

Guns In the United States

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About the Editor

Michael Erbschloe has worked for over 30 years performing analysis of the economics of information technology, public policy relating to technology, and utilizing technology in reengineering organization processes. He has authored several books on social and management issues of information technology that were published by McGraw Hill and other major publishers. He has also taught at several universities and developed technology-related curriculum. His career has focused on several interrelated areas:

- Technology strategy, analysis, and forecasting
- Teaching and curriculum development
- Writing books and articles
- Publishing and editing
- Public policy analysis and program evaluation

Books by Michael Erbschloe

Threat Level Red: Cybersecurity Research Programs of the
U.S. Government (CRC Press)

Social Media Warfare: Equal Weapons for All (Auerbach Publications)

Walling Out the Insiders: Controlling Access to Improve Organizational
Security (Auerbach Publications)

Physical Security for IT (Elsevier Science)

Trojans, Worms, and Spyware (Butterworth-Heinemann)

Implementing Homeland Security in Enterprise IT (Digital Press)

Guide to Disaster Recovery (Course Technology)

Socially Responsible IT Management (Digital Press)

Information Warfare: How to Survive Cyber Attacks (McGraw Hill)

The Executive's Guide to Privacy Management (McGraw Hill)

Net Privacy: A Guide to Developing & Implementing an e-business
Privacy Plan (McGraw Hill)

Introduction

*In 2014 there were 11,008 firearm homicides in the United States.
In December 2017 there were 11,800 companies in the United States that manufacture some firearm component.*

Faced with a national epidemic of gun violence that began in the 1980s and continued throughout most of the 1990s, the federal government launched a new effort to help local authorities address gun crime. Many cities worked with NIJ researchers and other federal, state and local partners to design and test interventions to get illegally obtained guns off the streets and out of the hands of urban youth.

Initially, firearms violence intervention and research focused on either reducing the demand for illegally obtained guns or reducing the supply. More than 20 years of intervention programs, however, have shown that a single approach is not likely to work. To reduce gun violence, a sustained program that addresses both demand and supply is needed. A successful intervention will have elements of federal-local law enforcement collaboration, community involvement, targeted intervention tactics and continuous program evaluation.

When illegal gun transactions are viewed as a market phenomenon, trafficking and other illegal acquisition activities represent the supply side of the market. Criminal intent and a desire for self-protection primarily drive the demand side. Disrupting supply tackles the problem of illegal firearms transactions by attempting to stop illegal trafficking or seizing guns before they are used in a crime. Disrupting demand tackles the problem through programs intended to prevent, control, and deter criminals from seeking to acquire and use guns.

People between the ages of 15 and 24 are most likely to be targeted by gun violence as opposed to other forms of violence. From 1976 to 2005, 77 percent of homicide victims ages 15-17 died from gun-related injuries. This age group was most at risk for gun violence during this time period.

Teens and young adults are more likely than persons of other ages to be murdered with a gun. Most violent gun crime, especially homicide, occurs in cities and urban communities. [1]

Intimate partner violence can be fatal when a gun is involved — from 1990 to 2005, two-thirds of spouse and ex-spouse homicide victims were killed by guns. The overall number of firearm homicides among intimates has fallen considerably during the past 30 years, however.

The National Rifle Association (NRA) is the strongest influencer of gun regulation in the United States and it has annual revenues of over \$330 million and a staff of Over 800 to make its influence as effective as possible. The NRA reported spent \$30 million to influence the 2016 U.S. elections.

The CDC gun research ban was prompted by gun lobby after concerns that such research was demonstrating risks of firearms ownership. In 1993, a New England Journal of Medicine article based on CDC-funded research found that keeping a gun in the home was strongly associated with an increased risk of homicide by a family member. The NRA responded to this study by calling for the elimination of the CDC's National Center for Injury Prevention, which had funded the study. In 1996, Congressman Dickey successfully included a rider in the federal Labor-HHS-Education spending bill to prohibit CDC from using funds "to advocate or promote gun control" and also to cut \$2.6 million, the amount CDC had spent on gun research the previous year, from the National Center for Injury Prevention's budget.

In 2011, Congress expanded the rider to provide that no funds anywhere in the Labor-HHS-Education bill, including NIH funds, could be used, "in whole or in part, to advocate or promote gun control." This expansion of the rider came after a NIH-funded study was published in 2009 investigating the link between gun possession and gun assaults.

The Bureau of Alcohol, Tobacco, Firearms, and Explosives (ATF) was established as a separate component within the Department of Justice pursuant to Title XI of the Homeland Security Act of 2002, Public Law 107-296, on January 17, 2003.

The mission of ATF is to protect communities from violent criminals, criminal organizations, the illegal use and trafficking of firearms, the illegal use and storage of explosives, acts of arson and bombings, acts of terrorism, and the illegal diversion of alcohol and tobacco products. The major functions of ATF are to:

- Reduce the risk to public safety caused by illegal firearms trafficking.

- Reduce the risk to public safety caused by criminal possession and use of firearms.

- Reduce the risk to public safety caused by criminal organizations and gangs.

- Improve public safety by increasing compliance with Federal laws and regulations by firearms industry members.

- Reduce the risk to public safety caused by bombs and explosives.

- Reduce the risk to public safety caused by criminal use of fire.

Improve public safety by increasing compliance with Federal laws and regulations by explosives industry members.

Reduce the loss of tax revenues caused by contraband alcohol and tobacco trafficking.

Source: <https://nij.gov/topics/crime/gun-violence/pages/affected.aspx>

Source: <https://www.atf.gov/about/who-we-are>

The National Institute of Justice Research

NIJ is the research, development and evaluation agency of the U.S. Department of Justice dedicated to improving knowledge and understanding of crime and justice issues through science. We provides objective and independent knowledge and tools to inform the decision-making of the criminal justice community to reduce crime and advance justice, particularly at the state and local levels.

The National Institute of Justice is committed to being a transformative force in the criminal justice field by meeting five strategic challenges:

Fostering science-based criminal justice practice — supporting rigorous scientific research to ensure the safety of families, neighborhoods and communities.

Translating knowledge to practice — disseminating rigorous scientific research to criminal justice professionals to advance what works best in preventing and reducing crime.

Advancing technology — building a more effective, fair and efficient criminal justice system through technology.

Working across disciplines — connecting the physical, forensic, and social sciences to reduce crime and promote justice.

Bolstering the research infrastructure — supporting new scholars, encouraging researchers from a broad array of disciplines to apply their work to criminal justice, and increasing the availability of research findings and data.

Adopting a global perspective — understanding crime in its social context within the U.S. and globally.

NIJ supports research, evaluation, and development projects in seven areas:

Causes and correlates of crime.

Crime prevention and control.

Prevention of violence and victimization.

Forensic sciences.

Corrections practice and policy, including community corrections.

Law enforcement effectiveness, legitimacy, accountability and safety.

Courts and adjudication.

Within each of these broad areas, NIJ establishes research goals that are translated into specific research objectives within each program area. The research objectives for each of NIJ's portfolios are determined by:

Existing research knowledge (because knowledge accumulates).

Input about crime-fighting successes, failures and needs gathered directly from practitioners, policymakers and researchers.

The successes and struggles of programs undertaken by other federal agencies, including other Office of Justice Programs bureaus and offices.

Research on Gun Crimes

According to the National Crime Victimization Survey, 467,321 persons were victims of a crime committed with a firearm in 2011. In the same year, data collected by the FBI show that firearms were used in 68 percent of murders, 41 percent of robbery offenses and 21 percent of aggravated assaults nationwide. Most homicides in the United States are committed with firearms, especially handguns.

Homicides committed with firearms peaked in 1993 at 17,075, after which the figure steadily fell, reaching a low of 10,117 in 1999. Gun-related homicides increased slightly after that, to a high of 11,547 in 2006, before falling again to 10,869 in 2008.

Gangs and Gun-Related Homicide

Gun-related homicide is most prevalent among gangs and during the commission of felony crimes. In 1980, the percentage of homicides caused by firearms during arguments was about the same as from gang involvement (about 70 percent), but by 1993, nearly all gang-related homicides involved guns (95 percent), whereas the percentage of gun homicides related to arguments remained relatively constant. The percentage of gang-related homicides caused by guns fell slightly to 92 percent in 2008, but the percentage of homicides caused by firearms during the commission of a felony rose from about 60 percent to about 74 percent from 1980 to 2005.

Nonfatal Firearm-Related Crime

Nonfatal firearm-related crime has fallen significantly in recent years, from almost 1.3 million incidents in 1994 to a low of 331,618 incidents in 2008. Since then it has risen; in 2011 there were 414,562 incidents.

As a percentage of all violent incidents (i.e., rape, sexual assault, robbery and aggravated assault), between 1993 and 2011, nonfatal gun crime has ranged from a high of 8 percent to a low of 5 percent. In 2011, firearm crimes comprised 8 percent of all violent crimes.

Nonfatal Firearm Violence, 1993-2011

Year	Firearm incidents	Firearm victims	Firearm crime rate	Firearm crimes as a percent of all violent incidents
1993	1,222,701	1,529,742	7.3	8
1994	1,287,190	1,568,176	7.4	8
1995	1,028,933	1,193,241	5.5	7
1996	939,453	1,100,809	5.1	7
1997	882,885	1,024,088	4.7	7
1998	673,304	835,423	3.8	6
1999	523,613	640,919	2.9	5
2000	483,695	610,219	2.7	6
2001	506,954	563,109	2.5	7
2002	450,776	539,973	2.3	7
2003	385,037	467,345	2.0	6
2004	405,774	456,512	1.9	7
2005	446,365	503,534	2.1	7
2006	552,035	614,406	2.5	7
2007	448,414	554,780	2.2	7
2008	331,618	371,289	1.5	5
2009	383,390	410,108	1.6	7
2010	378,801	415,003	1.6	8
2011	414,562	467,321	1.8	8

Source: Bureau of Justice Statistics, National Crime Victimization Survey, 1993-2011.

Who Has Guns and How Are They Acquired?

NIJ's earliest firearms studies uncovered who owns guns, legally and illegally, and how illegal gun trafficking is tied to juvenile gun violence and other crimes such as drug dealing and gang crime. Highlights of these studies:

Many juveniles and young adults can easily obtain guns illegally; most claim to carry them for self-defense.

A study of persons arrested for a wide range of crimes showed that a higher percentage of arrestees than regular citizens own firearms. Arrestees are also more likely to be injured or killed by gun violence. Within a community, this amounts to an identifiable group of “career” offenders.

Surveys of offenders have found that they prefer newer, high-quality guns and may steal or borrow them; most, however, acquire guns “off the street” through the illicit gun market.

Federal law prohibits the sale of firearms or ammunition to juveniles and people who have been convicted of felonies and some violent misdemeanors. Federally mandated background checks keep these people from buying firearms at licensed dealers. Prohibited buyers may turn to the largely unregulated secondary market — gun sales between private individuals. The secondary market is a major source of guns used in crimes.

Why do people buy guns illegally? While some may buy them with the intent of using them in a crime, reasons can vary. Boston's Operation Ceasefire, a successful gun violence intervention, found that youths frequently acquire guns because they're afraid of being a target of violence from others.

Trace Data Can Illuminate Illegal Firearms Markets

Records of firearms and ammunition sales can help law enforcement and researchers untangle these illegal firearms markets. If a gun is part of a criminal investigation, the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) can trace it — that is, the ATF can provide information to law enforcement on a gun's movement through the supply chain to its first retail purchase. Some states, such as California, mandate the documentation of secondary-market firearms sales or require dealers to log ammunition sales. This information can help crime investigators develop leads about a gun-related crime.

By analyzing patterns in these data, researchers and law enforcement can identify potential traffickers and begin to understand how firearms move into illegal use. For example, researchers in Los Angeles and those with Boston's Operation Ceasefire both found that there is very little interstate trafficking in firearms that are used in crimes. Instead, most crime guns, especially those that move very quickly from legal sale into criminal use, were originally purchased legally in the local area.

Trace Data Can Help Stop Trafficking

Interventions to stop gun trafficking can use these data in different ways. The Operation Ceasefire Working Group, which first met in January 1995, decided to focus on traffickers of the types of guns used by Boston street gangs. The ATF worked closely with Boston police to flag guns that had recently been purchased illegally and used in a crime. In Los Angeles, a working group that was focused on reducing illegal trafficking created a warning letter campaign aimed at discouraging local citizens from selling their guns illegally.

Using Trace Data to Police Illicitly Obtained Firearms

How do guns get into the wrong hands? One way to answer this question is use trace data — that is, the original sales information for guns that were eventually recovered by law enforcement. In some states, records on subsequent, private sales of firearms are also available.

These data can help investigators answer questions like "Where are illegally obtained guns coming from?", "Who buys guns that later end up seized by police?" and "How long does it take for a gun, once legally purchased, to move into criminal use?" The answers to these sorts of questions help law enforcement take steps to keep guns from getting into the wrong hands. They can also help policymakers understand what types of regulation are and are not helpful in fighting illegal firearms trafficking.

Research Using Trace Data and Secondary Purchases

In an NIJ-supported study, researchers looked at national trace data as well as data on secondary purchases in the state of California, which mandates recordkeeping for secondary firearms sales. For four years of data pulled from these records, they examined the amount of time that elapsed between a firearm's last legal sale and its recovery by law enforcement. (If this time is short, it can indicate illegal trafficking.) Then, they examined their findings in the context of state firearms regulations and enforcement to see whether state laws can have an effect on trafficking.

The researchers' results found that records of secondary sales, as mandated in California, are useful in identifying guns that may have been trafficked. They also found that it took longer for guns to eventually be recovered by police in those states that had laws regulating both firearm purchase and registration compared to states that had only one type of these laws and states that had neither. The researchers argue that this suggests that strong state firearms regulation can make it more difficult for criminals to acquire firearms.

Illegal Gun Markets

Strategies for Disrupting Illegal Firearms Markets A Case Study of Los Angeles: In the city of Los Angeles, 64 percent of homicides between 1999 and 2003 were committed with a handgun. Although federal law prohibits ownership of firearms and ammunition by juveniles and certain people who may be prone to violence, unregulated secondary markets offer opportunities for these people to acquire them.

Many "crime guns" move quickly from legal sale into criminal use. Research has shown that one of every five guns that is used in a crime in Los Angeles moves very quickly from its initial, legal sale into criminal use. This suggests that many legal gun purchases in the city might be what are called "straw purchases" — that is, a gun bought by an adult with a clean record expressly to give or sell it to someone who could not have otherwise gotten one.

Intervening in illegal gun markets could reduce criminals' access to guns. In 2001, an NIJ-funded project took a data-driven approach to understanding and disrupting these illegal gun markets in Los Angeles. The researchers hoped that intervening in these markets could help to reduce gun violence.

In their final report, the researchers argue that disrupting the illegal market in guns could have a real effect on gun violence. Contrary to commonly held belief, they say, high-crime areas are not awash in guns: Studies have shown that most robbers do not use guns and most youths who are in gangs or who commit crimes do not own one. By learning how guns move into the wrong hands, police and policymakers could make guns more difficult to access by those who will use them for harm.

The project first created a data-analysis software tool and workstation for the new Southern California Regional Crime Gun Center, run by the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF). The prototype system was designed to help crime analysts better detect patterns in firearm-trace data that could indicate trafficking. The system integrated different ATF data sources and overlaid an interface through which analysts could manipulate the data to check for indicators of trafficking, illegal sales or other suspicious activity. It also provided analysts with a system to report potential leads for investigation.

Using the prototype system to reconstruct the movement of crime guns in the county, analysts found a surprising result: Although law enforcement officers in Los Angeles believed that most guns being used by local criminals had been brought in from neighboring states with fewer firearms regulations, the data showed that most crime guns were actually purchased originally from in-county, licensed dealers. In fact, there was often only a few miles between the home address of the original purchaser of a gun and that of the gun's possessor at the time it was recovered by police.

In reviewing these data, an interagency working group (composed of ATF officials, criminal justice researchers, law enforcement, prosecutors and other stakeholders) suspected that straw purchases were driving these outcomes. The working group designed an intervention, described in the next section (Intervening in Gun Markets) meant to make these "straw buyers" think twice about illegally transferring their guns.

The interagency working group was also concerned about potential illegal markets for ammunition. Researchers designed a study, described on the page Criminal Purchase of Firearm Ammunition, to determine whether prohibited individuals were buying ammunition from dealers, and if so, where and what they were buying.

Intervening in Gun Markets

In Los Angeles, which has a high rate of gun-related crime, research has shown that many crime guns move relatively quickly — and over relatively short geographic distances - from their original, legal purchase to recovery by law enforcement. (See Strategies for Disrupting Illegal Firearms Markets: A Case Study of Los Angeles. This suggests that many guns used by criminals are given or sold to them by straw buyers. Criminal justice theory suggests that people like these straw buyers — who have little, if any, criminal history — are more easily deterred by risks of arrest and prosecution than are those with criminal histories. A working group composed of law enforcement, academics, and other stakeholders in Los Angeles designed a letter campaign designed to remind potential straw buyers of their legal responsibility to transfer their gun legally and that the state had a record connecting that gun to them.

Two separate areas of Los Angeles, with a total population of 425,000 people, were included in the letter program. The working group chose these areas because they have large numbers of residents who legally buy guns that later are used in crimes by others.

For about a year in 2007 and 2008, researchers sent letters to residents of these areas who initiated gun purchases on odd-numbered days. (People who initiated purchases on even numbered days didn't receive the letter, for comparison purposes.) The letters outlined the problem of gun violence in the city and reminded recipients of their legal responsibilities as gun owners. Specifically, the letters informed recipients that it was a crime to sell or give a gun to someone without completing a dealer record of sale form. They also warned recipients that they could be prosecuted if they did not do so and the gun was later used in a crime.

Each would-be purchaser received their letter during the legally mandated 10-day waiting period before they could return to the dealer and pick up their new gun. For 22 months afterwards, researchers tracked the outcomes of the transactions.

The researchers found one difference between the group that received letters and the group that had not: Those who received the warning letter were much more likely to report that their guns had been stolen than those who hadn't. The researchers suggest that the letter may have caused this outcome in two different ways - by motivating more law-abiding people to report real thefts of their new guns or by inspiring straw buyers to falsely report thefts after an illegal transfer in order to protect themselves.

The researchers point out that only 13 percent of crime guns uncovered around the time of the study had been bought in the past two years. They suspect that a greater period of monitoring would have revealed a more pronounced effect of the letter on firearms trafficking.

Further Reading:

Report from the Los Angeles case study: Ridgeway, Greg, Glenn L. Pierce, Anthony A. Braga, George Tita, Garen Wintemute, and Wendell Roberts. "Strategies for Disrupting Illegal Firearm Markets: A Case Study of Los Angeles" (pdf, 92 pages), Santa Monica, Calif.: RAND Corporation, 2008.

Report about the letter-deterrence study: Ridgeway, Greg, Anthony A. Braga, George Tita, and Glenn L. Pierce. "Intervening in gun markets: An experiment to assess the impact of targeted gun-law messaging" (pdf, 8 pages), *Journal of Experimental Criminology* 7 (2008): 103-109.

Criminal Purchase of Firearm Ammunition

Public efforts to restrict firepower among those most prone to violence generally focus only on guns, not ammunition. For example, firearms dealers run the names of would-be gun buyers through an instant background check system to verify whether the person is legally allowed to own a gun. But although the same restrictions technically apply, ammunition purchasers are not subject to the same background check. This means that people who shouldn't be able to buy ammunition might be doing just that.

Research on illegal gun markets in the streets of Chicago shows that criminals already have a more difficult time buying ammunition than buying guns. If retail sales of ammunition were more tightly controlled to keep ammunition from falling into the wrong hands, would this squeeze the illegal market even further, and, perhaps, reduce gun violence?

To answer questions about ammunition markets, NIJ-funded researchers worked with the Southern California Regional Crime Gun Center, operated by the U.S. Bureau of Alcohol, Tobacco, Firearms and Explosives. They studied the handwritten logs of two months' worth of ammunition sales in 2004 from federally licensed dealers in the city. (A local ordinance requires

these dealers to record ammunition buyers' names, addresses, thumbprints, state-issued ID numbers and other personal data. Police periodically collect the logs, but until 2004, they did not reference them unless they were investigating a specific crime.)

The researchers found that 2.8 percent of the 2,540 ammunition purchases during this period were by people who were not legally allowed to own ammunition. All told, these illegal buyers bought more than 10,000 rounds of ammunition (2.3 percent of the total). Most of the buyers were local. A few, however, lived in the high-crime neighborhoods in the south of the city. The researchers suspected that buyers in these neighborhoods went just over the border to stores in L.A. County.

These data demonstrate that the data-logging requirement is not deterring many restricted people from buying ammunition. The researchers argue that consistent requirements across jurisdictions and a greater use of the log books by investigators could help locate people who own guns illegally and stem the flow of deadly firepower into the hands of people most likely to use it for violence.

Further Reading:

Report from the study: Tita, George E., Anthony Braga, Greg Ridgeway, and Glenn L. Pierce, "The Criminal Purchase of Firearm Ammunition," *Injury Prevention* 12 (August 2006): 308-311.

Gun Safety Technology Market Survey

Since the mid-1990s, numerous teams have developed firearms with advanced gun safety technology to varying degrees of maturity. These firearms are designed to contain authorization systems that generally combine an authentication mechanism that actuates a blocking mechanism in a seamless process that is designed to take less time than handling and firing a conventional gun.

In June 2013, NIJ published *A Review of Gun Safety Technologies*, a technology assessment and market survey of existing and emerging gun safety technologies that are of interest to the law enforcement and criminal justice communities and others interested in gun safety. The report is an unbiased summary of existing and emerging technologies and the availability and use of those technologies to inform any future federal research and development strategy and innovation in gun safety technology.

A Review of Gun Safety Technologies does not endorse any particular technology, developer, patent, company or approach. At the time the report was published, personalized firearms were not commercially available in the United States, but at least three products - two handguns and a shotgun - were at a technology maturity level that can at least be described as commercializable or pre-production.

Read the full report <https://www.ncjrs.gov/pdffiles1/nij/242500.pdf>

Read the press release http://www.ojp.gov/newsroom/pressreleases/2013/ojppr061713_2.pdf

The report responds to an executive action issued by the President on January 26, 2013. He directed the Attorney General to issue a report on the availability and most effective use of new gun safety technologies and challenge the private sector to develop innovative technologies.

Firearms and Examination and Ballistics

NIJ funds research and development to improve how law enforcement gathers and uses evidence. We support the enhancement and creation of tools and techniques to identify, collect, analyze, interpret, and preserve evidence; including firearms and ballistic evidence. (see table below) NIJ also funded an evaluation of law enforcement use of the National Integrated Ballistic Information Network (NIBIN). Learn more about the evaluation.

Award Title	Awardee	Award Number	Amount	State	Status	Fiscal Year
Physical and Chemical Trace Evidence from 3D-Printed Firearms	The University of Mississippi	2017-IJ-CX-0001 (0)	\$50,000	MS	Open	2017
RECOVERY OF DEFACED SERIAL NUMBERS USING INFRARED THERMAL IMAGING	Idaho State University	2015-R2-CX-0017 (2)	\$48,375	ID	Open	2017
Recovery of Defaced Serial Numbers Using Infrared Thermal Imaging	Idaho State University	2015-R2-CX-0017 (1)	\$48,015	ID	Open	2016
Forensic Firearms Research Database and Firearms Imaging Metrological Standards	National Institute of Standards and Technology, U.S. Department of Commerce	2016-DNR-6257 (0)	\$902,363	MD	Open	2016
RECOVERY OF DEFACED SERIAL NUMBERS USING	Idaho State University	2015-R2-CX-	\$50,000	ID	Open	2015

Award Title	Awardee	Award Number	Amount	State	Status	Fiscal Year
<u>INFRARED THERMAL IMAGING</u>		0017 (0)				
<u>Applied Research, Development, and Method Validation of Toolmark Imaging, Virtual Casing Comparison, and In-Lab Verification for Firearms Forensics</u>	<u>Cadre Research Labs, LLC</u>	2015-DN-BX-K032 (0)	\$217,450	IL	Closed	2015
<u>Assessing the Quality of 3-Dimensional Imaging on the BrassTrax HD3D System and Validating an In-Silico Solution to Confirm NIBIN Hits</u>	<u>City and County of Denver - Police Department</u>	2015-DN-BX-K034 (0)	\$79,150	CO	Open	2015
<u>Applied Research, Development, and Method Validation for a Statistically Based Comparison of Tool Marks using GelSight-Based 3D Imaging and Novel Comparison Algorithms for Firearm Forensics</u>	<u>Cadre Research Labs, LLC</u>	2014-DN-BX-K012 (0)	\$190,400	IL	Closed	2014
<u>Applied Research and Development of a Three-dimensional Topography System for Imaging and Analysis of Striated and Impressed Tool Marks for Firearm Identification using GelSight</u>	<u>Cadre Research Labs, LLC</u>	2013-R2-CX-K005 (0)	\$193,000	IL	Closed	2013
<u>Infrared Thermal Imaging for Use in Restoration of Defaced Serial Numbers</u>	<u>Idaho State University</u>	2013-R2-CX-K012 (0)	\$316,004	ID	Closed	2013
<u>Applied Research and Development of a Three-dimensional Topography System for Firearm Identification using GelSight</u>	<u>Cadre Research Labs, LLC</u>	2012-DN-BX-K058 (0)	\$200,000	IL	Closed	2012

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