

Gaps continue in firearm surveillance: Evidence from a large U.S. City Bureau of Police

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Abstract

While the broad relationship between violence, poor health outcomes, and firearms is well-established, there is limited research in the public health field on the source of guns collected by police departments, many of which are used for violent crime that results in injury or death. This data could be valuable for purposes of improving surveillance around violent crime and health outcomes as well as for evaluating prevention strategies and future programs that aim to reduce gun violence.

The objectives of this study are to describe how guns come into police possession, identify the primary source of these guns, determine how guns leave possession of lawful owners, and determine disposition of guns and perpetrators. In order to meet the objectives, we analyzed data on 762 cases in which a gun was recovered by the Pittsburgh Bureau of Police Firearm Tracking Unit (FTU). Descriptive analyses were conducted.

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Most cases involve a single perpetrator. Traffic stop and street patrol accounted for 31% of method of recovery. Most perpetrators (79%) were carrying a gun that did not belong to them. More than 30% of the guns recovered were reported stolen by owners when the FTU contacted them. For 44% of the guns, whether the gun was stolen was either unknown or not able to be determined. In most cases, individual

What is already known on this subject?

- Homicide by firearms ranks among the leading causes of death of young people in the United States.
- Given the significant and timely public health issue of violence, determining the sources of the firearms used in these crimes is a priority.
- No system exists to track acquisition, type, or motivation for firearms.

What this study adds?

- It highlights the continuing difficulty in obtaining data around firearms and the relatively large amount of missing data on this topic.
- It is important to understand all parts of the pathway from firearm source to violent crime outcome, especially major channels for diverting firearms from the legal to illegal market since diversion and theft are key sources of firearms for youth and juveniles.
- Given that 79% of perpetrators are connected to firearms for which they are not the legal owner, it is highly likely that a significant amount of theft or trafficking is the source of perpetrators' firearms.
- Future studies should be conducted to assess the pathway by which firearms travel from legal ownership to illegal ownership.

owners did not know how they lost possession of their firearm (62%).

Currently there is no way to track firearms from a legal purchase into hands that do not have legal ownership, even through official police data. A large number of guns recovered are taken from persons who are not the lawful owner of the gun. In the majority of cases, the guns were privately owned, as opposed to being traced back to a dealer. How the guns left the possession of their lawful owners is unknown, and collecting this data proves to be challenging. Future studies should be conducted to assess the pathway in which guns travel from legal to illegal ownership.

Introduction

Violence has been established as a significant public health issue. Though no one is immune to violence, the burden of gun violence weighs heavy among younger individuals. From a public health perspective, it contributes to a tremendous amount of mortality and years of potential life lost among youth and young adults,¹ particularly when there is a firearm involved.² Homicide by firearms continues to rank among the leading causes of death of young people in the United States. Of the 12,765 homicides in 2012, 8,855 were due to a firearm,³ meaning more than two-thirds of homicides involve a firearm.

Firearms are also involved in self-inflicted acts of violence (suicides). According to the Centers for Disease Control and Prevention (CDC), of the 38,264 suicides in 2010, 19,392 (51%) involved a firearm.⁴

Few studies have assessed detailed information about acquisition or type of firearms recovered by police, or the motivation for the police recovering the firearm. This data is challenging to collect and often incomplete, leaving large gaps where information is missing. Those that have attempted to trace and identify recovered firearms use different measures and methods for assessing acquisition, and not all involve the perspective of law enforcement. Several important studies that evaluated firearm acquisition used sales or licensure volume as a measure to link with violent crime and the resulting outcomes.^{5,6} Though it is clear that the prevalence of guns and retail sales are associated with a greater prevalence of crime and gun-related mortality, this does not describe in detail the source of firearms for all violent crime (particularly among youth). It is important to understand the major channels for

diverting firearms from the legal to illegal market since diversion and theft are key sources of firearms for youth and juveniles.⁷ In a sense, this is an important link in the chain connecting firearms and violent health outcomes.

Attempts to characterize the illegal acquisition of firearms in the U.S. have been fraught with difficulty. The total number of firearms stolen annually is hard to determine beyond a rough estimate. Ludwig and Cook and the Bureau of Alcohol, Tobacco and Firearms (ATF) put the number at more than 500,000 firearms per year based on studies done in the 1990's^{8,9}; in 2012, a poll of firearm owners commissioned by Mayors Against Illegal Firearms put the number around 600,000 just from private residences.¹⁰ It also can be difficult to determine if firearms recovered by the police are stolen, and whether or not they are weapons used to commit violent crimes. Studies in the 1990's put the percentage of recovered firearms as having been stolen at anywhere from 6-32%, and surveys of incarcerated persons suggested that 9-32% of them had acquired their most recent handgun via theft.¹¹ An attempt by Wintemute et al. to characterize the life cycle of firearms stopped short of determining the percent or number of firearms stolen, instead reporting only if the purchaser and possessor were different people.¹² An older descriptive study of guns recovered from an urban buyback program suggested that some of the recovered firearms were not used in the most violent crimes that result in death. However, individuals who turn in firearms to buyback programs can be motivated by incentives and may only return legally purchased guns. Additionally, there was no information about the individuals who participated.¹³ Given the increased public and media attention to firearm violence, there is room for more timely and improved firearm surveillance using alternative methods.

The overall aim of this study was to determine and classify the sources of firearms recovered by the Pittsburgh Bureau of Police. Specifically, we aimed to 1) Identify the primary source of these firearms, 2) Determine how firearms leave possession of lawful owners, 3) Describe demographic characteristics of owners and perpetrators, and 4) Determine disposition of firearms and perpetrators. We analyzed data on 762 cases in which a gun was recovered by the Firearms Tracking Unit. Data collection was performed by two data collectors in the FTU offices from February to September 2012.

Materials and Methods

The study team initially met with members and leaders of the Firearms Tracking Unit (FTU) of the Pittsburgh Police in December 2011 to discuss their processes and priorities for collecting, storing, aggregating, and dispersing their data. The FTU has several members dedicated to investigating and collecting data on all firearms retained by the Pittsburgh Police. Data are compiled and stored in paper files, and certain fields are entered into an electronic database. The study team developed a form to manually collect data from the paper files.

This data collection form was developed with input from the FTU and study team members. The form was divided into three sections: Weapon, Owner, and Perpetrator. A single case could have more than one weapon, owner, or perpetrator. Each case was uniquely identified by CCR number, a unique 8-digit number assigned to each call or incident to which the police respond. Due to privacy and legal concerns, certain data could not be recorded on the form for use by non-police, such as names, birth dates, or addresses associated with the owners or perpetrators and data obtained from the state police (e.g., the number and nature of “hits” from the National Crime Information Center (NCIC), a computerized index of crime and criminals, including records of stolen firearms, available to all law enforcement agencies). For cases with multiple firearms, the firearms were numbered sequentially by the data collector and the make/model and serial number were recorded to differentiate between firearms. Owners were associated with individual firearms. Adult perpetrators who were arrested and referred for court action were identified by OTN, a unique number assigned by the court. The OTNs enabled the data collectors to follow up on actions taken against the perpetrators, including final charges and verdicts. Perpetrators who were not charged with a crime and juvenile perpetrators were identified only by demographic information and sequential numbering within cases.

It should be noted that handgun sales in Pennsylvania, initially by a dealer or subsequently between persons, must be documented and conducted through a federal firearms licensed (FFL) dealer while shotgun and rifle sales are documented only the first time they are sold by a dealer.

Therefore, when the FTU traces a handgun, the documented owner should be the last legal owner, but when a rifle or shotgun is traced, the identified “owner” may be the original owner, not the current owner. The data collectors recorded information for the last known owner identified by police.

Data collection was performed by two data collectors in the FTU offices from February to September 2012. Because cases could have multiple firearms and/or perpetrators, the master dataset was broken down into two subsets for statistical analysis. One subset had a single record for each firearm and was used to examine firearm-specific variables, such as recovery method, final disposition, stolen/not stolen status, and owner characteristics. The other subset had one record per perpetrator (or, if no perpetrator was identified or involved, per case) and was used to explore perpetrator-specific variables, such as type, demographics, and court outcomes. Descriptive statistics were run on each data subset using SPSS 19.

Results

We collected data on 762 cases for 2008. (Note, percentages may not add up to 100 percent due to missing values.) It is assumed that this included all cases for that year.

Firearms

During the study period a total of 893 firearms were recovered by the Pittsburgh Police.

Fifty-seven firearms (6.4%) were found in the National Integrated Ballistic Information Network (NIBIN) as having been used in prior incidents. For a large proportion of the firearms ($n = 396$, 44.3%), the police could not determine if the firearm had been stolen. After recovery and when police made contact with owners, more than 30 percent of the firearms were said to have been stolen ($n = 292$, 32.7%), yet only 169 of those (57.9%) had been officially reported stolen prior to recovery by police (Table 1). Of the 292 stolen firearms, the police could not always determine if the owner of the stolen firearm knew the thief. Forty-nine (16.8%) said they did and 33 (11.3%) said they did not. Police determined that in 88 cases the owner reported the theft to an insurance company, and in 74 cases they did not.

Table 1.
Status and source of stolen firearms recovered by the Police Firearm Tracking Unit (n=893)

	Yes	No	Unknown/ Cannot Determine	N/A	Missing
Was the Firearm Claimed to have been Stolen?	32.7% (n=292)	21.9% (n=196)	44.3% (n=396)	0.0% (n=0)	1.0% (n=9)
For Firearms Claimed to have been Stolen (n=292):					
Was the firearm reported stolen to police before recovery?	57.9% (n=169)	40.8% (n=119)	1.0% (n=3)	0.0% (n=0)	0.3% (n=1)
Was the insurance company notified before recovery?	4.8% (n=14)	25.3% (n=74)	66.8% (n=195)	2.1% (n=6)	1.0% (n=3)
Did the owner say (s)he knew the likely thief?	16.8% (n=49)	11.3% (n=33)	70.2% (n=205)	0.7% (n=2)	1.0% (n=3)
Was the place locked when the firearm was taken?	9.2% (n=27)	11.6% (n=34)	76.0% (n=222)	2.1% (n=6)	1.0% (n=3)
For Firearms Reported Stolen to Police Before Recovery (n=169):					
Was a copy of the police report in the FTU file?	39.6% (n=67)	56.8% (n=96)	0.6% (n=1)	0.6% (n=1)	2.4% (n=4)

For most firearms (n = 551, 61.7%) the place where the owner lost possession of the firearm was unknown. Of those for which the place was known (n=157), owners reported losing possession of their firearms from the home in 86 instances (54.7%), while 27 firearms (17.2%) were reportedly lost from a vehicle, and 44 firearms (28.0%) from some other place. Almost half of the reported stolen firearms originated in the county of Allegheny. Of the 292 firearms reportedly stolen, 59 (20.2%) came from within the city of Pittsburgh, 46 (15.8%) were taken from a locality within Allegheny County but outside the Pittsburgh city limits, 41 (14.0%) were taken from another county in Pennsylvania, and 1 (0.3%) was from a different state. For the remainder (145, 49.7%), the locality from which the firearm originated was unknown or missing.

Owners

The police were able to identify most of the last known owners of recovered firearms (n = 691, 77.4%). Owners were mostly Caucasian (n = 432, 61.7%) though a significant number were Black (n = 245, 35.0%). Most identified owners were male (n = 569, 81.3%), with females making up only a minority of owners (n = 120, 17.1%). Importantly, the gender proportion varied based on if the firearm was reported stolen. For firearms not stolen, male ownership was 82.1%, female ownership was

13.3%, and 4.1% were unidentified owners. For firearms reported stolen prior to recovery, 79.9% were male, 16.6% female, and 3.6% were unidentified. For firearms reported stolen after recovery, 63% were male, 19.3% were female, and 17.6% were unidentified (Figure 1).

Table 2.
Demographics of firearm owners vs. perpetrators

	Owners (n=700)	Perpetrators (n=607)
Gender		
Male	81.3% (n=569)	91.8% (n=557)
Female	17.1% (n=120)	5.4% (n=33)
Missing	1.6% (n=11)	2.8% (n=17)
Race		
White	61.7% (n=432)	13.7% (n=83)
Black	35.0% (n=245)	83.5% (n=507)
Other	1.1% (n=8)	0.7% (n=4)
Missing	2.1% (n=15)	2.1% (n=13)
Age		
% <18yrs	Unavailable	15.0% (n=91)
% 18-21yrs	Unavailable	22.9% (n=139)
% >21yrs	Unavailable	60.1% (n=365)
Missing	n/a	2.0% (n=12)

Perpetrators

Of the 762 cases, 553 (73 percent) involved a total of 607 perpetrators. Most (n = 478, 78.7%) were carrying or linked to a firearm that did not belong to them. Eighty-six (14.2%) were owners that committed an offense while legally carrying their firearm, 10 (1.6%) were owners illegally carrying their firearm but committing no other offense, and 12 (2.0%) were owners that committed an offense while illegally carrying their firearm (Figure 2). Perpetrators were overwhelmingly male (n = 557, 91.8%) and Black (n = 507, 83.5%). Most were adults with 60.1% above age 21 (n = 365), 22.9% were between ages 18 and 21 (n = 139), and 15.0% were juveniles (n = 91). Table 2 offers a comparison of the demographics of owners versus perpetrators.

Discussion

Firearms Tracing

The Pittsburgh Police Bureau has engaged in comprehensive firearms tracing since 2000, meaning that all firearms recovered are submitted for tracing, thus reducing the selection bias that might occur if the police chose which firearms to trace. While the data are still influenced by police investigative tactics, and not all traced firearms are associated with a crime, the sample of firearms recovered in 2008 ought to correlate well with the actual population of crime firearms in Pittsburgh. When comprehensive tracing began in the 1990's in a few select cities, firearms had a 50-50 shot of being successfully traced. In 1999, Cook and Braga reported only a 54% success rate nationally. This was hindered by firearms too old to be traced, serial number inaccuracies or obliterations, errors on the trace form, problems with the FFL records, and other issues.⁸ In Pittsburgh, 59.2% of firearms recovered in 2000 could be traced to the original purchaser.¹⁴ In this 2008 study, 77.4% of original owners were identified. Only demographic data for owners were released for this study, so while it was determined that firearm owners were overwhelmingly white and male, data on place of residence or purchase, or age of owner were not available.

Stolen Firearms

The primary purpose of this study was to explore the characteristics of stolen firearms. Determining whether or not a firearm is stolen can be quite difficult. Part of the problem rests on the underreporting of theft by owners. As discussed previously, more than a half million firearms may be stolen annually, but in 2012 the NCIC received only 190,342 reports of lost or stolen firearms.¹⁵

Additionally, illegally diverted firearms may be reported by the owner as stolen to conceal firearms trafficking.¹⁶ The determination of whether or not firearms recovered in Pittsburgh were stolen firearms depended on local police reports (in Pittsburgh or other localities) submitted by owners prior to recovery and, if the firearm was not previously reported stolen, to successful identification and communication with the last owner. Of the 893 firearms recovered by the Pittsburgh Police, 169 (18.9%) were reported stolen prior to recovery, and 123 (13.7%) were reported stolen after recovery (i.e., when the police traced the firearm, made contact with the owner, and were told that the firearm had been stolen but not previously reported). Twenty-two percent of firearms were not stolen – for instance, they may have been recovered directly from the owners or their kin (either during a crime investigation or voluntarily turned in), the owner may have lent or sold the firearm legally or illegally, or the owner may have misplaced the firearm. For 396 firearms (44.3%), the police were unable to determine if the firearm had been stolen.

This was primarily because 22.6% of owners could not be identified, and of those who were identified, 43.6% did not respond to attempts to contact them. For the firearms for which no owner could be contacted, stolen status could be assigned based solely on prior police reports or determination that the possessor of the firearm at time of recovery was definitely not the lawful owner (e.g., via confession). This is also why the police could not determine where the owner lost possession for the majority of firearms (61.7%). However, when this determination could be made, most of the firearms (72.0%) were reportedly lost from the home or from a vehicle, likely through theft or burglary, although some of these firearms may have been illegally given or sold to another person then reported missing from one of these locations. This contrasts

with the number of ATF investigations involving firearms stolen from a residence or vehicle. Over a four year period spanning from January 1, 1999, to December 31, 2002, the ATF conducted 2,608 firearm trafficking investigations, of which 337 (13.0%) involved firearms taken from a home or vehicle, representing only 6.6% of firearms investigated in that time period due to the relatively low number of firearms per investigation for this type of trafficking (mean 23.0 versus 48.6 for all other types of trafficking).¹⁰

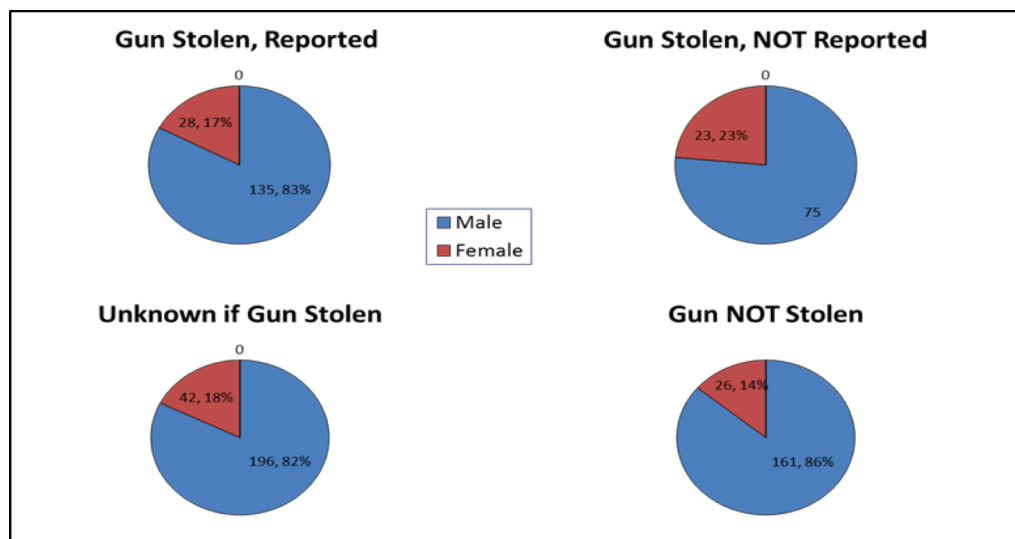
Trafficking

Firearms that are recovered by suspicious means from a non-owner without having been previously reported stolen may be indications of trafficking. Owners who have illegally transferred their firearm may be more likely to resist contact attempts or claim the firearm was stolen after the police contact them. Of particular concern are straw purchasers – those who buy a firearm for someone who otherwise could not legally obtain one. Bradford, Gundlach, and Wilkie concluded that most trafficked firearms are initially sold by a retail FFL dealer, and one important pathway via which firearms are trafficked are straw purchases.¹⁷ There are certainly FFL dealers willing to sell firearms to a buyer they know is making the purchase for another person. A 2010 survey of dealers in California found that 20% would agree over the phone to sell to someone who stated that the firearm was intended for someone else.¹⁸ Another telephone survey conducted in 2003

found that more than 50% of dealers in large cities throughout the U.S. would willingly participate in a straw purchase.¹⁹ In a study of ATF investigations from January 1999 to December 2002, Braga et al. found that 41.3% of investigations involved straw purchasing.¹⁸ In an earlier study of ATF cases involving youth under age 25, Braga and Kennedy found that 50.9% of investigations involved straw purchasing.⁸

Trace reports and police investigations are rarely able to tell if a firearm has been trafficked, especially if the owner claims the firearm was stolen; however, evidence of straw purchasing may be available. Wintemute et al. examined the relationship between purchaser and possessor for firearms recovered from persons under 25 years of age and traced in California in 1999, finding that the majority of the firearms for which a purchaser was identified had been purchased by someone over 24 years old – clearly a different person than the possessor at time of recovery.¹² In a study of firearms recovered by the Milwaukee police, only 9% were confiscated from the original purchaser.²⁰ An examination of firearms sold and subsequently recovered in Baltimore found that firearms were more likely to be recovered if they were originally bought by someone who was young, black, and female.²¹ A study of FFLs in California found that the number of traces leading to an FFL dealer for firearms involved in violent and firearm related crimes was related to the gender of the purchaser; as the number of traces increased, so did the percent of

Figure 1: Comparison of gender composition by firearm status.



female purchasers. The authors explained that this phenomenon may be due to girlfriends and spouses making straw purchasing for their male partners.²² Similarly, a study of hand firearms purchased from FFLs in California in 1996 found that the odds of a firearm being traced was significantly elevated if the purchaser was young and female.²³

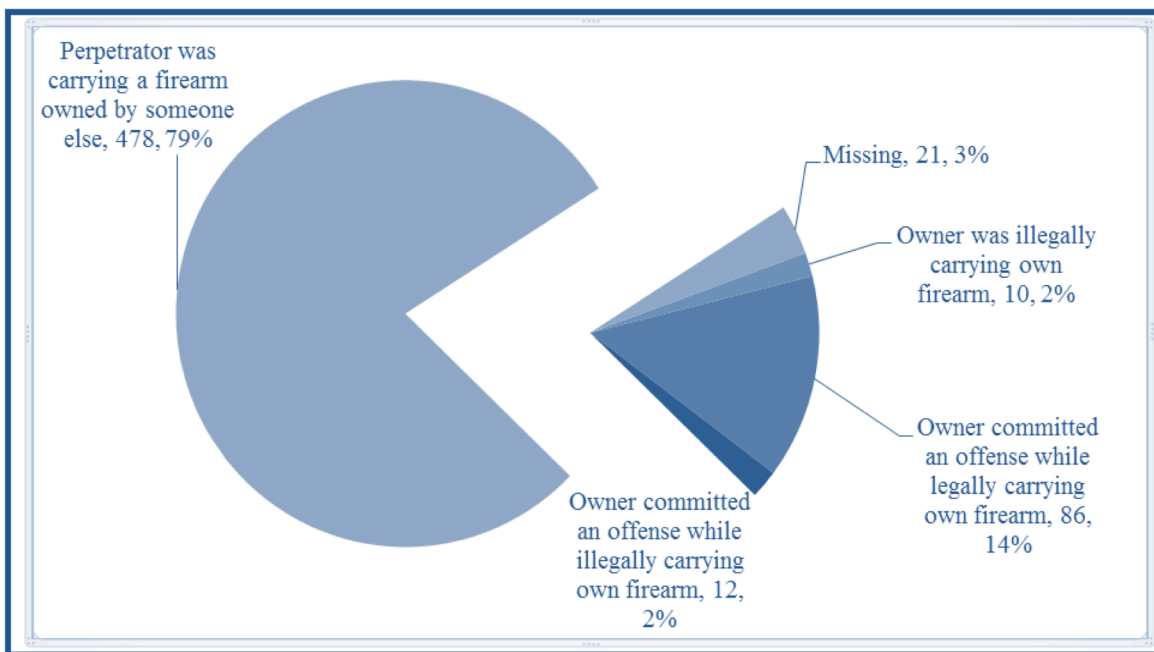
Detailed Firearm Surveillance

To examine the Pittsburgh data for similar evidence, the gender proportion was compared across four categories of firearms: not stolen, stolen and reported prior to recovery, stolen but not reported prior to recovery, and firearms for which stolen status could not be determined. The hypothesis was that the percent female would be higher for firearm stolen but not reported prior to recovery and firearm with undermined stolen status, since these categories would be more susceptible to trafficking. The results, which support the hypothesis, are summarized in Figure 1. Additional evidence that many of the firearms were stolen or straw purchased comes from comparison of the owners versus perpetrators, most of whom were not

the owners of the firearms with which they were associated. Both groups were mostly males, but the proportion of male to female was higher for perpetrators than for owners. Additionally, most owners were white while most perpetrators were black. However, these comparisons are confounded by the fact that black males are more likely to be arrested than any other racial group in Pittsburgh.²⁴ *Origin.*

For another trafficking indicator – where the firearms originated – it was difficult to obtain and interpret the available data. Dealer information was not available, nor was owner residence or place of purchase. The only information came from firearms determined to be stolen, and the data were missing for half of the stolen firearms. For the 147 firearms with data on the police locality in which they were stolen, 40.1% came from within Pittsburgh, 71.4% came from with Allegheny County where Pittsburgh resides, and only one (0.7%) came from outside of Pennsylvania. Caution should be taken in generalizing these conclusions to stolen firearms with unknown localities or firearms with undermined stolen status. It may be that firearms

Figure 2.
Ownership of firearm by perpetrator, Pittsburgh, 2008.



from out of the state were less likely to be successfully traced to owners, or that it was more difficult for the police to contact owners from other states to obtain this information. Generally, the literature suggests wide geographic variability in the number of recovered firearms originating from out of state.²⁵ Analysis of ATF investigations from July 1996 to December 1999 found that 73.8% of investigations involved intrastate trafficking, 46.6% involved interstate trafficking, and 6.2% involved international trafficking.⁷ Interstate flow of firearms seems heavily influenced by state policies, with movement primarily from “weak law” states to “strong law” states.^{8,11}

Conclusion

Given the major public health issue of firearm injuries and death, it is important to understand the “pathway” from firearm source to violent crime outcomes. The Pittsburgh Police engages in comprehensive firearms tracing, but the data available to the police and to the public about recovered firearms are often limited. In most cases the original owner and one or more perpetrators are identified, but it is still difficult to determine definitively if many of the recovered firearms have been stolen or trafficked. Given that 79% of perpetrators are connected to firearms for which they are not the legal owner, it is highly likely that a significant amount of theft or trafficking is the source of perpetrators’ firearms. This analysis provides some evidence of straw purchasing and little evidence of interstate trafficking. Both raise the issue of increasing public knowledge regarding safe storage of firearms and injury prevention as a method of reducing access to firearms where feasible.

Many firearm injuries occur among young people, accounting for significant morbidity, mortality, and potential years of life lost. These data suggest that many perpetrators of firearm violence, especially homicides, acquire their firearms through theft or trafficking. This study offers a timely opportunity to encourage ongoing, systematic collaboration between public health and law enforcement with the purpose of describing, understanding and reducing violent crime (particularly violent death) as well as reducing the difficulty in data collection for firearms. Future studies should be conducted to assess the pathway in which firearms travel from legal ownership to illegal ownership, as well as to investigate ways of

incorporating or linking this type of data into currently existing public health surveillance around violence.

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