DEC. 04

U.S. Department of Justice
Office of Justice Programs
National Institute of Justice

NIJ

Special REPORT

Supplement I: Status Report to the Attorney General on Body Armor Safety Initiative Testing and Activities

December 27, 2004

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Sarah V. Hart
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Cover photograph of law enforcement officer by Larry Levine, courtesy of the Washington Metropolitan Area Transit Authority, 2001.

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I. Introduction:

On November 17, 2003, Attorney General John Ashcroft announced the Department of Justice's Body Armor Safety Initiative in response to concerns from the law enforcement community regarding the effectiveness of their armor. He directed the National Institute of Justice (NIJ) to initiate an examination of Zylon®-based bullet-resistant armor[1] (both new and used), to analyze upgrade kits[2] provided by manufacturers to retrofit Zylon®-based bullet-resistant armors, and to review the existing process by which bullet-resistant armor is certified to determine if the process needs modification.

On March 11, 2004, as part of the Attorney General's directive, the Office of Justice Programs (OJP) held a Body Armor Summit. At the same time, NIJ released its report, "Status Report to the Attorney General on Body Armor Safety Initiative Testing and Activities" (https://vests.ojp.gov/index.jsp, and click on the link entitled, "Department of Justice Body Armor Summit"). Summit participants included representatives of Federal, State, and local law enforcement agencies and associations; manufacturers of bullet-resistant fiber, fabric, and armor; and standards and testing organizations. They provided guidance to OJP on the future of body armor research and development, standards and testing, and also reviewed information about NIJ's preliminary evaluation of Zylon®-based armor. NIJ continues to conduct research and testing to assess the performance of used Zylon®-based armor, to identify methods for measuring changes in ballistic-resistant materials and ballistic performance, to assess the performance of the manufacturer-provided upgrade kits worn in conjunction with used Zylon®-based armor, and to assess the existing body armor standard and compliance testing process. NIJ also continues to conduct research and testing to determine the cause of the Forest Hills, Pennsylvania, armor penetration discussed in the March 11, 2004, status report. The following information supplements what is contained in that report.

II. Study of the Forest Hills Incident:

In the summer of 2003, a Forest Hills, Pennsylvania, police officer was shot and seriously injured when a bullet penetrated the front panel of his Second Chance Ultima® armor, which is made of multiple layers of fabric woven from Zylon® yarn. The incident is the first case reported to NIJ in which NIJ-compliant body armor appears to have failed to prevent penetration from a bullet it was designed to defeat.

NIJ was able to obtain the rear panel of the armor worn by the injured officer in order to test the armor and its materials of construction. As previously reported in the status report, the tensile strength[3] of Zylon® yarns removed from the rear panel of the armor

[1] Zylon® (PBO fiber – poly-p-phenylenebenzobisoxazole) is a high-strength organic fiber produced by Toyobo Co., Ltd.

[2] An upgrade kit is an additional ballistic panel that is inserted into the armor to supplement the protection provided by the original armor.

[3] Tensile strength is the maximum stress (force exerted over a given cross-sectional area) that a material, in this case a Zylon® yarn, can withstand prior to failure.

was found to be up to 30 percent lower than yarns from "new" armors of the same model supplied by Second Chance Body Armor, Inc. for this study. Tensile strength is a critical property that influences ballistic performance of body armor.

To study possible reasons for the Forest Hills armor penetration, armor panels used in the study needed to be uniformly weakened to match the condition of the officer's armor. The method used to induce degradation was to expose some of the new Second Chance armor panels (in carriers) to water vapor by "conditioning" them in a temperature and humidity (T&H) chamber. During the conditioning, Zylon® yarn specimens were removed from some body armor panels every two weeks to monitor changes in the mechanical properties and, as part of the applied research, to look for changes in the chemical properties. After five months of conditioning, Zylon® yarns from the armor panels exhibited tensile strengths comparable to those of Zylon® yarns taken from the back panel of the officer's body armor in the Forest Hills incident.

A detailed, shot-by-shot test plan was developed to study the factors that may have played a role in the Forest Hills incident to determine the factor, or combination thereof, most likely responsible for the body armor penetration. With earlier handgun and ammunition studies indicating that bullet velocity did not play a significant role, velocity was eliminated as an experimental variable. The factors included in the ballistic performance study were: 1) ballistic material tensile strength, 2) bullet type, 3) barrel twist, 4) shot angle, and 5) shot location on armor.

A total of 32 new ballistic panels were tested, 16 of which were "as supplied" by Second Chance, and the other 16 were weakened in the T&H chamber for five months. All combinations of the five factors mentioned above were taken into account in this testing. Each armor panel was shot six times. Of the 192 shots comprising this study, none penetrated any of the armor panels.

With these results, no definite conclusions can be drawn at this time that would explain the cause of the Forest Hills body armor penetration. The tests focused on studying the five factors considered most likely to have contributed to the penetration. As the research has progressed, however, several other factors that may have contributed to the penetration have been identified.

First, it is possible that the tensile strength of the ballistic material in the front panel—the panel that was penetrated—was significantly lower than the back panel at the time of the incident. NIJ is currently attempting to obtain the front panel of the Forest Hills armor for testing and analysis. This may help explain the cause of the failure. Access to the front panel for destructive tests had previously been denied because it was needed as evidence for the criminal prosecution. Even if the front armor panel can be obtained now, it may be difficult to draw definitive conclusions from it because of the passage of time and exposure to unknown environmental and handling conditions over the past year.

Second, NIJ sought to attain similar tensile strengths in the test armors and those in the Forest Hills armor. However, other mechanical properties might also influence ballistic

strength. Unfortunately, they were not measured, because they are difficult to measure accurately. Further, material properties were determined using standardized tests under "static" conditions (i.e., forces applied to yarns very slowly). Under "dynamic" conditions (i.e., forces applied to yarns very rapidly—as when a yarn is struck by a bullet fired from a gun—the materials may not behave the same. Work is underway by NIJ to examine the differences between the "static" and "dynamic" properties of ballistic materials.

Third, the particular cause of the degradation might also influence how these materials respond to ballistic impacts. It is unknown whether Zylon® yarn damaged by chemical means will respond the same as that damaged by mechanical means. During other ballistics tests, observations of body armor returned from the field indicated that armor panels may have localized regions of mechanical damage due to folding, flexing, abrasion, and other wear effects. Bullets might be more likely to penetrate these regions. Again, due to unknown handling conditions over the past year, it is not possible to determine the condition of the armor at the time of the incident.

Fourth, the presence of moisture in an armor panel can also influence ballistic resistance. The moisture content in the interior of the officer's armor panel at the time he was shot is not known. To help determine whether moisture permeation into the ballistic panel of Ultima® armors may be an issue, a humidity sensor was placed inside one of the ballistic panel covers in the T&H chamber. This sensor indicated that the Comfort Cool® material used for the ballistic panel covering performs in a manner consistent with advertisements by the developers and marketers of the system (W.L. Gore and Associates and Second Chance Body Armor, Inc.); that is, it is breathable. Moisture permeates the barrier in near-real time. Tests up until now have been performed on dry armor panels. Further studies will determine whether moisture may have been a contributing factor.

At the present time, the definitive cause of the penetration has not been determined. However, ongoing and planned studies may yet provide additional information that will explain the Forest Hills penetration.

It is important to note that the trend in police homicides has continued to decline steadily since the introduction of body armor and the initiation of the Department of Justice's body armor standards and testing program. Despite the Forest Hills incident, the lives of more than 2,800 police officers have been saved as a result of body armor. An officer who is not wearing armor is 14 times more likely to suffer a fatal injury than an officer who is wearing armor. Therefore, law enforcement officers would be well advised to continue to wear body armor and carefully follow manufacturers' instructions concerning its use and care.

III. Testing of Upgrade Kits:

Second Chance is the only body armor manufacturer known to have offered an upgrade kit for certain models of Zylon®-based body armor. At NIJ's request, Second Chance

provided approximately 50 armors and matching upgrade kits for each of the three primary soft armor protection levels[4] (IIIA, II, and IIA) for testing. The samples included both new and used upgrade kits, with the majority of the armors having been previously worn. A series of statistically based ballistic tests were performed to ensure that the performance of any Second Chance Ultima® and Ultimax® models of body armor is acceptable when used in conjunction with the upgrade kit offered by the manufacturer. Ultima® models achieve all of their ballistic protection from Zylon®, whereas Ultimax® models achieve ballistic protection through use of some Zylon® as well as other ballistic materials. Given the premise that Zylon® degradation leads to reduce ballistic performance, the Ultima® models were used because their all-Zylon® construction was considered more likely to exhibit signs of degraded ballistic performance. The level of test stringency selected for this assessment required that the upgrade kits successfully defeat a total of 48 shots of the same two threat rounds (24 each) specified in the NIJ standard. New models of body armor submitted to NIJ to determine compliance with the requirements of the NIJ standard are evaluated at this same level of test stringency.

The upgrade kit tests relied on first identifying individual body armor samples whose ballistic resistance could reasonably be considered suspect. This was accomplished by performing a six-shot ballistic penetration screening test on one armor panel from each body armor sample. In this test, three shots of each of the two threat rounds specified in the NIJ Standard for each armor protection level (IIIA, II, or IIA) were fired at the panels at the reference velocities specified in the NIJ standard (for a total of six shots per panel). One of the three shots for each caliber was fired at a 30-degree angle. If a bullet penetration occurred on any of the six-shot screening tests, the performance of that armor sample was considered to be degraded, and the untested companion armor panel from that same armor was combined with an upgrade kit and subjected to the same six-shot ballistic penetration test to determine if the upgrade kit provided the expected level of protection. Ballistic testing has been completed for all three threat levels.

Second Chance also provided data describing the testing they conducted to confirm the satisfactory performance of the upgrade kits. The results of their testing have been reviewed and their conclusions appear to be supported by the data they supplied. However, they relied heavily on ballistic limit testing [5] to confirm that the upgrade kit, in concert with used armor, would produce a ballistic limit value that was at least equal to the ballistic limit performance of new armor. The NIJ tests suggest that in addition to the ballistic limit tests, had the manufacturer conducted pass/fail penetration tests on suspect degraded armor samples, a better understanding of the upgrade kit performance would have been achieved. Additional tests of the upgrade kits with performance-degraded armors in such a manner would have been a more stringent way to confirm that the upgrade kit reliably improves the ballistic-resistance performance to the level required by the NIJ standard.

[4] For an description of protection levels, please see the NIJ Ballistic Resistance of Personal Body Armor Standard 0101.04 at http://www.ojp.usdoj.gov/nij/pubs-sum/183651.htm

[5] Ballistic limit testing estimates the velocity at which a given bullet is expected to completely penetrate a body armor panel 50 percent of the time.

IV. Upgrade Kit Test Results:

Level IIIA: Single armor panels from 18 Ultima® body armor samples were screened using the six-shot ballistic performance test protocol. Eight armor panels experienced at least one penetration, and the majority of those eight panels experienced multiple penetrations. After combining each companion armor panel with an upgrade kit and subjecting the combination to a six-shot ballistic performance test, two of the eight armors yielded a single penetration, and several experienced significant backface signatures.[6] The results indicated an unacceptable level of penetration performance. The excessive backface signatures would be considered unacceptable if the armor were new and tested in accordance with the NIJ Standard.

Level II: Single armor panels from 11 Ultima® body armor samples were screened using the six-shot ballistic performance test protocol. Eight armor panels experienced at least one penetration, with two of the eight experiencing more than one penetration. After combining each companion armor panel with an upgrade kit and subjecting the combination to a six-shot ballistic penetration test, none of the armor panels experienced a penetration. The results indicated an acceptable level of penetration performance. However, significant backface signatures were recorded. The performance of the armor would be considered unacceptable as a result of the excessive backface signatures if the armor were new and tested in accordance with the NIJ Standard.

Level IIA: Single armor panels from 26 Ultima® body armor samples were screened using the six-shot ballistic performance test protocol. Nine armor panels experienced at least one penetration, with one of the nine experiencing more than one penetration. After selecting eight of the nine companion armor panels and combining each with an upgrade kit, the combination was subjected to a six-shot ballistic penetration test. None of the armor panels experienced a penetration. The results indicated an acceptable level of penetration performance. However, significant backface signatures were recorded. The performance of the armor would be considered unacceptable as a result of the excessive backface signatures if the armor were new and tested in accordance with the NIJ Standard.

Based on tests conducted, the upgrade kit, though not returning the well-worn armor samples to the level of performance of new armor, did provide added protection to the armors. Ultima® and Ultimax® models of body armor worn with the upgrade kits provide a higher degree of safety for officers than the Ultima® and Ultimax® models alone. Therefore, officers that continue to wear the Ultima® and Ultimax® models of body armor should likewise continue using their upgrade kits.

[6] Backface Signature (BFS): When armor is tested, it is mounted on clay backing material whose consistency is controlled. After the shot, the depth of the clay deformation behind the armor panel is measured and recorded as the BFS.

A table of these results can be found in the Appendix of this document. NIJ will provide the results of the ballistic testing of the upgrade kits to the law enforcement community via the Bulletproof Vest Partnership (BVP) website, https://vests.ojp.gov.

V. Applied Research Effort/Ballistic Testing:

NIJ is continuing to conduct research on the causes and mechanisms of armor degradation. Analytical techniques and tools are also being developed to identify the cause and extent of body armor degradation. It is anticipated that ongoing research conducted by NIJ will ultimately lead to test protocols to validate the performance of used armor and the development of a nondestructive test procedure for ballistic armor. Currently, the only method of testing armor performance is through destructive means (i.e., ballistic testing). In addition, NIJ has issued a solicitation for additional research to be conducted in the areas of advanced ballistic-resistant materials and degradation of ballistic-resistant materials.[7]

NIJ is also continuing to perform ballistic testing on used armor. For the second phase of testing (Phase II), discussed in the March 11, 2004, *Status Report to the Attorney General on Body Armor Safety Initiative Testing and Activities*, approximately 500 armors have been randomly selected for testing from five different climatic regions, five different age categories, and four different manufacturer categories. Evaluating body armor from different climatic regions may establish whether temperature and humidity lead to conditions that affect body armor performance. NIJ is currently in the process of requesting armor samples for this phase of testing using the BVP website. The BVP website has been updated to include an automated process for contacting agencies to request their armor for testing and for reimbursing agencies for the purchase of replacement armor. The test results will indicate whether Zylon®-based armors degrade, the general extent of the degradation, and what factors may be causing the degradation. Preliminary findings for the second phase of testing are expected in Spring 2005.

VI. Summary of Interim Findings:

The following is a summary of interim findings from the work conducted by NIJ since the announcement of the Attorney General's Body Armor Safety Initiative:

- Research conducted thus far has supported the fact that ballistic-resistant materials, including Zylon®, can degrade. Degradation may reduce the ballistic-resistance safety margin that armor manufacturers build into their armor designs. It is imperative that manufacturers understand the vulnerabilities of materials used in their armor designs, take steps to protect the materials against these vulnerabilities, and account for any sources of performance loss during the armor design process.

[7] See the following URL for a copy of this solicitation: http://www.ncjrs.org/pdffiles1/nij/sl000688.pdf.

- Determining the performance level of used armor is a difficult and complex task. This was demonstrated by the Forest Hills body armor examination discussed above. Attempting to: 1) assess the condition of used armor; 2) replicate that condition by weakening "new" armors; and 3) determine why the armor may have allowed a penetration from a bullet it was designed to defeat has proven to be extremely challenging. There are numerous factors, or combination thereof, that appear to influence the ballistic resistance of body armor.

- Through research conducted, it appears that there are analytical tools and techniques that can be used to reveal and measure degradation in ballistic-resistant fiber. It is anticipated that this will lead to a protocol for aging new armor to evaluate its performance, a definitive test for determining the performance level of armor in field use, and eventually to a non-destructive test method for determining the performance level of used armor.

- Upgrade kits do not appear to bring used Second Chance armor up to the level of performance of new Second Chance armor. NIJ conducted a series of statistically based ballistic tests to determine the acceptability of upgrade kits offered by Second Chance Body Armor, Inc., for use with Ultima® and Ultimax® models of body armor. Significant backface signatures were experienced during testing. Additionally, two of the level IIIA armor samples experienced a penetration when tested with an upgrade kit, which signifies that the upgrade kit does not afford adequate protection for level IIIA armor, as specified in the NIJ Standard.

  Based on tests conducted, although the upgrade kit did not return the well-worn armor samples to the level of performance of new armor, they did provide added protection to the armors and hence increased safety. Therefore, officers that continue to wear the Ultima® and Ultimax® models of body armor should likewise continue using their upgrade kits.

- Body armor has been credited with saving the lives of over 2,800 police officers. An officer who is not wearing armor is 14 times more likely to suffer a fatal injury than an officer who is wearing armor.

  Therefore, law enforcement officers would be well advised to continue to wear body armor and carefully follow manufacturers' instructions concerning its use and care.

Results of Upgrade Kit Penetration Testing

All armors tested were Second Chance Body Armor "Ultima", Zylon, male body armors.

Level IIA Armor

Sample	OLES ID Number	Panel Tested	Model Number	NIJ Standard	Serial Number	Date of Manufacture	Lot Number	Condition	Penetrations: 9 mm (see note 1) 1st 0°	2nd 0°	30°	357 Mag (see note 2) 1st 0°	2nd 0°	30°	Result	Back Face Signature: 9 mm 1st 0°	2nd 0°	357 Mag 1st 0°	2nd 0°	Result
1	PP031	Front	ZYL IIA 898101	.03	01022247	Jan-2002	72326	4	No	No	No	No	No	No	Pass	37	35	**47**	44	**Fail**
2	PP053	Front	ZYL IIA+ 896080	.03	08016002	Aug-2001	71821	4	No	No	No	No	No	No	Pass	39	34	**47**	42	**Fail**
3	PP048	Back	ZYL IIA 898101	.03	08016006	Aug-2001	71821	3	No	No	No	No	No	No	Pass	37	38	40	41	Pass
4	PP036	Back	ZYL IIA 898101	.03	12013453	Dec-2001	655691	3	No	No	No	No	No	No	Pass	39	29	**51**	**46**	**Fail**
5	PP051	Front	ZYL IIA 898101	.03	07014330	Jul-2001	71821	3	No	No	No	No	No	No	Pass	35	37	**45**	38	**Fail**
6	PP052	Front	ZYL IIA+ 896080	.03	08016007	Aug-2001	71821	4	No	No	No	No	No	No	Pass	37	33	43	**50**	**Fail**
7	PP045	Front	ZYL IIA 898101	.03	09993621	Sep-1999	70338	3	No	No	No	No	No	No	Pass	33	35	43	40	Pass
8	PP043	Back	ZYL IIA 898101	.03	01993765	Jan-1999	83125	4	No	No	No	No	No	No	Pass	35	29	**46**	43	**Fail**

Level II Armor

Sample	OLES ID Number	Panel Tested	Model Number	NIJ Standard	Serial Number	Date of Manufacture	Lot Number	Condition	Penetrations: 9 mm (see note 3) 1st 0°	2nd 0°	30°	357 Mag (see note 4) 1st 0°	2nd 0°	30°	Result	Back Face Signature: 9 mm 1st 0°	2nd 0°	357 Mag 1st 0°	2nd 0°	Result
1	PP056	Front	ZYL II 898101	.03	05010090	May-2001	71639	4	No	No	No	No	No	No	Pass	32	35	37	**58**	**Fail**
2	PP055	Back	SMU II+ 001221	.04	06021442	Jun-2002	668	3	No	No	No	No	No	No	Pass	27	30	34	33	Pass
3	PP062	Front	SMU II+ 001221	.04	12020325	Dec-2002	670	2	No	No	No	No	No	No	Pass	28	28	38	43	Pass
4	PP057	Front	SMU II+ 001221	.04	07022608	Jul-2002	5408	3	No	No	No	No	No	No	Pass	30	33	38	40	Pass
5	PP059	Back	SMU II+ 001221	.04	12020326	Dec-2002	670	3	No	No	No	No	No	No	Pass	25	25	36	41	Pass
6	PP065	Front	SMU II+ 001221	.04	09023490	Sep-2002	5477	3	No	No	No	No	No	No	Pass	28	33	40	39	Pass
7	PP070	Back	SMU II+ 001221	.04	03036009	Mar-2003	5831	4	No	No	No	No	No	No	Pass	30	29	38	35	Pass
8	PP067	Front	SMU II+ 001221	.04	06025020	Jun-2002	668	3	No	No	No	No	No	No	Pass	30	29	37	**45**	**Fail**

Level IIIA Armor

Sample	OLES ID Number	Panel Tested	Model Number	NIJ Standard	Serial Number	Date of Manufacture	Lot Number	Condition	Penetrations: 9 mm (see note 5) 1st 0°	2nd 0°	30°	44 Mag (see note 6) 1st 0°	2nd 0°	30°	Result	Back Face Signature: 9 mm 1st 0°	2nd 0°	44 Mag 1st 0°	2nd 0°	Result
1	PP116	Front	SMU IIIA+ 001221	.04	05015678	May-2001	4607	2	No	No	No	No	No	No	Pass	29	32	**45**	**46**	**Fail**
2	PP111	Front	SMU IIIA+ 001221	.04	05013097	May-2001	4607	3	No	No	No	**Yes**	No	No	**Fail**	34	32	N/A	43	N/A
3	PP101	Front	SMU IIIA+ 001221	.04	08033437	Aug-2003	55660	2	No	No	No	No	No	No	Pass	30	27	42	**46**	**Fail**
4	PP110	Back	SMU IIIA+ 001221	.04	01020684	Jan-2002	540	3	No	No	No	No	**Yes**	No	**Fail**	33	34	41	N/A	N/A
5	PP114	Front	SMU IIIA+ 001221	.04	05013093	May-2001	4607	2	No	No	No	No	No	No	Pass	31	33	**45**	43	**Fail**
6	PP108	Back	SMU IIIA+ 001221	.04	01020685	Jan-2002	540	4	No	No	No	No	No	No	Pass	28	35	44	43	Pass
7	PP112	Back	SMU IIIA+ 001221	.04	01020686	Jan-2002	540	3	No	No	No	No	No	No	Pass	31	32	42	**45**	**Fail**
8	PP092	Back	SMU IIIA+ 001221	.04	07023872	Jul-2002	5321	3	No	No	No	No	No	No	Pass	30	32	**47**	**45**	**Fail**

Notes:
1) The 9 mm threat for NIJ Standard 0101.03 level IIA armor is a 124 gr. 9 mm FMJ RN bullet with a velocity of 1090 (+50/-0) ft/s.
2) The magnum threat for NIJ Standard 0101.03 level IIA armor is a 158 gr. 357 Magnum JSP bullet with a velocity of 1250 (+50/-0) ft/s.
3) The 9 mm threat for level II armor is a 124 gr. 9 mm FMJ RN bullet with a velocity of 1175 (+50/-0) ft/s for NIJ 0101.03 armor and a velocity of 1205 (±30) ft/s for NIJ 0101.04 armor.
4) The magnum threat for level II armor is a 158 gr. 357 Magnum JSP bullet with a velocity of 1395 (+50/-0) ft/s for NIJ 0101.03 armor and a velocity of 1430 (±30) ft/s for NIJ 0101.04 armor.
5) The 9 mm threat for NIJ Standard 0101.04 level IIIA armor is a 124 gr. 9 mm FMJ RN bullet with a velocity of 1430 (±30) ft/s.
6) The magnum threat for NIJ Standard 0101.04 level IIIA armor is a 240 gr. 44 Magnum SJHP bullet with a velocity of 1430 (±30) ft/s.

About the National Institute of Justice

NIJ is the research, development, and evaluation agency of the U.S. Department of Justice. The Institute provides objective, independent, evidence-based knowledge and tools to enhance the administration of justice and public safety. NIJ's principal authorities are derived from the Omnibus Crime Control and Safe Streets Act of 1968, as amended (see 42 U.S.C. §§ 3721–3723).

The NIJ Director is appointed by the President and confirmed by the Senate. The Director establishes the Institute's objectives, guided by the priorities of the Office of Justice Programs, the U.S. Department of Justice, and the needs of the field. The Institute actively solicits the views of criminal justice and other professionals and researchers to inform its search for the knowledge and tools to guide policy and practice.

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NIJ has seven strategic goals grouped into three categories:

Creating relevant knowledge and tools

1. Partner with State and local practitioners and policymakers to identify social science research and technology needs.
2. Create scientific, relevant, and reliable knowledge—with a particular emphasis on terrorism, violent crime, drugs and crime, cost-effectiveness, and community-based efforts—to enhance the administration of justice and public safety.
3. Develop affordable and effective tools and technologies to enhance the administration of justice and public safety.

Dissemination

4. Disseminate relevant knowledge and information to practitioners and policymakers in an understandable, timely, and concise manner.
5. Act as an honest broker to identify the information, tools, and technologies that respond to the needs of stakeholders.

Agency management

6. Practice fairness and openness in the research and development process.
7. Ensure professionalism, excellence, accountability, cost-effectiveness, and integrity in the management and conduct of NIJ activities and programs.

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In addressing these strategic challenges, the Institute is involved in the following program areas: crime control and prevention, including policing; drugs and crime; justice systems and offender behavior, including corrections; violence and victimization; communications and information technologies; critical incident response; investigative and forensic sciences, including DNA; less-than-lethal technologies; officer protection; education and training technologies; testing and standards; technology assistance to law enforcement and corrections agencies; field testing of promising programs; and international crime control.

In addition to sponsoring research and development and technology assistance, NIJ evaluates programs, policies, and technologies. NIJ communicates its research and evaluation findings through conferences and print and electronic media.

To find out more about the National Institute of Justice, please visit:

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