



IN-BRIEF

Model Strategies for Field Drug Testing Programs



“A successful field drug testing program requires continued communications and support between law enforcement, crime laboratories, and the judicial system.”

—Nancy Crump, Phoenix Police Department

Background

In the United States, drugs and certain chemicals are classified into one of five schedules depending on their accepted medical use and abuse potential. Cannabis/THC, cocaine, methamphetamine, and heroin have been the most frequently identified drugs by U.S. crime laboratories each year since 2001 (DEA, 2002; DEA, 2020), and all are Schedule 1 and 2 controlled substances. Although these are the most popular, other drugs have emerged—including synthetic cannabinoids and fentanyl-related compounds. Possession, sale, and trafficking of these substances can lead to criminal investigations and judicial proceedings requiring the presence of these substances to be confirmed by forensic laboratories. GC-mass spectrometry (MS) and Fourier transform infrared spectroscopy (FTIR) are examples of instrumentation used for confirmatory analysis.

Prior to confirmatory testing, seized material is often subjected to a screening test. Screening techniques for drugs in a laboratory setting can include technologies such as GC-FID, GC-MS, color tests, thin layer chromatography, and Raman and infrared (IR) spectroscopy. Recent advances in technology have allowed many of these screening techniques to be incorporated into portable instruments, making presumptive field testing a more viable option for

Objectives

- ▶ Describe field drug testing programs (FDTPs).
- ▶ Outline objectives and history of the field investigation drug officer (FIDO) program.
- ▶ Highlight two agencies that have implemented FDTPs.
- ▶ Summarize successful FDTP practices and policies.
- ▶ Offer examples and ideas for improving or implementing FDTPs.



developing actionable results. These technology advances are also helpful for color blind officers, who cannot conduct color-based testing.

The most recent Bureau of Justice Statistics' Census of Publicly Funded Forensic Crime Laboratories, conducted in 2015, showed that analysis of controlled substances represented 33% of the 3.8 million new requests for services in 2014. Controlled substance request backlogs increased by 53% in 2014 compared with 2009, going from 139,200 to 213,700 backlogged cases (Durose et al., 2016). A recent National Forensic Laboratory Information System (NFLIS) survey of drug chemistry sections in forensic laboratories showed one of the major contributors to backlogged controlled substance cases was the increase in emerging drugs (DEA, 2019). Not only are laboratories faced with increased caseloads, backlogs, and turnaround times, but the complexity of the substances to be identified has increased, requiring additional cost and time to validate new methods to identify new and emerging substances. This comes with increased costs and strain on laboratory resources and staffing. As a result of the opioid crisis, annual laboratory expenditures for drugs/controlled substances increased by 37% from 2015 to 2016 (DOJ, 2019; Speaker, 2021).

Laboratories have implemented ways to reduce these burdens, including updating their case acceptance policies. Examples of updated case acceptance policies include requesting that agencies only submit weighable amounts of drugs for testing and not paraphernalia, unless it is the only item in the case; asking agencies to submit just one or two of similarly marked tablets versus the entire seizure unless it is necessary for the laboratory to make an inference on the drug present in all the tablets for a distribution case; and not accepting syringes because of the hazards they pose to laboratory staff and their associated unique handling requirements. Another option to reduce laboratory burden is to have law enforcement officers perform drug tests in the field. Field drug tests can presumptively identify a seized substance, and in many jurisdictions, these presumptive drug tests are sufficient for a plea deal or grand jury process (Strom et al., 2011). Of respondents in the NFLIS drug chemistry section survey, 23% stated that cases were not submitted to their laboratory after law enforcement field drug testing unless confirmatory analysis was needed (DEA 2019). The Forensic Technology Center of Excellence (FTCoE) published a report entitled *Landscape Study of Field Portable Devices for Presumptive Drug Testing* that provides an overview of presumptive drug testing and portable devices (Roper-Miller et al., 2018).

This In-Brief describes field drug testing programs (FDTPs) that provide a training framework for certifying law enforcement officers to presumptively identify drugs in the field. Potential FDTP impacts are indicated in Figure 1. This report highlights two crime laboratories that have had well-established FDTPs with their law enforcement agency partners for nearly 2 decades. These partnerships help reduce the laboratory's drug seizure case backlogs, decrease their turnaround times, and free up laboratory resources for analysis of emerging substances.

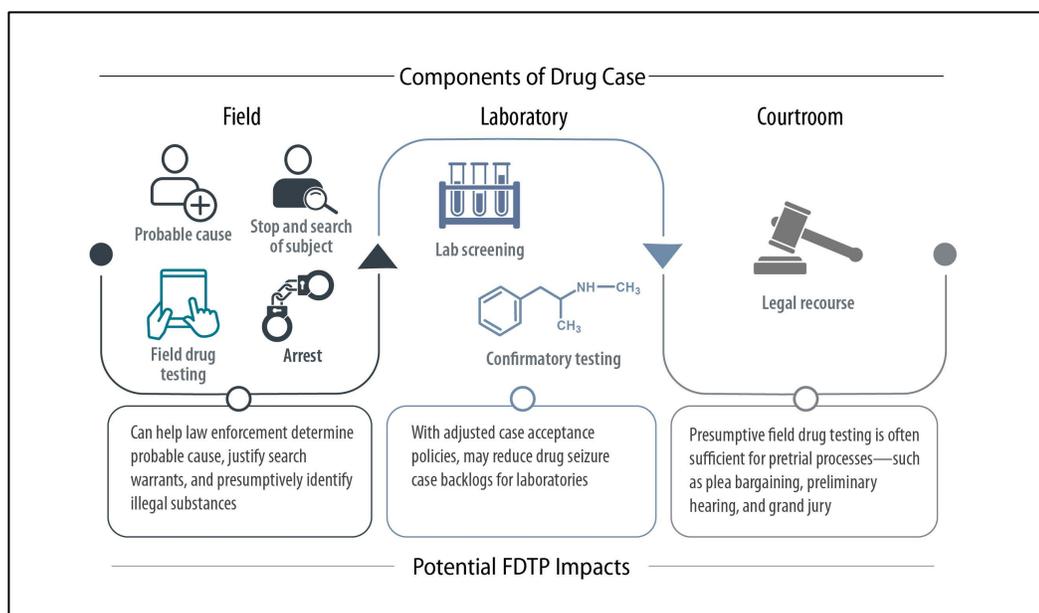


Figure 1. Potential Impacts of Implementing an FDTP



Field Investigation Drug Officer Program

Overview

In 2002, initial steps began to develop a field investigation drug officer (FIDO) program under the National Forensic Science Technology Center (NFSTC) with funding from the National Institute of Justice (NIJ) (National Forensic Science Technology Center, n.d.). These initial steps included meetings with a multidisciplinary team across the forensic science community. The FIDO program had five main objectives to assist crime laboratories, law enforcement, and the judicial system with a plan for law enforcement field drug testing. The program aimed to test and evaluate currently available drug detection technologies and provide a training program and quality assurance guidance to assist stakeholders.

The FIDO training program was modeled after the Phoenix Police Department's Controlled Substances Field Identification program. The FIDO program provided information on personnel requirements, performance standards, evidence control, report preparation, and quality control. These requirements are similar to those for a laboratory operation but are more specific to law enforcement field drug testing. There are various reasons that a laboratory may implement an FDTP like FIDO. Figure 2 demonstrates goals and motivations for implementing a FDTP and its potential benefits.

Objectives of the FIDO program

- Provide a guide for standardized methodology for field drug testing.
- Allow crime laboratories to have oversight in training and certifying law enforcement officers.
- Instill confidence in field drug testing.
- Reduce backlogs.
- Be flexible and adaptable to new technology.

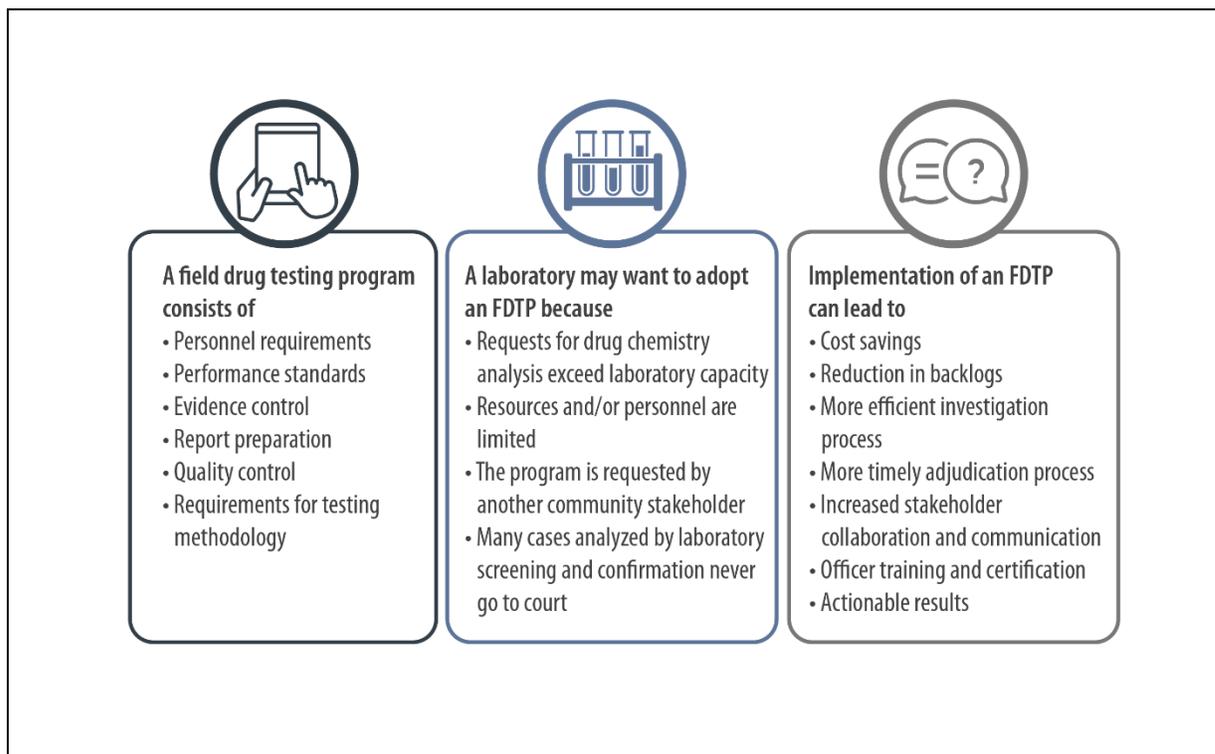


Figure 2. Example goals, motivations, and potential benefits from implementing an FDTP



In 2006, a FIDO pilot training program was conducted and included the Utah Bureau of Forensic Services, Philadelphia Police Department and District Attorney, Oregon State Police, Ontario Oregon Police Department, and Michigan State Police. In addition, FIDO performed a validation of four commercial field drug testing kits including the Narcopouch®, nik®, NARK®, and QuickCheck™. Drugs analyzed during this validation included cocaine hydrochloride, cocaine base, methamphetamine, and heroin. The program specifically focused on training for these four substances and field drug testing using colorimetric test kits.

Although these substances are among the main drugs encountered in the United States, there are other drugs that may be distinct to a region or that are emerging substances an agency may want to include in their field testing protocols. An agency may want to add these additional drugs to its field detection training for officers. The original FIDO program laid the foundation and provided a model for training for a successful program. In 2020, Florida International University received funding from the United States Department of Justice, Bureau of Justice Assistance ([Award Number: 2020-D3-BX-K001](#)) to establish an updated training model and provide training to law enforcement officers (Perez, 2020). Training topics included methods to presumptively identify drugs in the field and proper evidence collection techniques, effectively carrying the torch for the original FIDO program.

Several agencies have developed their own FDTPs related to the original FIDO program but have adapted their programs based on the needs and resources of their own crime laboratory, law enforcement, and judicial system. The next section highlights how two forensic laboratories implemented their own FDTPs.

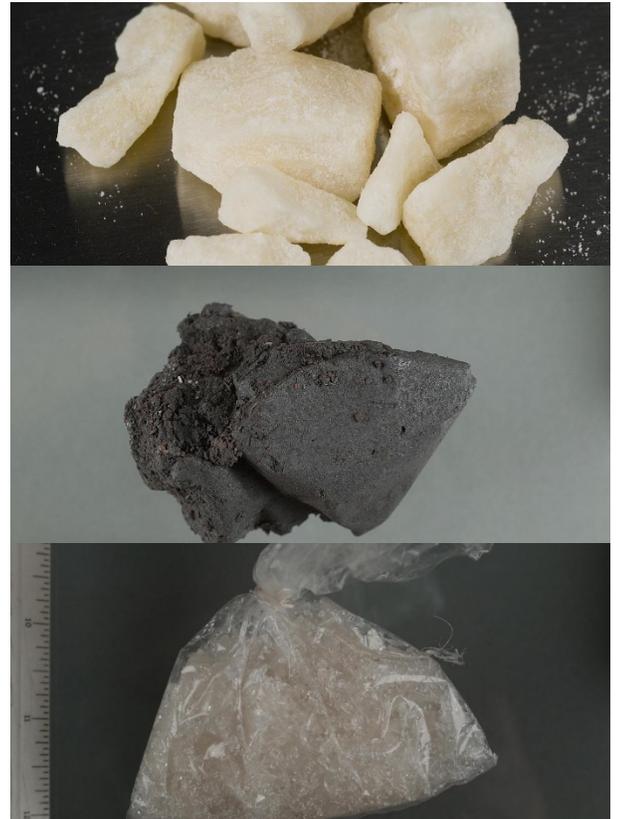
Phoenix Police Department Controlled Substance Field Identification Program

Laboratory overview

Phoenix is the fifth-largest city in the United States with an estimated population of 1.7 million in 2019 (U.S. Census Bureau 2020). Controlled substances submitted by the Phoenix Police Department (PPD) are processed by the Controlled Substances Section (CSS) of the PPD Laboratory Services Bureau (LSB). The LSB resides within the Investigations division of the PPD. At capacity in 2020, the CSS consisted of 12 full-time staff positions including one analyst whose main responsibility is oversight of the field identification program.

Initial field drug testing program

In 2000, PPD began a pilot program to develop the Controlled Substance Field Identification program (CS FID). This pilot program was adapted from the Arizona Department of Public Safety. Initially, commercial colorimetric test kits were used for the presumptive field identification of cocaine hydrochloride, cocaine base, methamphetamine, and marijuana. The FIDO training model was based on this successful program. One difference between colorimetric testing for the PPD and the FIDO program is that the FIDO program includes heroin. The majority of the heroin in Arizona is black tar, so



(From top to bottom) crack cocaine, black tar heroin, methamphetamine



using a colorimetric test as described in the FIDO program would not be useful for the PPD. Field testing using colorimetric test kits requires only a small amount of sample, typically around 50 mg. In most cases this allows for enough sample remaining to complete a confirmatory laboratory analysis as needed.

Current field drug testing program

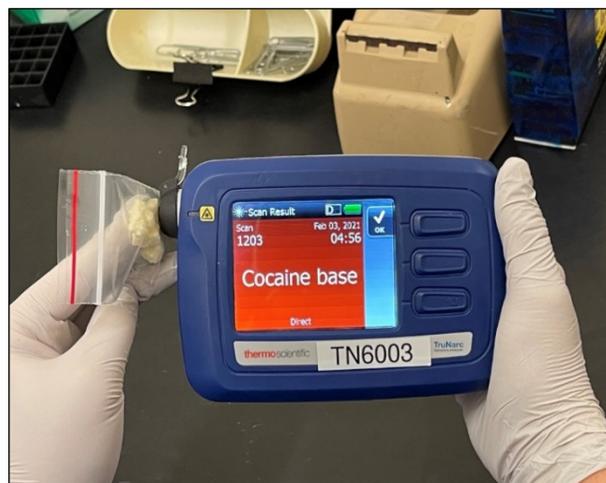
In 2012, as a response to the changing drug trends and interest from the County Attorney's Office, the PPD began looking into field drug testing that would allow for an expanded panel of drugs, in particular opioids like heroin. The PPD began to validate a pilot program for using handheld Raman spectroscopy. After the pilot program and validation, 22 drugs were added to the PPD CS FID using Raman spectroscopy. Marijuana field drug testing still undergoes colorimetric testing. Using Raman spectroscopy reduced the minimum sample size required for analysis by half to 25 mg. Approximate costs for PPD CS FID using Raman spectroscopy instrumentation is \$25,000 per device, and up to 6 years of optional warranty coverage can be purchased. The PPD replaces their handheld Raman instruments approximately every 6 years, and any retired instruments are used for training new officers. In addition to the handheld instrumentation, there are yearly consumable costs such as colorimetric test kits for marijuana and Raman spectroscopy heroin test kits for black tar heroin. These consumable costs can be variable. In 2020, consumable costs for field testing were approximately \$5,000. The PPD LSB personnel are responsible for management of supplies and coordinating and verifying instrument maintenance. To minimize downtime, the laboratory has two spare devices that are loaned to precincts as needed if one of their assigned devices needs to be sent in for repair.

Training and certification

Training, certification, and metric tracking are performed by PPD LSB personnel. The initial training is conducted over a 2-day period. Many CS FID certified officers have multiple cases per year reviewed by the PPD LSB when plea agreements are not accepted and the case proceeds to court. If a certified officer has no such cases in a year, then at least one case is randomly selected to undergo full laboratory analysis. The laboratory results are compared with the field identification results. Although approximately 10% to 15% of field drug testing evidence comes back to the laboratory for full analysis because the case proceeds to trial, it is important that officers not included in that percentage of cases are reviewed annually through the PPD quality assurance process of randomly retesting at least one case per officer. In 2020, 614 cases involving a field test result (almost 12%) were reexamined, resulting in discovery of only one misidentification. Officers are trained on protocols to assist with deciding when to submit a sample to the laboratory instead of through the CS FID program. Examples include protocols to follow when an officer receives results of inconclusive or the resulting substance identified is not on the approved testing list. There is mandatory annual recertification training that



For more information about the PPD's FDTP, listen to [season 4, episode 1](#) of the Just Science podcast; this episode features Nancy Crump, Assistant Crime Laboratory Administrator, PPD.



The handheld Raman spectrometer used by PPD personnel; this device shows a presumptive positive cocaine powder test.



includes passing a test that all certified officers must attend and pass to remain active. To pass, officers are required to receive 80% on a written test and 100% on a practical test. Officers are required to analyze at least 10 samples per year to remain active. The PPD currently has 230 to 250 CS FID certified law enforcement officers.

Impact

In 2020, CS FID certified officers averaged 42 field identifications per officer, for around 7,500 items identified in the field. Certified officers create a field drug testing report (see Appendix) or affidavit that is sent to the County Attorney's Office with descriptions of the presumptive positive result. These cases are not submitted to the laboratory for further confirmation unless the case goes to trial for adjudication. This protocol has greatly reduced the number of incoming cases to the PPD LSB. The flexibility of their program allows for validating and implementing alternative field drug testing methods and adding additional drugs as a result of changing drug trends and stakeholder needs.

Over the years, PPD LSB has seen a decrease in drug analysis requests for commonly encountered drugs and an increase in field drug identifications.

Tips for success

- Keep testing protocols simple. The handheld Raman instrument is easy to use, and the marijuana test kits the PPD uses are simple to read.
- Require annual retraining. Periodic retraining helps ensure compliance to testing protocols and is key to making sure the program is providing accurate, reliable results.
- Communicate with stakeholders. Collaboration with involved entities, such as prosecuting attorneys, is crucial to maintaining a program that meets the needs of a particular jurisdiction.

Utah Field Investigation Drug Officer Certification

Laboratory overview

Utah had an estimated population of 3.2 million in 2019 (U.S. Census Bureau, 2020). The Utah Bureau of Forensic Services (BFS) laboratory system is located within the Utah Department of Public Safety and provides forensic services to criminal justice entities throughout the state. In 2019, the laboratory system received 2,548 controlled substance cases for analysis for which 6,020 samples were tested. In 2020, there were six full-time analyst positions for processing submitted substances.

Initial field drug testing program

Starting in 2003, Utah BFS began a marijuana identification program, which is complementary to FIDO. The program includes a week-long training program that teaches officers how to take a marijuana sample from screening to identification (typically a laboratory-only function in other jurisdictions) to report writing and courtroom testimony. Since the inception of this program, the laboratory has not routinely accepted marijuana submissions for analysis. This has freed up laboratory staff time and resources to focus on cases that require more complex chemical analyses.



Current field drug testing program

The Utah BFS's current field drug identification program was implemented as a pilot program in 2006 and tests for methamphetamine, cocaine, and heroin. This program is run in parallel with the marijuana identification program but is for presumptive testing only. One unique aspect of this program is that the laboratory created customized colorimetric test kits to provide to FIDO-certified officers. These are called Utah Narcotic Identification Test (UNIT) kits. These kits are used in typical drug seizures and in most instances are sufficient to proceed with a case without additional analysis by the laboratory, whereas unusual cases are submitted directly to the laboratory. The UNIT kits allow for presumptive results in a quick manner that can aid investigations. Because the laboratory creates and distributes the UNIT kits, Utah BFS is able to customize and adapt the kits for their particular needs. For example, a known substance is supplied with each kit as a quality control measure that enhances the validity of the tests. Law enforcement personnel are trained to test their chemicals with the known substance to demonstrate that the test will work appropriately each time it is used. Testing this known substance daily helps to mitigate false positive or false negative results. The laboratory provides complimentary replacement reagents and kits to participants as needed. The average annual cost of supplies for Utah BFS's FDTP is \$1,500, which is paid for by the laboratory. A senior forensic scientist oversees the program and is responsible for managing supplies, teaching training courses, and issuing certifications. Program enhancements—such as adding instrument-based testing, including portable Raman or mass spectrometry—may occur as Utah BFS continually evaluates the needs of the program and its law enforcement stakeholders.



A UNIT kit

Training and certification

Any law enforcement agency can participate in the Utah BFS's FDTP training program. Participants are primarily from Utah agencies, but there have been participants from neighboring states. Attendees can be from different sections of an agency such as crime scene, patrol, and detective units. Training is conducted over the course of 1 day. Each year, FIDO-certified officers undergo recertification and provide the program manager with a sampling of their cases. The recertification includes a written exam that covers basic information about the program, types of tests performed, resulting colors, and information on quality control. Cases are reviewed for proper documentation and conclusions. Biannually, FIDO-certified officers must pass proficiency testing provided by the program manager. To date, approximately 400 law enforcement personnel have been trained. In 2021, there were 150 FIDO-certified officers in Utah with UNIT kits. In the future, Utah will be implementing training video tutorials for use by their FIDO-certified officers.

Impact

Shortly after their field drug testing program was implemented in 2006, the Utah BFS saw an estimated 50% reduction of cases submitted to the laboratory for analysis from 6,500 cases in 2003 to 3,000 cases in 2008. That decrease has remained consistent over the past 14 years, even as the state's population has increased, with 2,548 controlled substances cases submitted in 2019. This estimated reduction of submitted cases is for marijuana, cocaine, methamphetamine, and heroin resulting from their FIDO and Marijuana Identification programs. With less routine workload, the laboratory can turn drug results around promptly, with the standard turnaround routinely being about 7 business days. By freeing up resources, the laboratory can respond to rush cases quickly and more analyst time can be dedicated to the investigation of new and emerging substances.



Tips for success

- Make training accessible. One thing that has helped to facilitate the success of the Utah BFS FDTP is that the program manager attends the Utah Narcotic Officers Association annual conference and offers certification and recertification as a break out class during the conference.
- Provide resources for officers who may not conduct field testing daily. The UNIT kits include a card that provides the names of the reagents, how many drops of each are needed, and the expected result if the reaction is positive.

Summary

A successful FDTP requires continued communications and support between law enforcement, crime laboratories, and the judicial system. Although the original FIDO program laid the training foundation for an FDTP, each crime laboratory has the ownership, oversight, and flexibility to create an FDTP to meet their specific needs as illustrated by the programs developed by the PPD and Utah BFS. Some changes from the original FIDO program may include using a validated technique other than colorimetric testing or non-commercial colorimetric testing kits and validating and implementing testing for drugs outside the scope of FIDO. The essential components of developing a customized FDTP are performing a pilot study, completing a validation, training certified law enforcement officers properly, continuing to use quality assurance measures, recertifying officers annually, and ensuring testing and reporting protocols are followed. Both PPD and Utah BFS have successfully implemented FDTPs that use a laboratory, instead of each individual police department, as the centralized location for training and certifying law enforcement officers and overseeing the quality assurance process. Implementing an FDTP benefits law enforcement, crime laboratories, and the judicial system.

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Image Credits

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References

Durose, M. R., Burch, A. M., Walsh, K., & Tiry, E. (2016, November). *Publicly funded forensic crime laboratories: resources and services, 2014* (NCJ 250151). U.S. Department of Justice, Office of Justice Programs. <https://www.bjs.gov/content/pub/pdf/pffclrs14.pdf>

National Forensic Science Technology Center. (n.d.). *Field Investigation Drug Officer (FIDO) Program*. National Institute of Justice. https://projects.nfstc.org/tech_transition/fido/index.htm

Perez, L. (2020, December). *Global Forensic and Justice Center awarded nearly \$7 million in federal funding*. FIU News. <https://news.fiu.edu/2020/fius-global-forensic-and-justice-center-awarded-nearly-7-million-in-federal-funding>

Ropero-Miller, J., LaPorte, G., Shute, R., Cochran, A., & Grabenauer, M. (2018, May). *Landscape study of field portable devices for presumptive drug testing*. <https://forensiccoe.org/private/5dd59c2e8c7d7>

Speaker, Paul J., "Project FORESIGHT Annual Report, 2019–2020" (2021). *Faculty & Staff Scholarship*. 3008. https://researchrepository.wvu.edu/faculty_publications/3008

Strom, J., Smiley McDonald, H., Stout, P., Ropero-Miller, J., & Bachrach, J. (2010, August). *NIJ controlled substances case processing study*. National Institute of Justice. <https://www.ncjrs.gov/pdffiles1/nij/grants/233830.pdf>

U.S. Drug Enforcement Administration (DEA), Office of Diversion Control. (2002). *National Forensic Laboratory Information System 2001 Annual Report*. U.S. Drug Enforcement Administration. https://www.nflis.deadiversion.usdoj.gov/nflisdata/docs/Year_2001_Annual_Report.pdf

U.S. Drug Enforcement Administration (DEA), Diversion Control Division. (2019). *NFLIS-Drug 2019 Survey of Crime Laboratory Drug Chemistry Sections Report*. U.S. Drug Enforcement Administration. <https://www.nflis.deadiversion.usdoj.gov/nflisdata/docs/NFLIS-Drug2019SurveyofCrimeLaboratoryDrugChemistrySectionsReport.pdf>

U.S. Drug Enforcement Administration, Diversion Control Division. (2020). *National Forensic Laboratory Information System: NFLIS-Drug 2019 Annual Report*. U.S. Drug Enforcement Administration. https://www.nflis.deadiversion.usdoj.gov/nflisdata/docs/NFLIS-DRUG_2019_Annual_Report.pdf

U.S. Department of Justice (DOJ), Office of Justice Programs (OJP) National Institute of Justice (NIJ). (2019). *Report to Congress: Needs Assessment of Forensic Laboratories and Medical Examiner/Coroner Offices*. <https://www.justice.gov/olp/page/file/1228306/download>

U.S. Census Bureau. (2020). *QuickFacts: Phoenix city, Arizona*. <https://www.census.gov/quickfacts/phoenixcityarizona>

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Appendix: Phoenix Police Department Instrumental Field Test Report Template

INCIDENT #:
FIELD DRUG TEST REPORTED: **(DRUG)**
INSTRUMENT SERIAL NUMBER:
INSTRUMENT SELF CHECK SCAN(S) #
EVIDENCE SCAN(S) #
EVIDENCE SCAN/TEST TIME(S) :
BARCODE #:
EVIDENCE DESCRIPTION:

RESULTS:

THE RESULT(S) OF THE INSTRUMENTAL FIELD TEST(S) INDICATE(S) THE PRESENCE OF
 (DRUG) . THE ITEM IS IN A USABLE CONDITION.

CERTIFICATION:

I AM A CURRENTLY CERTIFIED CONTROLLED SUBSTANCE OFFICER AND HAVE SUCCESSFULLY COMPLETED TRAINING FROM THE PHOENIX POLICE DEPARTMENT CRIME LABORATORY IN FIELD DRUG TESTING. I AM A SWORN OFFICER WITH THE PHOENIX POLICE DEPARTMENT AND I WILL BE AVAILABLE TO TESTIFY IN A COURT OF LAW AS TO MY FINDINGS IN THIS CASE.

IF TRIAL PROCEEDINGS ARE REQUIRED FOR THE ADJUDICATION OF THIS MATTER, AN ANALYSIS WILL BE PERFORMED BY THE PHOENIX POLICE DEPARTMENT CRIME LABORATORY AND A WRITTEN REPORT WILL BE PROVIDED. PLEASE NOTIFY THE CRIME LABORATORY REFERENCING THIS DR NUMBER AT LEAST FOUR WEEKS PRIOR TO THE START OF THE TRIAL.

Reporting Officer: _____

SERIAL NUMBER:

DATE: