

# **Comprehensive Ballistic Fingerprinting of New Guns: A Tool for Solving and Preventing Violent Crime**

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## ***Ballistic Fingerprinting: An Overview***

Firearms, especially handguns and rifles, leave unique markings on the ammunition they fire (both the bullet and the shell casing) that are commonly referred to as “ballistic fingerprints.”<sup>1</sup> Since the 1930’s, police have used ballistic fingerprinting to help them solve crimes and convict violent criminals. Ballistic evidence can help narrow an investigation on suspects plausibly connected to separate shooting incidents, or on a suspect in possession of the firearm used in a crime.<sup>1</sup>

The efficiency of ballistic fingerprinting increased exponentially in recent years as a result of advancements in computer technology that enable police to digitally capture thousands of pieces of ballistics evidence, log them into databases, and search these databases for matches or near matches. In 1997, the Bureau of Alcohol, Tobacco and Firearms (ATF) and the Federal Bureau of Investigation (FBI) established the National Integrated Ballistics Identification Network (NIBIN). NIBIN is a federal-local partnership that resulted in 8,800 successful matches that linked 17,600 crimes between March 2000 and July 2002.<sup>1</sup> Currently the NIBIN system is used only for ammunition actually associated with a crime.

As a result of this new resource, it is now common practice for law enforcement agencies to obtain ballistic fingerprints from firearms recovered from criminal suspects and crime scenes, and to attempt to match the ballistic fingerprints to those taken from other crime scenes.

## ***Comprehensive Ballistic Fingerprinting Laws: Expanding Tools for Law Enforcement***

Two states, Maryland and New York, enacted laws in 2000 that require ballistic fingerprinting of all new handguns sold by licensed firearms dealers in the state. At the time of sale, dealers must provide a shell casing (in Maryland) and/or a bullet (in New York) for inclusion in a database maintained by the state police. At least four other states—Massachusetts, Connecticut, New Jersey and California—have considered adopting ballistic fingerprinting laws of this type.<sup>2</sup>

The purpose of mandatory ballistic fingerprint laws is two-fold:

- 1) To aid police investigations of shootings by creating more comprehensive ballistic databases;
- 2) To serve as a deterrent to the criminal use of guns.

Ballistic fingerprinting of new firearms is designed to increase accountability for the unlawful use or transfer of guns. Other gun policies designed to increase accountability and solve crimes, such as handgun registration, can only work when police have recovered a firearm used in a crime. Unfortunately, police do not recover most guns used in shootings.

However, police usually have some ballistic evidence from shootings that can be traced for matches. Therefore, laws requiring ballistic fingerprinting of new guns in a state can greatly expand the number of crimes that can be traced back to the original owner of the gun. If the original owner claims that he sold the gun to someone else, 14 states including Maryland require evidence of a background check for the

sale.<sup>a</sup> At least three other states further enhance accountability by requiring gun owners to report all gun thefts.<sup>3</sup> Ballistic fingerprinting laws should, therefore, be viewed as one of several accountability measures needed to deter illegal gun sales and use, including permit-to-purchase licensing and stiff penalties for gun law violations.

The effectiveness of ballistic fingerprinting laws such as Maryland's and New York's are limited by the lack of a national law. This is particularly true for New York, which has some of the nation's most restrictive state and local gun laws, where the overwhelming majority of crime guns that were originally sold in states with minimal gun sale regulations.<sup>4</sup>

### ***How Ballistic Fingerprinting of New Guns Could Affect Criminal Gun Supply and Use***

#### **# Reducing the Supply of Guns to Criminals and Youth**

Ballistic fingerprinting may be effective as a complement to other laws designed to increase gun owners' accountability, such as licensing and registration. In states with comprehensive permit-to-purchase licensing systems and handgun registration (e.g., New York, New Jersey, Massachusetts), criminals who are able to obtain firearms are heavily dependent on illegal guns supplied by traffickers who buy guns in states with weak gun laws. This dependence on out-of-state guns is associated with lower levels of gun availability to criminals.<sup>5</sup> For example, the ability of traffickers to sell handguns purchased from gun dealers in Georgia for \$100 to criminals in New York City for \$600 attests to the fact that New York's gun laws have made handguns a more scarce commodity on city streets.<sup>6</sup>

Research also contradicts the claim that *all* criminals are so determined and resourceful that they will always do whatever it takes to get a gun, regardless of regulatory obstacles, risk of incarceration, or price of the gun. Although guns are clearly a useful tool for robbing and assaulting, fewer than 10% of violent crimes in the U.S. involve firearms.<sup>7, b</sup> In a survey of incarcerated adults, one in five criminals who did not use a gun to commit their crimes cited the difficulty in obtaining a gun as playing an important role, and 17% indicated that financial costs were a barrier.<sup>8</sup>

#### **# Detering Violent Crime**

In addition to providing disincentives to illegal gun sales, ballistics databases can discourage criminals' use of guns. A study conducted in Maryland prior to the state's implementation of its ballistic fingerprint law indicated that criminally-involved youth were acutely aware that police commonly use ballistic evidence to link guns to shootings. Youth who had recently acquired a gun were extremely wary of buying used guns, especially from strangers, because they did not want to be caught with a gun that could be linked to other crimes.<sup>9</sup> Police recording of ballistic fingerprints of new guns sold greatly expands the list of potential guns that would be risky for either illegal gun traffickers or their customers. Ballistic fingerprinting could also spur criminals to discard guns used in crime. This may reduce the number of guns available to criminals, and increase the costs of having and using a gun in crime.

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<sup>a</sup> Federal law only requires background checks for guns sold by licensed gun dealers, thus providing a large loophole for criminals to obtain guns from private sellers.

<sup>b</sup> Firearms are involved in 31% of robberies, 2% of rapes and sexual assaults, and 7% of assaults.

### ***Analysis of Criticisms of Comprehensive Ballistic Fingerprinting***

As with any technology, ballistic fingerprinting is not fool-proof, nor is it a panacea for violent crime. Criticism of ballistics fingerprinting policies include the following arguments:

- # **Computerized systems for matching ballistic fingerprints have a high error rate:** This criticism is based largely on a single study.<sup>10</sup> ATF ballistics experts have refuted this study because it used a type of ammunition that produces inferior images.<sup>11</sup> Therefore, estimates of the accuracy of a large ballistics analysis system that are generated from this study are not valid.
- # **Ballistic fingerprints naturally change over time as a gun is used:** Opponents use this argument in their claims that ballistics imaging technology is fundamentally flawed. However, the ATF and ballistics experts report that any such changes do not generally interrupt the system's ability to identify matches.<sup>11, 12</sup>
- # **Criminals will attempt to defeat the technology:** Some argue that criminals will physically alter parts of the gun, or will replace parts altogether, to change a gun's ballistic fingerprint. While it may be impossible to prevent criminals from attempting to defeat the system, the ATF reports that such efforts to date have been very rare.<sup>11</sup> Analogously, few criminals wear gloves in order to avoid leaving their fingerprints at a crime scene, and very few guns used in crime have obliterated serial numbers to prevent gun tracing.

Nevertheless, comprehensive ballistic fingerprint policies are likely to prompt some criminals to attempt to alter their guns' ballistic fingerprints, and this could reduce the effectiveness of these systems. Some alterations may not prevent the system and ballistics experts from making a valid match in the database.<sup>11</sup> Furthermore, a range of strategies could be considered to deter ballistic fingerprint alteration. Just as possession of a gun with an obliterated serial number is a federal crime, possession of a gun that has been altered to change its ballistic fingerprint, without proper notification of the police, could be made a separate crime with significant penalties. Inventive engineers may also be able to design guns in ways that make it more difficult to change ballistic fingerprints.

- # **Ballistic fingerprinting policies such as those in Maryland and New York will not stop violent crime because criminals tend to use stolen firearms:** This claim is false. Research shows that the vast majority of criminals *do not* obtain their guns through theft.<sup>13</sup>
- # **Maryland's law has not resulted in criminal convictions:** This is true, however the reasons for this are unknown. Possible explanations include the relative newness of Maryland's system and the lack of a national system which precludes Maryland from investigating guns sold outside of the state. Research is needed to determine whether criminals are altering the ballistic fingerprints on new guns sold in Maryland since the ballistic fingerprint law went into effect. This could be done by testing the guns recovered from criminals that were sold in Maryland after the ballistic fingerprint law went into effect. These guns should have matches in the State police ballistics database. If police find that fewer criminals are using guns sold in Maryland after the law went into effect, this may indicate that the law has been a deterrent to illegal gun sales and criminal use of guns.
- # **The large size of databases that would result from ballistic fingerprint laws will diminish the system's accuracy and efficiency:** This criticism comes from a technical report on the feasibility of a ballistic imaging database for all new handgun sales in California.<sup>10</sup> ATF's

experience with their ballistics database is just the opposite — more information improves its ability to find matches.<sup>11</sup> Furthermore, any problems with database size can be alleviated to some extent by partitioning the database by state and local geography since most crime guns are sold within the same county or county adjacent to where the guns are recovered in crime.<sup>14</sup>

# **The true objective of mandatory ballistic fingerprinting is to create a national gun registry:** Ballistic fingerprinting policies are intended to interrupt criminal behavior by connecting crimes to specific guns, and they have no history of misuse against non-criminal gun owners. While including identifying information on gun owners in ballistic fingerprint databases would make them easier for law enforcement to use, including this information is not a necessity for the system to work. In addition to the ballistic images, the databases could include only identifying information on the gun, such as the manufacturer, model, caliber, and serial number.<sup>15</sup> This information could be used to trace the gun to identify the first retail purchaser and the gun dealer that sold the gun just as ATF currently does hundreds of thousands of times each year.

### ***Considering a Federal Comprehensive Ballistic Fingerprinting Law***

Important lessons can be learned from careful study of the implementation of existing state ballistic fingerprinting laws and the effects these laws have on illegal gun markets and gun violence. As mentioned above, data from crime gun traces could be used to gauge the potential deterrent effect of these state laws. Further review of how ballistic fingerprint databases have been used in criminal investigations should shed light on key implementation issues and the databases' value in criminal investigations.

A federal ballistic fingerprint law would be appropriate if research indicates that existing state laws are helping to solve and deter a significant number of gun crimes, and the very large size of the database does not substantially reduce its ability to assist in linking guns to crime scenes. When considering a federal ballistic fingerprint law for new gun sales, policymakers should also consider that a federal law may be more effective than state laws due to its potential for deterring interstate gun trafficking.

Although a federal ballistic fingerprint law may be more effective than a patchwork of state systems, the costs of creating, maintaining, and using a federal system are likely to be substantial. The projected costs of the system must be weighed against the potential to reduce the enormous social and economic costs associated with gun violence. Eighty lives per day—almost 29,000 per year—are lost to gun violence in the United States.<sup>16</sup> The social costs of gun violence in the United States have been estimated to be an extraordinary \$100 billion per year.<sup>17</sup> If ballistic fingerprinting laws result in significant reductions in gun violence— by strengthening law enforcement efforts to identify and prosecute violent offenders and deterring illegal gun use by and transfers to criminals and youth—the investment will be well worth it.

### **ADDITIONAL RESOURCES:**

Bureau of Alcohol, Tobacco and Firearms (ATF): [www.atf.treas.gov](http://www.atf.treas.gov)

Federal Bureau of Investigation (FBI): [www.fbi.gov](http://www.fbi.gov)

Bureau of Justice Statistics (BJS): [www.ojp.usdoj.gov/bjs/](http://www.ojp.usdoj.gov/bjs/)

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