the hands of children, ignorant users, or career criminals. The findings of this study suggest that the private ownership of firearms offers benefits to the community as well as costs. Thus, laws that are intended to discourage, or have the effect of discouraging, firearms ownership from otherwise responsible adults might act perversely to decrease public safety rather than to increase it. Since prospective victims without criminal records are more likely to obey gun bans than are criminals, gun bans would be expected to produce larger relative reductions in defensive gun use by noncriminal victims than in criminal use of firearms. Additional firearms legislation may not act to save lives as claimed, but it may actually cost lives by rendering it too difficult to obtain a firearm when one is needed.

References

Amiel, B. (1995) Pro-choice gals-for-guns make sense. Maclean's, April 3, 1995: 11.

Bellis, M. (1995) Man get probation for firing at robbers. The Toronto Star, May 22, 1995: 25.

Berk, R.. A, Fenstermaker Berk, S., Loeseke, D. and Rauma, D. (1983). Mutual combat and other family violence myths. The dark side of families: current family violence research, (eds) D. Finkelhor, R. J. Gelles, G. T. Hotaling and M. A. Straus. Beverly Hills: Sage: 197-212.

Bureau of the Census (1991) U.S. population by age, sex, and households, 1990. Washington, DC.: U.S. Department of Commerce.

Cook, P. J. (1985) The case of the missing victims: gunshot woundings in the National Crime Survey. Journal of Quantitative Criminology. 76: 480-489.

Cook, P. J. (1991) The technology of personal violence. In Crime and justice, a review of research. Vol 14: 1-71. (ed) M. Tonry. Chicago: University of Chicago Press.

Federal Bureau of Investigation (1994). Uniform crime reports for the United States. 1993. Washington, DC.: U.S. Department of Justice.

Friedland, M. L. (1984). A Century of Criminal Justice. Toronto, Canada: Carswell.

Greenspan, E.L. (1994). Martin's Annual Criminal Code 1995. Aurora, Canada: Canada Law Book.

Hawley, D. L . (1988) Canadian Firearms Law. Toronto, Canada: Butterworths.

Hindelang, M. J., Hirschi, T. and Weis, J. G.. (1981) Measuring Delinquency. Beverly Hills, CA: Sage.

Hofstadter, R. (1970) America as a gun culture. American Heritage 21: 4 - 85.

Hogg, P. W. (1992). Constitutional law of Canada (3rd ed). Scarborough, Canada: Carswell.

Kleck, G. (1988) Crime control through the private use of armed force. Social Problems 35: 1-21.

Kleck, G. (1991) Point Blank: guns and violence in America. New York, New York: Aldine de Gruyter.

Kleck, G. and Gertz, M. (1995) Armed resistance to crime: the prevalence and nature of self-defense with a gun. Journal of Criminal Law and Criminology 86: 143-186.

Kong, R. (1994) Urban / rural criminal victimization in Canada. Juristat 14 (17) Ottawa, Canada: Statistics Canada.

Lai, V. W. (1994) Market analysis for personal self-defense in British Columbia. Unpublished MBA Research Project. Burnaby, Canada: Simon Fraser University.

Lipset, S.M. (1985) Revolution and counterrevolution: the United States and Canada. In Revolution and Counterrevolution. New Burnswick, NJ: Transaction: 37-76.

Loftin, C. and MacKenzie, E. (1990) Building national estimates of violent victimization. Unpublished background paper prepared for Symposium on the Understanding and Control of Violent Behavior (April 1-4, 1990): 21-23.

Mauser, G. (1990) A comparison of Canadian and American attitudes towards firearms. Canadian Journal of Criminology 32: 573-589.

Mauser, G. (1993) Firearms and self defense: the Canadian case. Presented to the annual meeting of the American Society of Criminology. Phoenix AZ, 27 - 30 October 1993.

Mauser, G. (1995) Commentary: Do Canadians use firearms in self-protection? Canadian Journal of Criminology 37: 556-561.

Mauser, G. and Buckner, T. (1997) Canadian attitudes toward gun control: the real story. Toronto, Canada: The Mackenzie Institute

Mauser, G. and Margolis, M. (1992) The politics of gun control: comparing Canadian and American patterns. Government and Policy 10: 189-209.

Moore, D.W. and Newport, F. (1994) Public strongly favors stricter gun control laws. The Gallup Poll Monthly 340: 18.

Sacco, V. F. (1995) Fear and personal safety. Juristat, Vol 15, No. 9. Ottawa, Canada: Statistics Canada.

Statistics Canada (1993) A National Overview, Population and Dwelling Counts. 93-301. Ottawa, Canada: Queen's Printer.

Statistics Canada (1994) Canadian crime statistics. 1993. 85-205. Ottawa, Canada: Queen's Printer.

Sudman, S., and Bradburn, N.M. (1973) Effects of time and memory factors on response in surveys. Journal of the American Statistical Association. 68: 808-815.

Tonso, W. R. (1982) Gun and society: the social and existential roots of the American attachment to firearms. Lanham, MD: University Press.

Wolfgang, M. E. (1958) Patterns in criminal homicide. Philadelphia: University of Pennsylvania Press.

Wright, J.D. and Rossi, P.H. (1986) Armed and considered dangerous: a survey of felons and their firearms. New York: Aldine.

Table 1. The telephone surveys which asked about frequency of defensive use of firearms

Survey research firm	Sowden	CSUR	CSUR	Canadian Facts
Year of interview	1988	1990	1990	1995
Target Population	BC	Canada	United States	Canada
Population covered	Residents	Residents	Residents	Residents
Telephone interview	Yes	Yes	Yes	Yes
Sample Size	403	393	344	1,505
Stratified Random Sampling	Yes	Yes	Yes	Yes
Random Digit Dailing	Yes	Yes	Yes	Yes
Professional interviewers	Yes	Yes	Yes	Yes
Gun type covered	All firearms	All firearms	All firearms	All firearms
Distinguished uses against persons	Yes	Yes	Yes	Yes
Excluded military, & police uses	Yes	Yes	Yes	Yes
defensive questions asked of:	All Rs	All Rs	All Rs	All Rs
Defensive question refers to:	Household	Household	Household	Household
Time frame of question about defensive use of firearms	Ever	Five years	Five years	1 & 5 years
percent who used a firearm against animals or humans	4.0%	3.1%	4.1%	2.1%
Implied total annual number of defensive uses of firearms	80,000	62,500	754,000	66,000
percent who used a firearm against human threat	1.9%	1.6%	3.8%	0.6%
Implied annual number of defensive uses of firearms against human threats	37,500	32,000	700,000	19,000

Table 2. Estimating the annual frequency of defensive gun use.

	Sowden(a)	Canadian Facts (b)	CSUR Canada(c)	CSUR US (c)
Percentages:				
Animal	2.1%	1.5%	1.5%	0.3%
Person	1.4%	0.5%	1.3%	3.5%
Both	0.5%	0.1%	0.3%	0.3%
Total	4.0%	2.1%	3.1%	4.1%
Number, in past 5 years:				
Animal	211,700	147,000	151,200	275,800
Person	141,100	52,000	131,000	3,218,200
Both	50,400	8,600	30,200	275,800
Total	403,200	207,600	312,400	3,769,800
Number, per year:				
Animal	42,500	47,100	30,200	55,200
Person	27,500	16,600	26,300	643,600
Both	10,000	2,700	6,000	55,200
Total	80,000	66,400	62,500	754,000

Source: Survey of BC general public conducted in 1988 (Mauser 1990); survey of Canadian general public conducted in 1995 (Mauser and Buckner in press); surveys of general publics in the United States and Canada conducted in 1990 (Mauser and Margolis 1992).
a - The wording of the question asked by Sowden was, "Aside from military service or police work, have you yourself, or a member of your household, ever used a gun for self-protection, or for protection of property at home, at work, or elsewhere, even if it wasn't fired?" A followup question asked, "Was this to protect against an animal or a person (or both)."
b - The wording of the question asked by Canadian Facts was, "Within the past five years, have you yourself, or another member of your household used a gun, even if it was not fired, for self-protection, or for protection of property at home, at work, or elsewhere? Please do not include military service, police work, or work as a security guard." Then the R was asked, "Was this to protect against an animal or a person (or both)." A follow up question was, "Did this incident or any of these incidents happen in the past 12 months?"
c - The wording of the question asked by CSUR in both the US and in Canada was, "Aside from military service or police work, in the past five years, have you yourself, or a member of your household, used a gun for self-protection, or for protection of property at home, at work, or elsewhere, even if it wasn't fired?" A followup question asked, "Was this to protect against an animal or a person (or both)."
NB #1: There were 10,079,442 households in Canada in 1991. (Statistics Canada 1993).
NB #2: There were 91,947,410 households in the US in 1990. (US Bureau of the Census 1991).
NB#3: The US population age eighteen or over was 186,532,400 in 1990.
NB#4: The annual estimate for the Sowden and CSUR surveys are based upon the assumption of equal probability during the past five years.
NB#5: The annual estimate for the Canadian Facts survey is based upon R's statements that 32 percent of these incidents occurred in the past 12 months.

Notes

[1]There is only one national group in Canada, the National Firearms Association, that supports the use of firearms in self defense. Unlike the United States, it is extremely rare for a women's group to support firearms ownership for protection. However, many women's groups teach self defense tactics and advocate (and sell) "bear spray" for women's self defense as well as "non-violent" alternatives such as whistles and alarms.

[2] The Governor General assented to Bill C-68 on December 5, 1995. This bill will be proclaimed into law section by section over the next few years. Section 12(6) of this bill will prohibit all handguns that are .25 or .32 calibre or that have a barrel length of 4 inches or less. Justice Minister Allan Rock testified before the Justice Committee of the House of Commons in February 1995 that these firearms were to be prohibited and confiscated because they were likely to be used for self defense.

[3]In general, crime rates in Canada and the United States are comparable because both countries use the same definitions for violent crimes, the Uniform Crime Report system. Nevertheless, there are a few important exceptions, so that "violent crime" is defined somewhat differently in the two countries. 'Violent crime' in the United States includes murder, non-negligent manslaughter, forcible rape, robbery, and aggravated assault but does not include 'abduction,' or 'other sexual offenses,' as does the Canadian category of 'violent crime.' To properly compare the violent crimes indices in the two countries, a number of modifications are required. First, both 'abduction' and 'other sexual offenses' must be excluded from the Canadian data. Second, Canadian crime data should be re-categorized to fit the definitions used by the FBI and the violent crime rate for Canada recalculated. A few terms are only used in the U.S. and are impossible to replicate exactly with Canadian statistics. To approximate 'aggravated assault,' all categories of assaults were aggregated, except assault level 1 and sexual assaults, with 'attempted murder.' To approximate the 'forcible rape' category in the US, all Canadian sexual assaults were aggregated (levels 1, 2 and 3), but 'other sexual offenses' were excluded. These adjustments reduced the Canadian Violent Crime Index in 1993 from 1,132 to 428 per 100,000 (Statistics Canada 1994).

[4] The only exception is a brief outline of these studies in reply to published criticism of my unpublished conference papers (Mauser 1995).

[5]The Canadian Criminal Code prohibits the ownership of a wide variety of weapons, eg, Mace, pepper sprays, certain types of knives, nunchakus. As well, it is illegal to carry anything that is intended to be be used as a weapon (Sections 87, 88, 89, 90(c) and Orders-in-Council SOR/74/297 74-05-07, SOR/78-277 78-03-28, inter alia).

[6]Bill C-51, passed by Parliament in 1977, removed "protection of property" from the list of legal reasons for most people to own "restricted weapons," 98 percent of which are handguns (CC§109.3 (c)(iii)). Applicants who say they want to own a firearm for self protection are routinely refused the appropriate permits. Nevertheless, a very small number of people (eg, trappers, judges, geologists, politicians) in Canada are allowed to own handguns for self-protection under other sections (CC§109.3 (c)(i) and (ii)).

[7]Handguns require two locks: not only must a handgun be locked in a "container" that "cannot readily be broken open," but it must also "be rendered inoperable by a secure locking device." The criminal code defines the general responsibility of the firearms owner (Greenspan 1994). and are augmented by RCMP regulations, Regulations Respecting the Storage, Display, Handling and Transportation of Certain Firearms, CC§6, JUS-92-193-02.

[8] An example will illustrate the situation: In January 1995, an 81 year old Palmerston, Ontario, jeweller was charged with weapons and assault charges after firing his pistol at two burglars, neither of whom were injured. The court granted the jeweller a conditional discharge and ordered him not to possess a firearm for one year (Bellis 1995).

[9] As explained in note #3, all Canadian sexual assaults were aggregated (levels 1, 2 and 3), and 'other sexual offenses' were excluded in order to approximate the 'forcible rape' category that is used by the FBI in the US.

[10]The GSS is a periodic survey, conducted by Statistics Canada, of the Canadian general population, aged 15 years or over, living in all 10 of the Canadian provinces, but excluding the territories (N =

10,000).

[11] In principle, it is illegal to own any prohibited weapons. It is passing curious why many police departments tolerate the open sale and ownership of 'bear spray." "Bear spray" is a stronger concentration of pepper spray (capsaicin) than "dog spray." The prohibition on the sale and ownership of Mace, due to its ineffectiveness as protection against animals, remains strictly enforced.

[12] This study was funded by the Langley Symposium, a Canadian civic group.

[13]This study was funded by the International Council for Canadian Studies, a program of the Canadian Embassy in Washington, DC.

[14]This study was funded by a National Rifle Association hunter services grant.

[15]See Kleck (1991) and Kleck and Gertz (1995) for an expanded analysis of these questions.

[16]A review of the surveys reported in Kleck and Gertz (1995) shows that, on average, the percentage of Rs reporting they 'ever' used a firearm in self protection is more than twice as high as it is when Rs are asked if they used a firearm during the 'past five years.'

[17] The US Bureau of the Census reported that there were 91.9 million households in the United States in 1990. The December 1993 Gallup Survey reported that 49% of households in the United States own firearms (Moore and Newport 1994).

Appendix. Comparison of actual violent crimes in Canada and the United States (1993)

	United States		Canada	
	per 100,000	frequency	per 100,000	frequency
Murder	10	24,526	2	630
Robbery	255	659,757	104	29,961
Forcible rape	41	104,806	121	34,764
Aggravated assault	440	1,135,099	201	57,655
Violent crime (US dfn)	746	1,924,188	428	123,010
Burglary (B&E)	1,099	2,834,808	1,414	406,582
population (1993)	US	257,908,000	Canada	28,753,000

Sources: Uniform Crime Reports for the United States. FBI. 1993; Canadian Crime Statistics, Cat. 85-205, Statistics Canada, 1993. These data are based on reports by local police departments.

Note #1. As of August 1995, when this was written, 1993 was the most recent year that all of the crime statistics were available for both countries.
Note #2: Crime rates may be compared because both Canada and the United States use the same definitions for violent crimes, the Uniform Crime Report system. Despite this, there are a few notable exceptions. To facilitate comparison between the two countries, Canadian crimes have been aggregated to fit the categories used by the FBI. Murder refers here to 'murder and non-negligent manslaughter,' and, in Canada, includes all 'homicides.' 'Burglary' in the US is equated with 'breaking and entering' in Canada. 'Violent crime' in the United States includes murder, non-negligent manslaughter, forcible rape, robbery, and aggravated assault but does not include 'abduction,' or 'other sexual offenses,' as does the Canadian category of 'violent crime.' Thus, both 'abduction' and 'other sexual offenses' have been excluded in this table from the Canadian data. A few terms are only used in the US and are impossible to replicate exactly with Canadian statistics. To approximate 'aggravated assault,' all categories of assaults were aggregated, except assault level 1 and sexual assaults, with 'attempted murder.' To approximate the 'forcible rape' category in the US, all Canadian sexual assaults were aggregated (levels 1, 2 and 3), but 'other sexual offenses' were excluded.