

Countering Drug-Impaired Driving

Addressing the Complexities of Gathering and Presenting Evidence in Drug-Impaired Driving Cases

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EXECUTIVE SUMMARY

Although alcohol-related impaired driving continues to be the primary cause of fatal automobile accidents (National Center for Statistics and Analysis, 2019), drug-impaired driving has emerged as a growing threat to public safety. In particular, cannabis-related impaired driving has emerged as the most-prevalent type of (nonalcohol) drugged driving (Kelley-Baker et al., 2017).¹ Identifying and prosecuting cases of driving under the influence of drugs (DUID) requires the engagement of three important actors within the criminal justice system: law enforcement, forensic toxicologists, and prosecutors. Each of these actors plays a crucial role in gathering, interpreting, or presenting evidence of drug-impaired driving to build a successful case. Meticulous observational and chemical evidence collection and skilled, simple interpretation of this evidence is particularly important in a DUID case because such cases can be more complex and difficult to prove than alcohol-related impaired driving cases (Compton, 2009). Although blood alcohol concentration (BAC) levels have been established and accepted as reliable

and valid evidence of alcohol-impaired driving, no equivalent technique yet exists that correlates an amount of a drug in the body with the degree of drug-related impairment (Arnold and Scopatz, 2016).

On behalf of the National Institute of Justice (NIJ), RTI International and the RAND Corporation convened a workshop, titled *Countering Drug-Impaired Driving*, on June 12 and 13, 2019. The workshop was held at the Office of Justice Program's (OJP) headquarters in Washington, D.C., and was designed to inform NIJ's science and technology innovation agenda. The workshop participants included law enforcement officers, forensic toxicologists, and prosecutors who are experienced in DUID cases (see the "Participants" box in the body of this report). The panel discussion focused on four areas: field observational tests, chemical tests, the role of technology, and admissibility of evidence. Using these discussions, the panel members identified and ranked needs for law enforcement, forensic toxicologists, and prosecutors to successfully identify and prosecute DUID cases.²

PRIORITY NEEDS



RESULTS

- The likely benefits of having the right number of officers with specialized training in identifying drug impairment should be identified.
- More observational tests should be added to the standard field sobriety testing battery (e.g., Romberg and finger to nose).
- Research should be conducted to identify the barriers to adoption of electronic warrants and the costs, risks, and benefits of implementation.
- The costs, risks, and benefits of alternative phlebotomy approaches (e.g., officer training, contracts) should be identified.
- Detailed data should be collected on the effectiveness of field sobriety tests when used for actual driving under the influence of drugs (DUID) cases and those data should be used to conduct additional research.
- Training should be developed and validated to boost the confidence of officers when testifying ("cops and court").
- Gaps in resources and potential funding sources should be identified that could bring labs up to the required level of capability.
- Access to interpretive DUID training for toxicologists (ideally jointly with prosecutors) should be promoted and improved.
- The impact and risks to justice and due process of not investing sufficient resources into toxicology testing should be identified.
- Solutions should be collected that could increase access to training.
- Critical research areas should be collected and identified.
- Best practices should be identified for dealing with refusals.
- The risks and benefits of changing implied consent laws and other possible solutions, such as e-warrants, should be highlighted.

WHAT WE FOUND

Workshop participants repeatedly stressed that detecting and characterizing a suspect's drug-induced impairment is of primary importance and that individuals might be impaired even if there is no means to relate the specific amount of a drug in their system to their impairment. Several useful tools exist that, when used in combination, gather adequate evidence to identify DUID. These tools include specialized officer training (The Drug Evaluation and Classification Program [DECP]), standardized field sobriety tests (SFSTs), roadside chemical testing, and subsequent toxicological screening. However, each of the available tools might be insufficient on its own to prove impairment and each comes with benefits and drawbacks. Examples of these benefits and drawbacks include the following:

- Specially trained individuals (i.e., officers trained as drug recognition experts [DREs]) can be very effective in characterizing impairment, but jurisdictions and regions might have too few experts to respond to suspected DUID cases in a timely manner.
- SFSTs are effective in detecting impairment, but officers must be properly trained in validated, standardized procedures; additional observational tests might be needed in the overall protocol to detect

drug-induced impairment; and officers must be prepared to present the observational evidence in court.

- Roadside chemical tests can be helpful in detecting impairment, but no roadside test will cover all possible drugs, and a negative test result does not mean that an individual is not impaired. Moreover, increasing the number of tests can lead to complications in test validation, officer training, and courtroom presentation.
- Laboratory-based toxicological screening provides a more-powerful means of drug detection, but its utility can be diminished by delays in acquiring samples, limited laboratory resources leading to backlogs, and insufficient training for toxicologists to interpret data when giving testimony in court. Moreover, the scientific evidence cannot conclusively link an amount of a drug in an individual's system to impairment, especially in the case of polydrug use.³

The panel members acknowledged that DUID cases are inherently complex and require law enforcement officers, forensic toxicologists, and prosecutors to work together to produce strong evidence that will hold up in court. The panelists identified needs for these groups to communicate

regularly and for each to have access to additional training in courtroom presentation for complicated DUID cases. The panelists further identified the following needs for each of these sectors:

- **Law enforcement officers** need additional tools to enhance their ability to collect evidence to detect drug-related impairment. Such tools would include conducting rigorous research to establish standardized, DUID-specific observational field tests that more law enforcement officers can be trained to use; implementing protocols that can result in more-timely blood draws; considering whether electronic search warrants (e-warrants) can make the evidence-gathering stage of a DUID case more efficient; and determining the optimal proportion of law enforcement that should have advanced training in detecting drug-related impairment. There is also a need to further develop and validate the DUID-specific training received by law enforcement.
- **Forensic toxicologists** need research (1) that can help identify the gaps in resources, standards, or capability (e.g., standard-

ized and uniform testing approaches and scope, research on the correlation between drug effects and impairment) that might be preventing them from delivering adequate, reliable, and timely results in some jurisdictions and (2) that can describe the impact on justice and due process of not investing sufficient resources into toxicology testing.

- **Prosecutors** need additional research that establishes the effectiveness of using validated observational field tests and chemical tests and identifies successful means to address the technical complexity of DUID cases. There is also a need to identify best practices for successfully prosecuting cases in the event that a suspect refuses to consent to observational or chemical tests. Prosecutors need mechanisms to increase DUID-specific training for themselves and court preparation for law enforcement and forensic toxicologists. Finally, research is needed to better understand the resulting risks and benefits to DUID cases of recent changes to implied consent laws.

INTRODUCTION

A national meeting of toxicologists, law enforcement practitioners, and prosecutors was organized in 2004 to address issues associated with prosecuting drug-impaired driving (NHTSA, 2004). In this meeting, participants identified multiple issues and needs, including the needs for more and better law enforcement resources, training and coordination, better documentation and understanding of the correlation between blood drug concentrations and impairment, and better preparation for courtroom testimony. In the years since this meeting, drug-impaired driving has continued to represent a serious and growing threat to public safety. Every year, tens of thousands of passengers, drivers, pedestrians, and others lose their lives or are injured in auto-related accidents, and in 2018, 29 percent of all fatal automobile accidents involved a driver who was operating a vehicle while impaired by alcohol (National Center for Statistics and Analysis, 2019). Drug-impaired driving has been harder to quantify because of varying laws and drug-testing practices from state to state (Berning and Smither, 2014), but the National Survey on Drug Use and Health estimates that in 2017, 12.8 million individuals drove under the influence of drugs alone; 21.4 million drove under the influence of alcohol; and 29.1 million drove under the influence of alcohol, drugs, or some combination thereof (Substance Abuse and Mental Health Services Administration [SAMHSA], 2018). The 2017 estimate of drug-impaired driving (12.8 million people) represents a 9-percent increase over the previous year (SAMHSA, 2018). After alcohol, cannabis-related impaired driving is the most-common type of drug-related driving in the United States (Kelley-Baker et al., 2017). As states across the nation legalize medicinal and recreational cannabis use, cannabis is becoming more-readily available and the need to prevent and deter cannabis-impaired driving is becoming increasingly urgent. Recent studies suggest that states that legalized cannabis use have observed temporary increases in traffic fatalities in the years subsequent to the opening of retail stores selling cannabis (Aydelotte et al., 2019; Lane and Hall, 2019). The general public also widely holds the misperception that drug-impaired driving is not a risky behavior (Allen et al., 2016; Doonan and Johnson, 2019; Watson and Mann, 2018), which can make the prevention of impaired driving more difficult. Although BAC levels have been established as a reliable and valid method of quantifying the degree of impairment, no similarly reliable method yet exists that can quantify the degree of impairment that results from other drugs.



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On June 12 and 13, 2019, RTI International and RAND Corporation researchers convened a panel of law enforcement officers, forensic toxicologists, and prosecutors to discuss, identify, and prioritize research needs pertaining to DUID cases. The panel members discussed various challenges with gathering, interpreting, and presenting evidence through observational field and chemical tests to help prove a DUID case under the totality of the circumstances.⁴ In this report, we begin by describing the role of law enforcement, toxicologists, and prosecutors in the collection, interpretation, and presentation of DUID evidence. We then present the challenges and recommendations panel members identified during the workshop, organized around the major themes of the panel discussion. The results and context from the discussion reflect the views of the panel participants and do not necessarily reflect the views of researchers from the RAND Corporation or RTI International.

Roles and Challenges in Drug-Impaired Driving Cases

Preventing and deterring drug-impaired driving requires the active participation of law enforcement, forensic toxicologists, and prosecutors. Each of these three actors plays a critical role in gathering and interpreting evidence which, under the totality of the circumstances, can build and establish a strong DUID case that is likely to result in a conviction. Observational field tests and chemical tests often are gathered as the main forms of evidence in a DUID case, but each of these types of tests presents unique challenges and limitations in collection, interpretation, and presentation.

First, law enforcement officers have varying degrees of training and experience in detecting drug-impaired driving. There are three different levels of training that are designed to

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equip law enforcement to perform certain observational field tests, which can produce evidence supporting a finding of drug-related impairment: the SFST,⁵ the Advanced Roadside Impaired Driving Enforcement (ARIDE) test,⁶ and DRE certification.⁷ Jurisdictions vary in the number of law enforcement officers that have obtained one of these three specific levels of training. Moreover, evidence of potential impairment that is collected by a law enforcement officer with SFST, ARIDE, or DRE training can be called into question if the officer deviates from the specified testing protocols pertaining to these levels of training or does not thoroughly document the actions and decisions that they made.

Second, the detection of drug-related impairment through chemical tests is a complicated task. Although the blood alcohol level of 0.08 percent is widely accepted as the threshold that establishes alcohol-related impairment (23 U.S.C. § 163),⁸ there is currently no established drug concentration in blood that is similarly correlated to impairment. In contrast to alcohol, which can be detected through a urine drug test for up to 12 hours after ingestion (Dolan, Rouen, and Kimber, 2004), THC is rapidly eliminated from the body,⁹ leaving a narrow window to collect a useful sample after an arrest or crash (Couper and Logan, 2004). Moreover, cannabis-related compounds and metabolites also might be detected by a chemical test several weeks after their ingestion (Cary, 2006). Therefore, the results of a chemical test that detects the amount of nonalcohol drugs present in a person's body by sampling an individual's oral fluid, urine, or blood might not be indicative of impairment at the time of testing. The presence of a drug could be detected long after it ceased having any impairing effects. Analyses of data from arrests did not identify a threshold THC concentration in blood that could provide an acceptable level of agreement with findings from SFSTs and therefore serve as an evidence-based limit (Logan, Kacinko, and Beirness, 2016). These chemical tests can function only as evidence of drug use—not impairment—unless the drug concentrations are very high. Because of these limitations, observational field tests performed by skilled law enforcement officers who make contact with the suspect are a critical piece of evidence, which, along with chemical tests (that provide corroboration), can support a finding of drug-related impairment.

Finally, the prosecution of DUID cases could be further complicated by a state's particular DUID laws, which vary widely across the United States. Six states have adopted a *per se* standard in their DUID laws. *Per se* state laws dictate a threshold amount of a drug in the body that will constitute evidence

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of potential impairment. Other states have decided not to establish such numerical thresholds and instead have adopted zero-tolerance DUID laws, in which a toxicology test result that establishes the presence of *any* amount of a specified drug is evidence of impairment (Boddie and O'Brien, 2018; Compton, Vegega, and Smither, 2009; Lacey, Brainard, and Snitow, 2010; Walsh, 2009). These different state laws shape how evidence is gathered and presented. For example, a jury that is considering the evidence in a state with a *per se* DUID statute might expect the prosecutor to present chemical test results that establish the concentration of a drug in the defendant's system at the time of testing. If no chemical test result has been collected, it could be detrimental to the prosecution's case.

In other cases, the inability of scientific evidence to conclusively support the correlation between impairment and the threshold amount of a drug in the body dictated by the *per se* statute can harm successful prosecution. For example, it is possible for a person who produces a chemical test result of only one nanogram of THC per milliliter of blood to have been impaired at the time of driving. Similarly, it is feasible for a person with a THC amount far above five nanograms of THC per milliliter of blood to not be perceptibly impaired. The level of actual impairment from drug use depends on individual physiological and behavioral factors, such as acquired tolerance to licit drugs with similar effects, the amount of the drug used on a regular basis, other drugs that might be in an individual's system, and tolerance to the drug of interest (U.S. Government Accountability Office, 2015). If the defendant was determined to be impaired but a chemical test revealed a blood concentration of the drug that did not quite meet the *per se* standard, then a jury might incorrectly interpret this result to mean that the defendant was not impaired. The lack of a scientific correlation between a specific amount of a drug and actual impairment can make the successful prosecution of a DUID case difficult and can sometimes lead to an incorrect interpretation of results.

Methodology

RTI International and RAND researchers convened the *Countering Drug-Impaired Driving* workshop in June 2019 to identify and prioritize needs to enhance the detection and prevention of incidents of drug-impaired driving. RTI International researchers reviewed relevant literature to identify experts from the fields of law enforcement, forensic toxicology, and prosecution who could knowledgeably contribute to the workshop discussion. Participants were invited based on their publication records or leadership positions, or per direct recommendations from other experts in the field. We intentionally included two panelists from Canada who could offer a perspective on how law enforcement officers, forensic toxicologists, and prosecutors have been responding to the challenge of drug-impaired driving in light of Canada's legalization of recreational cannabis in 2018. Moreover, the panel included several individuals from law enforcement who are trained as DREs and representatives from the International Association of Chiefs of Police, which is the organization that helped establish and deliver the DRE training program (International Association of Chiefs of Police, 1999).

The participants were asked to prepare for the workshop by reviewing materials prepared by RTI that outlined the main types of observational tests, chemical tests, and prosecutorial approaches to DUID cases. Selected panel members also were asked to give brief, informal remarks at the beginning of the structured workshop sessions to outline the scope of the problem and to share their particular expertise in addressing the issue at hand. The participants discussed the protocols, limitations, and challenges they face when collecting and interpreting evidence gathered through observational field and chemical tests. The discussion then shifted to the potential for technology to enhance actions taken by law enforcement and forensic toxicologists during the evidence-gathering stages of the case. The second day of the workshop focused on the challenges of prosecuting a DUID case. At the conclusion of each workshop topic discussion, the panel members were asked to comment on and rank the various research needs that had emerged from the

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discussion. The discussion section of this report summarizes the topics the participants identified and ranked as Tier 1 needs. A detailed explanation of our methodology to identify and rank these needs is provided in the technical appendix.

RESULTS

During the panel discussion, the workshop participants identified a total of 29 needs related to criminal justice system challenges in effectively identifying and prosecuting drug-impaired driving. During the prioritization, 13 of these needs were identified as high priority (see Table 1). These needs were subsequently grouped into four categories based on whether they primarily related to law enforcement, forensic toxicology, prosecution, or touched on multiple aspects of the criminal justice response to DUID (labeled *cross-sector*). The full list of needs is provided in the technical appendix.

The categorization of all of the identified needs, organized into Tier 1, Tier 2, and Tier 3, is shown in Table A.3 in the technical appendix. Of the 29 identified needs,

- eight were categorized as primarily related to law enforcement
- three were categorized as primarily related to forensic toxicology
- eight were categorized as primarily related to prosecution
- ten were categorized as cross-sector.

Top-tier needs touched on issues across the criminal justice system response to DUID, including training, adopting novel testing methods, and assessing the effectiveness of current methods, and issues with preparing for and approaching the prosecution of DUID cases. Each of the three categories specific to law enforcement, forensic toxicology, and prosecution was similarly represented in the top tier of needs. We note, however, that all of the ten cross-sector needs were classified as

lower tier,¹⁰ and each of the three needs in the forensic toxicology category were rated as high priority.

High-priority law enforcement needs were related to improved tools and training for gathering evidence of impairment at the roadside. These needs included adding other validated observational tests to the SFST and improving the use of law enforcement roadside phlebotomy collection or execution of e-warrants to allow for more-timely drawing of blood.¹¹ Research to identify regional deficits in the number of officers with ARIDE or DRE training also fell into the top tier of needs. Notably, not all of the types of chemical-testing methods were given high priority; research on oral fluid tests fell into the lower tier, while alternative phlebotomy approaches were ranked highly. Each of the three forensic toxicology needs was related in some way to resource constraints in toxicologist training and toxicology laboratories.

Prosecution needs largely dealt with tactical issues in navigating legal challenges in court. These included needs for research on the effectiveness of introducing observational field test results obtained by administering SFST, ARIDE, or DRE protocols in court; how to best prosecute cases where evidence from chemical tests is absent or inadmissible because of suspects' refusal to be tested; interpretations of implied consent laws; and better prosecutor training on litigating DUID cases. Prosecution needs related to societal and jurist perceptions of what constitutes impairment were rated lower, largely because participants rated the associated solutions as less likely to succeed.

DISCUSSION

Workshop participants repeatedly stressed the concept that “impairment is impairment.” By this, they meant that impairment can be detected and characterized in an individual regardless of the primary cause of that impairment. Many

of the tools and procedures that have long been used by law enforcement to detect and measure alcohol-induced impairment were designed to measure impairment generally, although they have been validated only for alcohol. However, research shows, for example, that the SFST battery is effective in detecting some drug impairment, not just alcohol-related impairment (Porath-Waller and Beirness, 2014). The participants therefore discussed how practitioners can keep a focus on detecting and proving impairment while avoiding unnecessary complications. In this context, *per se* laws were thought to be challenging because of the inability to scientifically assign specific amounts of drugs to levels of impairment. Although the validation of additional roadside performance tests to assist in detecting

impairment from drugs was thought to be helpful, participants thought that any additional tests or tools should be standardized, validated, and few in number to avoid adding too much complexity in training or courtroom presentation. It also was suggested that practitioners in each of the three sectors represented would benefit from better communication with each other, and each also could benefit from further training in courtroom presentation of evidence and expert testimony. In the following sections, we provide additional context on specific issues and needs in each of the three sectors.

Table 1. The 13 Top-Tier Needs

Problem or Opportunity	Associated Need
Law enforcement	
There are not enough officers with ARIDE and DRE training in many jurisdictions.	<ul style="list-style-type: none"> Identify the likely benefits from having the “right” number of trained officers.
Additional observational tests are needed to enhance DUID detection.	<ul style="list-style-type: none"> Add more observational tests to the standard field sobriety testing battery (e.g., Romberg and finger to nose).
Obtaining warrants often delays timely blood draws.	<ul style="list-style-type: none"> Conduct research to identify the barriers to adoption of e-warrants and the costs, risks, and benefits of implementation.
After obtaining authorization, timely blood draws are sometimes difficult to get.	<ul style="list-style-type: none"> Identify the costs, risks, and benefits of alternative phlebotomy approaches (e.g., officer training, contracts).
Field sobriety tests are effective, as long as standard protocols are followed.	<ul style="list-style-type: none"> Collect detailed data on the effectiveness of field sobriety tests when used for actual DUID cases for use in additional research.
Officers often are not prepared to go to court.	<ul style="list-style-type: none"> Develop and validate training to boost the confidence of officers when testifying (e.g., “cops and court” training).
Forensic toxicology	
Toxicology labs are not doing an adequate job with respect to the scope and sensitivity of DUID testing.	<ul style="list-style-type: none"> Identify the gaps in resources and potential funding sources that could bring labs up to the required level of capability.
There are not enough toxicologists to provide interpretive DUID consultation and testimony.	<ul style="list-style-type: none"> Promote and improve access to interpretive DUID training for toxicologists (ideally jointly with prosecutors).
There is a significant number of jurisdictions that are not receiving toxicology results in a sufficiently timely fashion.	<ul style="list-style-type: none"> Identify the impact and risks to justice and due process of not investing sufficient resources into toxicology testing.
Prosecution	
Drug impairment cases have become some of the most-technical and difficult to litigate for all participants.	<ul style="list-style-type: none"> Collect solutions that could increase access to training.
There are several technical issues related to the prosecution and evaluation of DUID cases that would benefit from additional research.	<ul style="list-style-type: none"> Collect and identify critical research areas.
The right to refuse testing can make the evaluation of impairment for DUID cases more difficult (e.g., SFST and chemical testing).	<ul style="list-style-type: none"> Identify best practices for dealing with refusals.
Loss of implied consent is likely to lead to additional risk as it becomes harder to enforce existing law.	<ul style="list-style-type: none"> Highlight the risks and benefits of changing implied consent laws and implementing other possible solutions, such as e-warrants.

Law Enforcement Needs

Validated, Standardized Training for Law Enforcement on Drug-Impaired Driving

The workshop participants discussed the need to create reliable, valid, and standardized observational field tests that can be used by a greater segment of law enforcement officers to enhance the capacity of the average law enforcement officer to detect drug-impaired driving. Currently, law enforcement can receive formal training through the SFST, ARIDE, or DRE training programs. The panel members discussed how these field sobriety tests are effective in producing evidence that supports a finding of potential impairment if a law enforcement officer follows the prescribed protocols. In one participant's words, "we have the tools, we just need to use them better."

The participants noted that it would be beneficial to offer routine, standardized training to every law enforcement officer. For example, the panel members discussed the possibility of adding a basic DUID class to the police academy. In addition to disseminating effective procedures for recognizing and documenting impairment in situations where it is more easily recognizable, such training also could help officers better identify situations where a DRE (who would have more-specialized training in identifying drug-related impairment) should be called to the scene.

Ideally, this type of training would be standardized and would result in reliable administration in the field by officers. The participants acknowledged that the specific DUID training offered through the SFST program or other non-SFST training for law enforcement can vary widely. Police officers administering the protocols differently in the field—either because of differences in the particular training they received in their

Without standardized training, the police officer's observations and judgment about impairment might not provide sufficient evidence to support prosecution.

jurisdiction or because they did not follow the protocol—can create challenges in the prosecution of the case. The ARIDE training was created to offer more-advanced training to officers who were not able to go through the DRE program, but one participant said that there has been a recent rise in nonstandardized ARIDE training. Without standardized training, the police officer's observations and judgment about impairment might not provide sufficient evidence to support prosecution.

Participants also noted the need to add more tests to the SFST that are validated for gathering evidence of drug-related impairment in particular, as opposed to alcohol-related or central nervous system depressant-related impairment. The panel members noted, for example, that the horizontal gaze nystagmus (HGN) test, which is one of the best types of observational field tests used to gather evidence of alcohol impairment, has not been validated for the detection of drug-related impairment.¹² More research is needed to create scientifically valid standardized observational field tests for drug-related impairment.

Research on the Appropriate Number of ARIDE- or DRE-Trained Law Enforcement Officers per Jurisdiction

The participants found that having officers trained through either the ARIDE or DRE program was one of the best ways to address drug-impaired driving, particularly in the absence of validated chemical tests that conclusively link impairment to a threshold amount of a drug in a person's system. Panel members noted that the expertise and thoroughness in detecting and gathering evidence of potential impairment that officers are trained to apply through the DRE program are critically important, especially in cases where the behaviors exhibited by an individual would not be obvious indicators of potential impairment to an untrained law enforcement officer.

Despite the effectiveness of these programs in countering DUID, participants asserted that not enough law enforcement personnel have received ARIDE or DRE training, but they also agreed that it is not feasible to train every law enforcement officer to the standards of these programs. The DRE program in particular has rigorous curriculum and completion requirements, and training staff or hiring trained DREs can strain a jurisdiction's resources. The standardized DRE program is expensive, time-intensive, and requires the completion of ongoing coursework to maintain DRE certification.¹³ One participant stated that, even when resources to provide training

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are present, there can still be challenges in identifying enough officers to complete the DRE course.

Even if a jurisdiction has DREs, an officer who performs a DRE evaluation for further observational field testing and assessments could encounter two challenges: (1) the amount of travel time required for the DRE to arrive at the specified location and (2) the amount of time it might take for the DRE to administer and document the 12-step protocol to collect evidence of potential impairment. One panel member stated that in some regions, it can take four to six hours for a DRE to arrive and conduct an assessment. Moreover, if a chemical test is requested and then a sample for the chemical test is collected, the amount of time between the initial roadside stop and the sample collection might make the drug test results more likely to be challenged in court. One participant plainly stated that the level of drug-related impairment could be different from the perceived level at the time of the stop by the time a DRE observes the subject.

Improved Timeliness of Warrants for and Acquisition of Chemical Tests

Given the time-sensitive nature of some evidence collection in DUID cases, the panel members discussed the challenges inherent in obtaining the legal authority to collect such evidence in a timely manner, particularly when obtaining warrants to collect chemical test results from suspects. An officer who requests a chemical test might be delayed in ordering the test because of the time involved with seeking and receiving a judge's approval for a search warrant. Long periods spent waiting for authorization and subsequent testing use up valuable time on-duty for an officer and might diminish the ultimate utility of the evidence if the ideal collection window is small for the substance in question. This waiting period could be extended in rural jurisdictions because of the distance between the vehicle stop and the hospital or facility where the specimen can be obtained. The panelists discussed how some jurisdictions have recognized this inefficiency and have streamlined the process by allowing e-warrants to be administered.

The workshop participants also discussed specific challenges in obtaining timely blood draws, even after the requisite authority has been granted. In particular, the panel members stated that it can be challenging to coordinate with a qualified phlebotomist or other trained professional to collect a sample for the chemical test in a timely fashion and that this process can take several hours. One participant stated that medical facilities in some jurisdictions object to requests to conduct blood draws by communicating to law enforcement that their primary function is not to operate as evidence-gathering locations. This has placed the burden of obtaining blood samples on law enforcement personnel, who must either obtain the samples themselves or identify different solutions. The participants discussed the wisdom of training law enforcement officers in phlebotomy to draw blood samples themselves. Some advocated for roadside phlebotomy and thought that existing law enforcement phlebotomy training programs needed to be expanded.¹⁴ Others noted that roadside phlebotomy could introduce potential liability and evidentiary challenges. Ultimately, participants considered alternative phlebotomy approaches to be promising but stated that there is a need for further research to identify effective processes.

Forensic Toxicology Needs

Many of the issues discussed at the workshop that are related to forensic toxicology echo those published in the regularly updated recommendations for toxicology laboratories involved in drug testing in DUID and traffic fatality investigations (D'Orazio et al., 2016). In that report, responding officials from toxicology laboratories commented on their best practices and challenges, including dealing with issues around staffing, funding, capacity, and technical competence; managing backlogs; outsourcing testing to private laboratories; providing courtroom testimony; and operating with a lack of adequate guidance. Laboratories should continue to make progress toward complying with the guidelines from this report. The workshop discussion, which we describe in the following sections, touched on many of these issues and ultimately resulted in high-priority

Tests might miss drugs that could be related to impairment, depending on the equipment and methodology being used at a particular laboratory and the requirements of state DUID laws.

needs primarily related to the timeliness and consistency of forensic toxicology results for DUID testing.

Improvements in the Timeliness and Consistency of Results from Forensic Toxicology Laboratories

The panel members stated that there can be wide variation in how laboratories perform chemical tests, and this can make it difficult in a courtroom setting to connect officer observations of impairment with a specific drug. Chemical test methodologies and laboratory equipment are generally designed to detect only certain drugs. Tests might miss drugs that could be related to impairment, depending on the equipment and methodology being used at a particular laboratory and the requirements of state DUID laws. One participant stated that laboratories might have various approaches to establishing and determining the limits of detection for certain drugs. Different laboratory equipment and methodologies might exhibit different sensitivities for the detection of certain drugs, which could render them unable to detect drugs if their concentrations are below a threshold value, even if those drugs could cause impairment below that level. This difference can be exacerbated by the use of private laboratories, which might not have the same funding and staffing constraints as publicly funded laboratories.

Several panel members stated that high-resolution mass spectrometry equipment often is the optimal type of equipment to use for tests where the identity of the impairing drug(s) is not clear; such equipment is versatile and sensitive enough to accurately test for a wide variety of drugs. This type of equipment can be very expensive, however, and therefore might be out of financial reach for some jurisdictions. Laboratory staff

might have to share this equipment for several purposes and could be reliant on federal grants or certain sources of funding to purchase the equipment and perform necessary maintenance. If, for example, a federal grant is used that is subject to Buy American Act requirements and few acceptable equipment manufacturers are located in the United States, then a laboratory might find it challenging to acquire needed equipment.¹⁵ The reality is that some laboratories simply do not have access to sophisticated equipment that would enable more-nuanced or more-sensitive testing. Although common, less-expensive testing equipment usually is sufficient for most routine DUID casework, participants were concerned that the growth in incidents of polydrug use or novel impairing substances would stress laboratories with limited resources. Laboratories are inherently limited by the equipment requirements for tests of specific substances of interest and by the available resources within the laboratories to perform the chemical tests. This is especially true for novel or emerging drugs, which might not have corresponding, validated detection methodology and available material standards. Many participants stated that the forensic laboratories that perform various types of chemical tests in DUID cases often are operating at full capacity or have request backlogs. As a result, it can take several weeks—or even months—for a lab to conduct a chemical test. A panel member commented that chemical testing is simply not occurring rapidly enough in potential DUID cases to meet the needs of the criminal justice system.

Prosecution Needs

Training in the Interpretation and Presentation of Evidence in DUID Cases

The participants discussed how drug impairment cases have become some of the most technically complex and difficult to prosecute, with one panel member pointing out that “our courtroom presence is where we are having a very hard time.” The participants discussed a need for state and local prosecutors to have access to specialized training or mentoring in prosecuting DUID cases. Prosecutors need to have sufficient case preparation time and must be skilled in presenting the evidence that a driver was impaired simply and clearly enough to persuade juries beyond a reasonable doubt despite evolving case law, varying evidence-collection standards and requirements, and changing juror expectations. The participants observed that it would be beneficial to have more-regular and more-collaborative communication across sectors about the standards of evidence collection and interpretation, which ultimately

would enhance a prosecutor's ability to bring forward the strongest DUID case.

The evidence in DUID cases can be complex and hard to cogently present in court in a persuasive manner. Although the participants stated that the observational field evidence, when properly collected, interpreted, and presented, should be sufficient to secure a conviction, they also discussed related issues that present challenges in prosecution. If a state does not have established case law in which state courts have determined the validity and reliability of evidence collected by officers trained in the SFST or through ARIDE or DRE programs, then prosecutors must introduce and establish the credibility of these standards in each case. This can extend the duration of a case and place a greater burden on prosecutors, who already might have sizable caseloads or who might not have much experience in prosecuting DUID cases. Panel members discussed a need, therefore, to highlight the benefits of using validated testing and evidence-collection procedures to facilitate successful prosecution of DUID cases.

The participants discussed the idea that this challenge could be addressed by standardizing the evidence-gathering process among law enforcement and toxicologists so that prosecutors in different states do not have to establish the validity of certain observational field and chemical tests in each individual DUID case. The participants also observed that it would be beneficial to have more-regular and more-collaborative communication across sectors about the standards of evidence collection and interpretation, which would enhance a prosecutor's ability to bring forward the strongest DUID case.

Law Enforcement Court Testimony in DUID Cases

In light of the complexities inherent in prosecuting a DUID case and the importance of observational field evidence, it is imperative that law enforcement officers be adequately prepared to testify in court. It is necessary to develop officers' skills to describe clearly and credibly (when relevant) their SFST, ARIDE, or DRE training and how this training informed and guided their decisions. They also should be able to identify various cues that suggest impairment, including a suspect's performance on certain observational field tests, and be able to explain these to a judge or jury. Participants agreed that one of the best ways to facilitate credible officer testimony is for the officer to clearly and thoroughly document all of the observations and evidence that were gathered prior to and during a traffic stop. This should entail meticulously documenting evidence the officer observed during the three phases of the SFST

protocol: the suspect's behavior while the vehicle was in motion prior to contact with the officer, the suspect's actions and demeanor after the vehicle has stopped and personal contact was established, and observations made during prearrest screening (NHTSA, 2015). The documentation of these observations, both before and during contact with the suspect, is critical for providing both evidence of impairment and the legal basis for initiating contact, making an arrest, or ordering collection of chemical tests.

Participants noted that DUID cases are among the most-contested cases in court, and officer testimony could face an aggressive cross-examination. An officer who displays signs of nervousness, is unable to promptly answer questions about their decisionmaking and actions on a particular case, or struggles to clearly and confidently describe the training they have received might appear less credible. This might damage the prosecutor's case and lead officers to avoid giving testimony in the future. Participants noted that, regardless of how conclusive the observational field tests ultimately are, thorough documentation of these observations allows the prosecutor to lead the officer through a line of questioning that will reveal, at the very least, the legal justification for performing the SFST or other observational field tests. Careful documentation therefore can increase an officer's confidence when testifying and ultimately strengthen the prosecutor's case. Panel members commented that good training can prepare officers to testify confidently and competently in court. One panelist suggested including a trial advocacy component into the police academy curriculum.

Collaboration Between Forensic Toxicologists and Prosecutors

A further complication arises when forensic toxicologists who have performed a chemical test are prohibited from testifying or choose not to testify to the implications of a particular chemical test result on an individual's level of potential impairment. The participants commented that although there is often good communication between law enforcement and prosecutors in

The evidence in DUID cases can be complex and hard to cogently present in court in a persuasive manner.

DUID cases, it would be beneficial for prosecutors to communicate more routinely with forensic toxicologists. Forensic toxicologists can help educate prosecutors about how to properly interpret chemical test results in the context of a DUID case and can share relevant scientific research that might be particularly beneficial to prosecutors. One panelist stated, for example, that a prosecutor might be unaware that there is not a valid scientific basis for inferring a level of impairment from a given chemical test in a case, which could lead the prosecutor to become frustrated at the toxicologist's seeming unwillingness to interpret the test results as evidence of impairment.

Participants discussed their frustration with *per se* laws in the context of the need for the expertise of forensic toxicologists in court. They noted that with drugs (unlike with alcohol), there generally is not a simple dose response that can associate a chemical test with a degree of impairment. In other words, “there is no magic number that could be used” to determine a level of impairment from a chemical test. One participant asserted that, because we know that certain drugs cause impairment at *some level* but not what that level might be for a particular individual, “the only number that scientifically makes sense is zero tolerance.” In states with *per se* laws, this can make prosecution very challenging. Participants discussed that on one hand, jurors might expect a chemical test showing a result that comports with the legal definition in the *per se* law, and if other evidence suggests that an individual was impaired but a chemical test shows that the suspect had a drug concentration below the legal level, this erroneously will be seen by the jury as exculpatory evidence. On the other hand, should a prosecutor present a chemical test showing that an impaired individual was over the legal *per se* limit, the defense might point to research showing the scientific invalidity of such a limit for determining impairment, thereby undercutting the utility of the test as evidence.

Therefore, participants noted that it is important for forensic toxicologists to be willing and available to testify in court. A forensic toxicologist who is able to testify can help educate the

jury about the inherent limitations of the meaning of chemical test results, which can help reinforce a prosecutor's arguments that these chemical tests should be considered along with other evidence. In contrast, cases can be damaged by instances where forensic toxicologists who have performed a chemical test are prohibited from testifying or choose not to testify in court on the meaning of the test result. Because the strength of a DUID case depends on the reliability and credibility of the evidence that was gathered and interpreted by the law enforcement officers and forensic toxicologists, testimony that is perceived to be incomplete or unconvincing might severely limit the prosecution's case. Close engagement among the DRE program, toxicology laboratories, and prosecutors—along with clearer communication about what experts, such as forensic toxicologists, *can* affirmatively testify to based on established scientific knowledge and the type of statements the forensic toxicologist's supervisor might allow—would better equip prosecutors as they prepare and present their cases.

Best Practices to Address a Suspect's Refusal to Consent to Testing

The participants discussed how the right to refuse either observational field or chemical testing can make the collection of evidence of impairment for DUID cases more difficult. Many states have an implied consent law. These laws allow a law enforcement officer to request and procure various types of chemical tests from a driver suspected of driving while impaired without first obtaining a search warrant, as long as the suspect does not revoke this implied consent by refusing to submit to the chemical test at the time of their arrest (Boddie and O'Brien, 2018). Many states have laws dictating various penalties for refusing an implied consent chemical test, although in 2016, the U.S. Supreme Court decided in *Birchfield v. North Dakota* that blood tests require a warrant and motorists might not be *criminally* punished for refusing a blood test.¹⁶ The process of obtaining a warrant can increase the amount of time it takes for an officer to investigate and collect evidence,

Forensic toxicologists can help educate prosecutors about how to properly interpret chemical test results in the context of a DUID case and can share relevant scientific research that might be particularly beneficial to prosecutors.

and in some cases, it might not be possible for a law enforcement officer to secure a warrant “in a timely fashion” at all in DUID cases (Compton, 2017). In any case, the right to refuse chemical testing can increase the amount of time required to collect the evidence, allowing the suspect’s body additional time to metabolize any drugs in their system and diminishing the overall utility of the test as evidence.

Participants noted the “loss of implied consent” as a significant issue affecting the ability to successfully address DUID and prosecute cases. Panel members noted that, especially in cases where implied consent is refused, officers need to be prepared to carefully document the observational evidence of impairment prior to and during a traffic stop. However, they also pointed out that, in most cases, participation in SFSTs is voluntary, and an individual suspected of impaired driving might refuse to participate in the test without legal consequence, thereby depriving law enforcement of another significant source of observational evidence in the case.¹⁷ Especially in cases where this “double refusal” happens, participants said, finding sufficient evidence to successfully prosecute a DUID case becomes extremely challenging. As a result, participants discussed the need to identify other solutions to address challenges with evidence collection in cases involving refusals. Many of the solutions discussed involved ways to obtain evidence in a more-timely fashion, through alternative approaches to blood draws; the use of e-warrants to obtain faster authorization for evidence collection; or the validation of techniques for less-invasive evidence collection, such as roadside blood pressure readings. They also discussed the potential need for research identifying and analyzing the risks and benefits of the right to refuse testing, with the hope of prompting a reevaluation of right to refusal in the face of the growing incidence of drug-impaired driving.

CONCLUSION

Drug-impaired driving persists as a major public safety threat. Preventing and deterring instances of drug-impaired driving require law enforcement officers, forensic toxicologists, and prosecutors to collect, interpret, and present evidence of potential impairment in a methodical way that adheres to established protocols. Drug-impaired driving cases often are more complex than alcohol-related cases because there is no scientifically established relationship among the amount of drug consumed, a physiological concentration detected through chemical tests,

Drug-impaired driving cases often are more complex than alcohol-related cases because there is no scientifically established relationship among the amount of drug consumed, a physiological concentration detected through chemical tests, and actual impairment.

and actual impairment. Furthermore, the physical signs and symptoms of impairment will not look the same for every individual. Law enforcement officers and forensic toxicologists can, however, apply the tools of standardized observational field and chemical tests to gather evidence which, under the totality of the circumstances, can be persuasive proof of drug-impaired driving.

The expert panel acknowledged the complexities inherent in DUID cases and discussed how additional training, clearer cross-sector communication, improved timeliness in the gathering or processing of certain evidence, additional resources, and focused research could enhance the capability of law enforcement, forensic toxicologists, and prosecutors to gather credible evidence that will lead to successful prosecutions. The participants discussed the importance of collaboration across roles on this topic, noting that better meeting the needs of law enforcement, forensic toxicologists, and prosecutors would improve and enhance the capabilities of the other sectors. A law enforcement officer who strictly follows the SFST, ARIDE, or DRE protocols and methodically documents the evidentiary basis for decisions made throughout their contact with the driver could enhance the forensic toxicologist’s basis for conducting certain chemical tests and the strength of evidence the prosecutor can present in court. The methodical practices of these actors

also will help a prosecutor educate the judge and jury on how to properly consider the observational field and chemical test evidence under the totality of the circumstances, leading to an overall improvement in the criminal justice system's means to address drug-impaired driving.

TECHNICAL APPENDIX

In this appendix, we present additional details on the workshop agenda and the process for identifying and prioritizing technology and other needs specific to the workshop assessing law enforcement needs for detecting drug-impaired driving. Through this process, we developed the research agenda that structured the topics presented in the main report. The descriptions in this appendix are adapted from those in previous Priority Criminal Justice Needs Initiative publications and reflect adjustments to the needs identification and prioritization process implemented at this workshop.

Pre-Workshop Activities

As we did in previous workshops conducted as part of the Priority Criminal Justice Needs Initiative, we recruited panel members by identifying knowledgeable individuals through existing professional and social networks (e.g., LinkedIn) and by reviewing literature published on the topic. We then extended invitations to those individuals and provided a brief description of the workshop's focus areas.

In advance of the workshop, panel members were provided an opportunity to identify the issues and topics that they felt would be important to discuss during the workshop. Using a comprehensive literature review and input from the workshop

participants, we structured the workshop agenda as shown in Table A.1.

Identification and Prioritization of Needs

During the workshop, we asked the participants to discuss the challenges that they or the practitioners they work with face. We also asked them to identify areas where additional research and development investment could help alleviate the challenges. During these discussions, participants suggested additional areas that are potentially worthy of research or investment. Participants also considered whether there were areas that were not included in the existing list and suggested new ones. Although the process of expert elicitation we describe was designed to gather unbiased, representative results from experts and practitioners in the field, there are several limitations that could affect the findings. The process typically elicits opinions from a relatively small group of experts. As a result, although efforts were taken to make the group as representative as possible of different disciplines, perspectives, and geographic regions, the final output of the workshop likely will be significantly influenced by the specific group of experts invited to participate. It is possible that the findings from the workshop would vary were a different group of experts selected. In particular, we recognize in retrospect that it would have been useful to have included perspectives from the defense bar in light of the needs that were ultimately identified by the group. Moreover, although the discussion moderators made every effort to act as neutral parties when eliciting opinions from the collected experts, the background and experience of the moderators had the potential to influence the questions they posed to the group and how they phrased those questions. This also could introduce bias that could influence the findings.

Table A.1. Workshop Agenda

Day 1

Welcome and Introductions
 Initial Discussion of Workshop Functions and Objectives
 Tests That Establish Impairment: Observational Field Tests
 Tests That Establish Impairment: Chemical Tests
 Role of Technology in Improving Impaired Driving Tests
 Review Key Benefits and Challenges Identified During Day 1, Prioritize Discussion for Day 2

Day 2

Summary of Day 1 and Overview of Agenda for Day 2
 Admissibility of the Evidence: Reliability and Validity of These Tests
 Review and Final Brainstorming Session
 Final Needs Prioritization
 Panel Review and Next Steps
 Identification and Prioritization of Needs

To develop and prioritize a list of technology and policy issues that are likely to benefit from research and investment, we followed a process similar to one that has been used in previous Priority Criminal Justice Needs Initiative workshops (see, for example, Jackson et al., 2015; Jackson et al., 2016, and references therein). The needs were prioritized using a variation of the Delphi Method, a technique developed at RAND to elicit expert opinion about well-defined questions in a systematic and structured way (RAND Corporation, undated). Participants discussed and refined problems and identified potential solutions (or *needs*) that could address each problem. In addition, needs could be framed in response to opportunities to improve performance by adopting or adapting a new approach or practice (e.g., applying a new technology or tool in the sector that had not been used before).

At the end of the discussion of each topic, participants were given an opportunity to review and revise the list of problems and opportunities they had identified. The participants' combined lists for each topic were displayed one by one in the front of the room using Microsoft PowerPoint slides that were edited in real time to incorporate participant revisions and comments.

Once the panel agreed on the wording of each slide, we asked them to anonymously vote using a handheld device (specifically, the ResponseCard RF LCD from Turning Technologies). Each participant was asked to individually score each problem or opportunity and its associated needs using a 1–9 scale for two dimensions: importance and probability of success.

For the *importance* dimension, participants were instructed that 1 was a low score and 9 was a high score. Participants were told to score a need's importance with a 1 if it would have little or no impact on the problem and with a 9 if it would reduce the impact of the problem by 20 percent or more. Anchoring the scale with percentage improvements in the need's performance is intended to help make rating values more comparable from participant to participant.

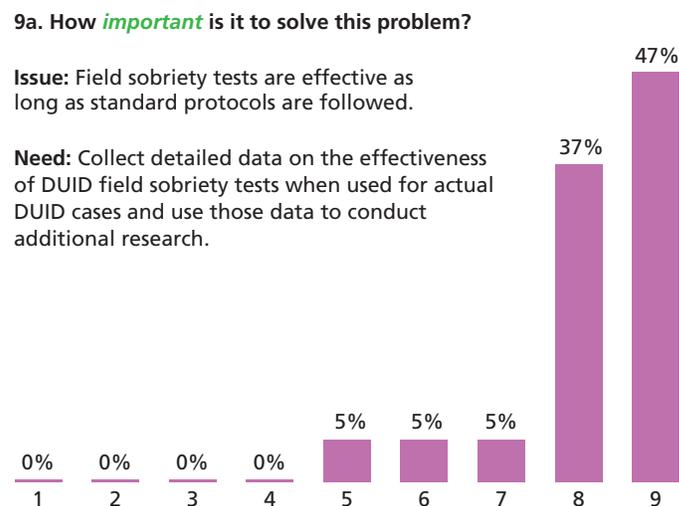
For the *probability of success* dimension, participants were instructed to treat the 1–9 scale as a percentage chance that the need could be met and broadly implemented successfully. That is, they could assign the need's chance of success between 10 percent (i.e., a rating of 1) and 90 percent (i.e., a rating of 9). This dimension was intended to include not only technical concerns (i.e., whether the need would be hard to meet) but also the effect of factors that might lead law enforcement, toxicologists, or prosecutors to not adopt the new technology, policy, or practice even if it was developed. Such factors could include, for example, cost, staffing concerns, and societal concerns.

After the participants rated the needs displayed on a particular slide (i.e., for either importance or probability of success), we displayed a histogram-style summary of participant responses. If there was a significant disagreement among the panel (the degree of disagreement was determined by the research team's visual inspection of the histogram), the participants were asked to discuss or explain their votes at one end of the spectrum or the other. If a second round of discussion occurred, participants were given an opportunity to adjust their ratings on the same question. This second-round rating was optional, and any rating submitted by a participant would replace their first-round rating. This process was repeated for each question and dimension at the end of each topic area. Figure A.1 shows an example of a slide on the importance dimension, with related issue, need, and histogram. Figure A.2 shows a slide on the probability of success dimension.

Once the participants had completed this rating process for all topic areas, we put the needs into a single prioritized list. We ordered the list by calculating an expected value using the method outlined in Jackson et al., 2016. For each need, we multiplied the final (second-round) ratings for importance and probability of success to produce an expected value. We then calculated the median of that product across all of the respondents and used that as the group's collective expected value score for the need.

We clustered the resulting expected value scores into three tiers using a hierarchical clustering algorithm. The algorithm we used was the "ward.D" spherical algorithm from the "stats"

Figure A.1. Example Slide for Rating the Importance of a Need



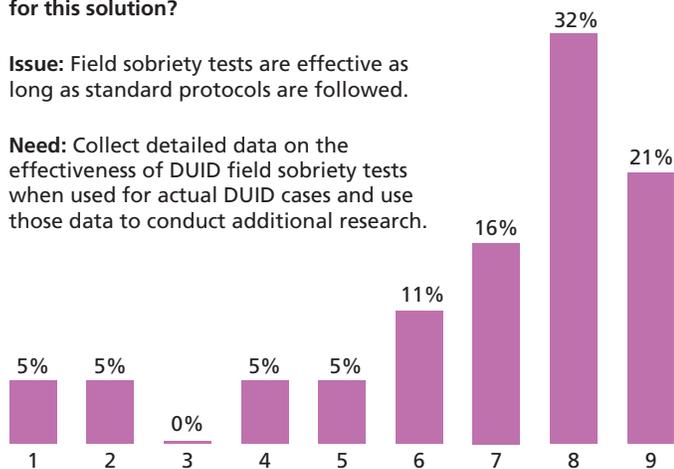
NOTE: Percentages on each question did not always sum to 100 percent due to rounding and variation in the number of participants who voted on each need.

Figure A.2. Example Slide for Rating the Probability of Success of a Need

9b. What is the *probability of success* for this solution?

Issue: Field sobriety tests are effective as long as standard protocols are followed.

Need: Collect detailed data on the effectiveness of DUID field sobriety tests when used for actual DUID cases and use those data to conduct additional research.



NOTE: Percentages on each question did not always sum to 100 percent due to rounding and variation in the number of participants who voted on each need.

library in the R statistical package, version 3.5. We chose this algorithm to minimize within-cluster variance when determining the breaks between tiers. The choice of three tiers is arbitrary but was done in part to remain consistent across the set of technology workshops we have conducted for NIJ. Also, the choice of three tiers represents a manageable system for policymakers. Specifically, the top-tier needs are the priorities that should be the primary policymaking focus, the second-tier needs should be examined closely, and the third-tier needs are probably not worth much attention in the short term (unless, for example, they can be addressed with existing technology or approaches that can be readily and cheaply adapted to the identified need).

Because the participants initially rated the needs by one topic area at a time, we gave them an opportunity at the end of the workshop to review and weigh in on the tiered list of all identified needs. The intention of this step was to let the panel members see the needs in the context of the other tiered needs and allow them to consider whether there were some that appeared too high or low relative to the others. To collect these assessments, we printed the entire tiered list and distributed it to the participants. This step allowed the participants to see all of the ranked needs collected across the day-and-a-half workshop, providing a top-level view that is complementary to the rankings provided session by session. Participants were then asked to examine where each of the needs landed on the overall tiered list and whether this ordering was appropriate or needed fine-tuning. Participants had the option to indicate whether

each problem and need pairing should be voted up or down on the list. An example of this form is provided in Table A.2.

We then tallied the participants' third-round responses and applied those votes to produce a final list of prioritized and tiered needs. To adjust the expected values using the up and down votes from the third round of prioritization, we implemented a method equivalent to the one we used in previous work (Hollywood et al., 2016). Specifically, if every panel member voted "up" for a need that was at the bottom of the list, then the collective effect of those votes would be to move the need to the top. (The opposite would happen if every panelist voted "down" for a need that was at the top of the list.) To determine the point value of a single vote, we divided the full range of expected values by the number of participants voting.

To prevent the (somewhat rare) situation in which small numbers of votes have an unintended outsized impact—for example, when some or all of the needs in one tier have the same or very similar expected values—we required that at least 25 percent of the workshop participants must have voted on that need (and then rounded to the nearest full participant). In this workshop, there were 20 participants, so for any votes to have an effect, at least five participants would have had to have voted to move the need up or down.

After applying the up and down vote points to the second-round expected values, we compared the modified scores with the boundary values for the tiers to see whether the change was enough to move any needs up or down in the prioritization. (Note that there were gaps between these boundaries, so some of the modified expected values could fall in between tiers. See Figure A.3.) As with prior work, we set a higher bar for a need to move up or down two tiers (from Tier 1 to Tier 3, or vice versa) than for a need to move to the tier immediately above or below. Specifically, a need could *increase by one tier* if its modified expected value was higher than the highest expected value score in its initial tier. A need could *decrease by one tier* if its modified expected value was lower than the lowest expected value in its initial tier. However, *to increase or decrease by two tiers* (which was possible only for needs that started in Tier 1 or Tier 3), the score had to increase or decrease by an amount that fully placed the need into the range two tiers away. For example, for a Tier 3 need to jump to Tier 1, its expected value score had to fall within the boundaries of Tier 1, not just within the gap between Tier 1 and Tier 2. Figure A.3 illustrates the greater score change required for a need to move two tiers (i.e., the need on the far right of the figure) compared with one tier (all other examples shown).

Table A.2. Example of the Delphi Round 3 Voting Form

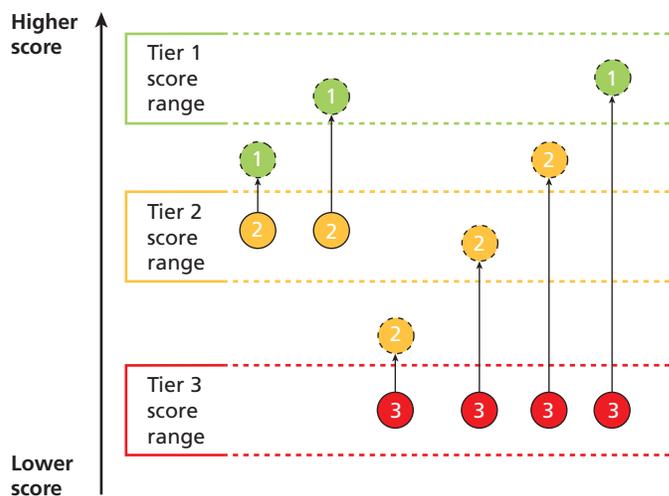
Question	Tier	Vote Up	Vote Down
Tier 1			
Issue: Toxicology labs are not doing an adequate job with respect to the scope and sensitivity of DUID testing. Need: Identify the gaps in resources and potential funding sources that could bring labs up to the required level of capability.	1		
Issue: Field sobriety tests are effective as long as standard protocols are followed. Need: Collect detailed data on the effectiveness of DUID field sobriety tests when used for actual DUID cases and use those data to conduct additional research.	1		
Tier 2			
Issue: The public is generally unaware of the different effects alcohol and other drugs have on impairment and subsequently on driving. Need: Conduct research to identify the most-effective ways to ensure that the public becomes aware of these effects.	2		
Issue: Video evidence cameras have limitations that juries are unaware of (which helps to set unrealistic expectations). Need: Develop best practices to maximize the benefits and address the limits of video evidence (with respect to driving under the influence).	2		
Tier 3			
Issue: Drivers might believe that they are better drivers under the influence of certain drugs. Need: Conduct a study of impaired drivers who have completed rehabilitation programs and discuss how their behavior has changed.	3		
Issue: Use of technology to enhance detection of impairment can be enhanced with current or new technology tools (e.g., automated blood pressure and nystagmus). Need: Conduct research to assess the viability of the current state of the art to enhance the detection process.	3		

NOTE: Shaded cells indicate that up or down votes were not possible (e.g., Tier 1 is the top tier, so it was impossible to upvote items in that tier).

Applying these decision rules to integrate the participants’ third-round inputs into the final tiering of needs resulted in numerical separations between tiers that were less clear than the separations that resulted when we used the clustering algorithm in the initial tiering. This can occur because, for example, when the final expected value score for a need that was originally in Tier 3 falls just below the boundary value for Tier 1, that need’s final score could be higher than that of some other needs in the item’s new tier (Tier 2). See Figure A.4, which shows the distribution of the needs by expected value score after the second-round rating process and after the third-round voting process.

As a result of the third round of voting, 22 needs did not change position, six needs rose one tier, and one need fell by a tier. No needs moved two tiers. The output from this process became the final ranking of the panel’s prioritized results.

Figure A.3. How a Need’s Increase in Expected Value Might Result in Its Movement Across Tier Boundaries



NOTE: Each example need’s original tier is shown by a circle with a solid border (the two needs starting in Tier 2 and the four needs starting in Tier 3). Each need’s new tier after the third-round score adjustment is shown by the connected circle with a dotted border.

Complete List of Needs

The complete list of identified needs is shown in Table A.3, and the needs are sorted by tier and theme.

Figure A.4. Distribution of the Tiered Needs Following Rounds 2 and 3

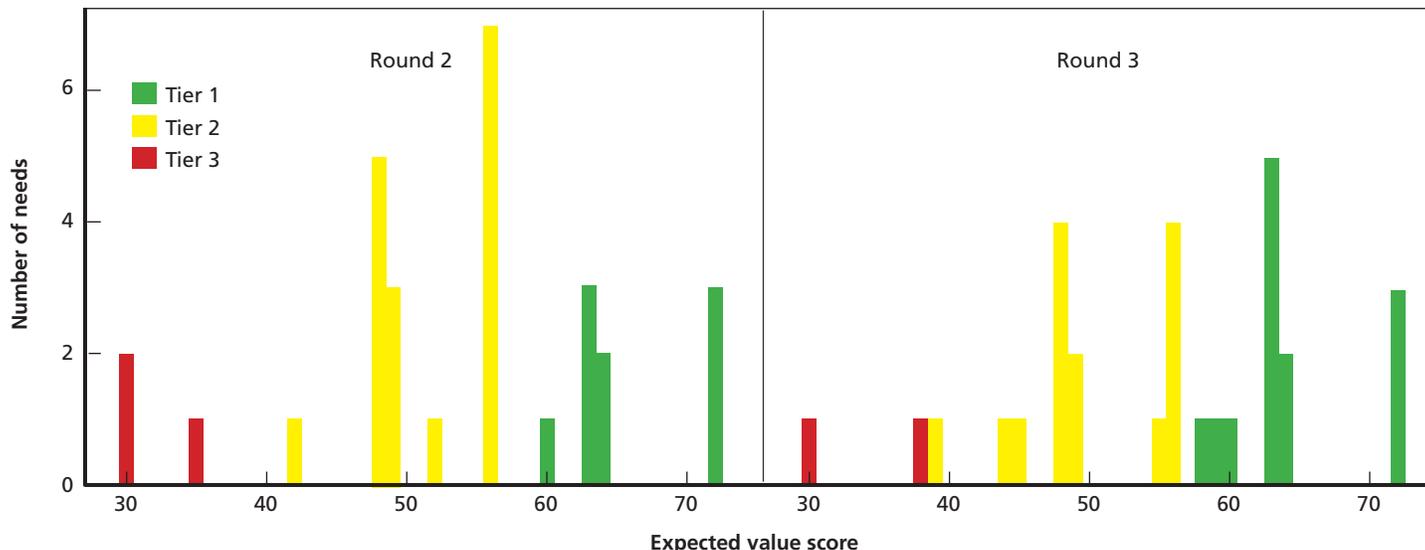


Table A.3. Complete List of Needs, by Tier

Issue	Need	Tier
Law enforcement		
Officers are often are not prepared to go to court.	<ul style="list-style-type: none"> Develop and validate training to boost the confidence of officers when testifying (“cops and court”). 	1
Additional observational tests are needed to enhance DUID detection.	<ul style="list-style-type: none"> Add additional observational tests to the standard field sobriety testing battery (e.g., Romberg and finger to nose). 	
After obtaining authorization, timely blood draws are sometimes difficult to get.	<ul style="list-style-type: none"> Identify the costs, risks, and benefits of alternative phlebotomy approaches (e.g., officer training, contracts). 	
Obtaining warrants often delays timely blood draws.	<ul style="list-style-type: none"> Conduct research on identifying the barriers to adoption of e-warrants and the costs, risks, and benefits of implementation. 	
There are not enough officers with ARIDE and DRE training in many jurisdictions.	<ul style="list-style-type: none"> Identify the likely benefits from having the “right” number of trained officers. 	
Field sobriety tests are effective as long as standard protocols are followed.	<ul style="list-style-type: none"> Collect detailed data on the effectiveness of DUID field sobriety tests when used for actual DUID cases and use those data to conduct additional research. 	
Forensic toxicology		
Toxicology labs are not doing an adequate job with respect to the scope and sensitivity of DUID testing.	<ul style="list-style-type: none"> Identify the gaps in resources and potential funding sources that could bring labs up to the required level of capability. 	1
There are not enough toxicologists to provide interpretive DUID consultation and testimony.	<ul style="list-style-type: none"> Promote and improve access to interpretive DUID training for toxicologists (ideally jointly with prosecutors). 	
There are a significant number of jurisdictions that are not receiving toxicology results in a sufficiently timely fashion.	<ul style="list-style-type: none"> Identify the impact and risks to justice and due process of not investing sufficient resources into toxicology testing. 	

Table A.3—Continued

Issue	Need	Tier
Prosecution		
Right to refuse testing can make the evaluation of impairment for DUID cases more difficult (e.g., field sobriety tests and chemical testing).	<ul style="list-style-type: none"> Identify best practices for dealing with refusals. 	1
Loss of implied consent is likely to lead to additional risk as it becomes harder to enforce existing law.	<ul style="list-style-type: none"> Highlight the risks and benefits of changing implied consent laws and other possible solutions, such as e-warrants. 	
Drug impairment cases have become some of the most technical and difficult to litigate for all participants.	<ul style="list-style-type: none"> Collect solutions that could increase access to training. 	
There are several technical issues related to the prosecution and evaluation of DUID cases that would benefit from additional research.	<ul style="list-style-type: none"> Collect and identify critical research areas. 	
Cross-sector		
There are a significant number of cases where toxicology results exist but no field sobriety test was performed.	<ul style="list-style-type: none"> Define model policies and identify the risks of not following those model policies. 	2
There is not a central point for discovery about research on these issues.	<ul style="list-style-type: none"> Create a clearinghouse that pulls together research across law enforcement, courts, transportation, and science. 	
Use of technology to improve documentation of impairment evaluations can be enhanced with current or new technology tools.	<ul style="list-style-type: none"> Conduct research to assess the viability of the current state of the art to enhance the documentation process. 	
The public is generally unaware of the different effects alcohol and other drugs have on impairment and, subsequently, on driving.	<ul style="list-style-type: none"> Conduct research to identify the most-effective ways to ensure that the public becomes aware of these effects. 	
Officer observations made in the field have the potential to add significant value to policy- and decisionmaking.	<ul style="list-style-type: none"> Conduct research to identify the costs and benefits of faster and more-efficient electronic collection of SFST, ARIDE, and DRE reports. 	
Drivers might believe that they are better drivers under the influence of certain drugs.	<ul style="list-style-type: none"> Promote the use of public education campaigns with regard to drug-impaired driving. Conduct a national study and/or survey on the values, attitudes, and beliefs associated with impaired driving. 	
It is difficult for researchers with new technologies to find agencies that are willing and able to field test.	<ul style="list-style-type: none"> Develop a registry of agencies that are interested in pilot testing. 	
Law enforcement		
It is difficult for officers to document and connect what they saw that is related to impairment prior to actually conducting a field sobriety test.	<ul style="list-style-type: none"> Conduct research to identify factors that improve compliance with best practices on incident documentation. 	2
Roadside oral fluid testing could assist with the arrest decision.	<ul style="list-style-type: none"> Develop best practices to describe the best uses and limits of the devices. 	
Prosecution		
Differences in reliance on validated standards between different jurisdictions can cause problems with prosecution.	<ul style="list-style-type: none"> Identify and highlight the benefits of using validated procedures on improving law enforcement effectiveness. 	2
Jurists have different perceptions of what it means to be impaired when driving.	<ul style="list-style-type: none"> Conduct research on jurist perceptions following drug-impaired driving trials. 	

Table A.3—Continued

Issue	Need	Tier
Jurors have different perceptions of what it means to be impaired when driving.	<ul style="list-style-type: none"> • Conduct research on juror perceptions following drug-impaired driving trials. 	
Video evidence cameras have limitations that juries are unaware of (which helps to set unrealistic expectations).	<ul style="list-style-type: none"> • Develop best practices to maximize the benefits and address the limits of video evidence (with respect to driving under the influence). 	
Cross-sector		
Drivers might believe that they are better drivers under the influence of certain drugs.	<ul style="list-style-type: none"> • Conduct a study of impaired drivers who have completed rehabilitation programs and how their behavior has changed. 	3
Use of technology to enhance detection of impairment can be enhanced with current or new technology tools (e.g., automated blood pressure and nystagmus).	<ul style="list-style-type: none"> • Conduct research to assess the viability of the current state of the art to enhance the detection process. 	3

Notes

¹ Although the classification drugged driving easily could include driving under the influence of alcohol, we seek to address issues specifically related to impairment from other drugs in this report. Unless stated otherwise, discussions of drugged driving or impairment from drugs should be construed to exclude effects from alcohol.

² The prioritized needs and other results from the discussion reflect the views of the invited experts, and these results do not necessarily reflect the views of researchers from the RAND Corporation, RTI International, or NIJ.

³ Polydrug use refers to instances when an individual uses more than one drug at a time.

⁴ The totality of the circumstances is defined as a “[t]est used to determine the constitutionality of various search and seizure procedures, e.g., issuance of a search warrant, *Illinois v. Gates*, 462 U.S. 213, 238, 239, 103 S.Ct. 2317, 2332, 76 L.Ed.2d 527; investigative stops, *U.S. v. Sokolow*, 109 S.Ct. 1581, 1585, 104 L.Ed.2d 1. This standard focuses on all the circumstances of a particular case, rather than any one factor” (Garner, 2004).

⁵ The NHTSA developed the SFST protocol to train law enforcement officers and other qualified persons on protocols to follow in potential impaired driving cases. The SFST is the most basic of the three levels of impaired driving detection training. It dictates the procedures and actions law enforcement officers should take during the following three phases: (1) “the officer observes the vehicle in operation, determines whether to stop the vehicle, and observes the stopping sequence;” (2) the officer initiates personal contact with the driver, “observes and interviews the driver face to face; determines whether to ask the driver to step from the vehicle; and observes the driver’s exit and walk from the vehicle;” (3) the officer performs a prearrest screening, during which “the officer administers field sobriety tests to determine whether there is probable cause to arrest the driver for [driving while impaired]. Depending on agency policy, the officer may administer or could arrange to have a preliminary breath test conducted” (NHTSA, 2015, pp. 4, 2, and 3, respectively).

⁶ ARIDE is a training program that “is intended to bridge the gap between the SFST and DRE course and to provide a level of awareness to the participants, both law enforcement and other criminal justice professionals, in the area of drug impairment in the context of traffic safety” (International Association of Chiefs of Police and the National Highway Traffic Safety Administration, 2013, p. 4). The ARIDE program builds on the protocols established during the three phases of the SFST and provides further training on how to recognize the signs and symptoms that might indicate impairment from different types of drugs.

⁷ The International Association of Chiefs of Police and the NHTSA created the DRE certification to rigorously prepare law enforcement officers to collect evidence of potential drug-induced impairment. A trained DRE should follow a 12-step protocol when making an assessment of potential impairment in the field. These steps and other information on the DRE certification are found at International Association of Chiefs of Police, undated.

⁸ The state of Utah recently reduced the blood alcohol content threshold to 0.05 percent.

⁹ THC, or tetrahydrocannabinol, is the primary psychoactive component of cannabis.

¹⁰ In earlier workshops, we examined participant ratings in more detail to provide additional useful context on lower-tier needs, such as identifying “high-risk, high-reward” needs that were rated as very important but very unlikely to succeed. In this workshop, however, lower-tier needs were generally rated lower in both importance and probability of success in roughly equal measure.

¹¹ e-Warrants enable electronic processing and issuing of warrants, potentially allowing for faster issuing of warrants and more-timely acquisition of evidence.

¹² In the HGN test, an officer positions a stimulus in front of the driver’s face, moving it from one side to another while observing the driver’s eye movements to detect signs of impairment.

¹³ A DRE school in Florida, for example, costs more than \$2,500 and requires ten days of an officer’s time. The academic portion of the training is followed by an extended certification phase with rigorous requirements (Institute of Police Technology and Management, undated). Course fees vary from location to location, but time and certification requirements are largely consistent.

¹⁴ NHTSA supports law enforcement phlebotomy training and recently published a toolkit for it. See NHTSA, 2019.

¹⁵ The Buy American Act (41 U.S.C. §§ 8301–8305) requires the United States government to prefer U.S.-made products in its purchases. This legislation has been extended to include purchases by other entities that use federal funds.

¹⁶ Some states do not have implied consent laws and therefore require law enforcement to always obtain a warrant before submitting a suspect to a chemical test. In states with implied consent laws, various administrative sanctions usually are applied when a suspect revokes the implied consent and refuses a chemical test, with examples including jail, fines, driver’s license suspension, or the refusal being admissible as evidence in a trial (Boddie and O’Brien, 2018).

¹⁷ There are some legal exceptions to this, and in many cases, refusal to participate in the SFST can still be admitted as evidence of guilt in court (Boddie and O’Brien, 2018).

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The RAND Justice Policy Program

RAND Social and Economic Well-Being is a division of the RAND Corporation that seeks to actively improve the health and social and economic well-being of populations and communities throughout the world. This research was conducted in the Justice Policy Program within RAND Social and Economic Well-Being. The program focuses on such topics as access to justice, policing, corrections, drug policy, and court system reform, as well as other policy concerns pertaining to public safety and criminal and civil justice. For more information, email justicepolicy@rand.org.

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About This Report

On behalf of the U.S. Department of Justice, National Institute of Justice (NIJ), the RAND Corporation, in partnership with the Police Executive Research Forum (PERF), RTI International, and the University of Denver, is carrying out a research effort to assess and prioritize technology and related needs across the criminal justice community. This research effort, called the Priority Criminal Justice Needs Initiative, is a component of the Criminal Justice Requirements & Resources Consortium (RRC), and is intended to support innovation within the criminal justice enterprise. For more information about the RRC and the Priority Criminal Justice Needs Initiative, please see www.rand.org/well-being/justice-policy/projects/priority-criminal-justice-needs.

This report is one product of that effort. In June 2019, RAND and RTI International researchers conducted an expert workshop on countering drug-impaired driving. This report presents the proceedings of that workshop, topics considered, needs that the panel developed, and overarching themes that emerged from the panel discussions. The participants were asked to discuss needs pertaining to the gathering, interpretation, and presentation of evidence conducted by law enforcement, forensic toxicologists, and prosecutors. This report should be of interest to law enforcement officers, forensic toxicologists, prosecutors, other actors within the criminal justice system, researchers, and lawmakers.

Other RAND research reports from the Priority Criminal Justice Needs Initiative that might be of interest are

- Sean E. Goodison, Michael J. D. Vermeer, Jeremy D. Barnum, Dulani Woods, and Brian A. Jackson, *Law Enforcement Efforts to Fight the Opioid Crisis: Convening Police Leaders, Multidisciplinary Partners, and Researchers to Identify Promising Practices and to Inform a Research Agenda*, Santa Monica, Calif.: RAND Corporation, RR-3064-NIJ, 2019
- Daniel S. Lawrence, Camille Gourdet, Duren Banks, Michael G. Planty, Dulani Woods, and Brian A. Jackson, *Prosecutor Priorities, Challenges, and Solutions*, Santa Monica, Calif.: RAND Corporation, RR-2892-NIJ, 2019
- John S. Hollywood, Sean E. Goodison, Dulani Woods, Michael J. D. Vermeer, and Brian A. Jackson, *Fostering Innovation to Respond to Top Challenges in Law Enforcement: Proceedings of the National Institute of Justice's 2018 Chief's Panel on Priority Law Enforcement Issues and Needs*, Santa Monica, Calif.: RAND Corporation, RR-2930-NIJ, 2019.

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