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Developing National Indicators for Drug-impaired Driving in Canada

Practices in Detection, Monitoring and Reduction

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Conflict of Interest

The authors do not have any conflicts of interest to declare.

Acronyms

Acronym	Definition
ADSE	approved drug screening equipment
CCMTA	Canadian Council of Motor Transport Administrators
DID	drug-impaired driving
DRE	Drug Recognition Expert
DTC	drug treatment court
ME	medical examiner
RCMP	Royal Canadian Mounted Police
SFST	standardized field sobriety test
SME	subject-matter expert



Executive Summary

Introduction

Canada lacks a standardized set of comprehensive and informative national indicators to adequately measure the full impact of drug-impaired driving (DID). Although important information is available through some data, such as number of fatalities and arrest rates, these data are limited, not always collected, under-reported, or inconsistently collected or reported. Other national data that could help broaden our understanding of the issue of DID, such as hospitalization data on injured individuals, are missing.

To effectively reduce harms, prevent collisions, better understand the true extent of the problem and improve overall approaches to addressing DID, a national set of targeted, standardized indicators that use data collected regularly from various sources are required. The Canadian Centre on Substance Use and Addiction (CCSA) initiated a three-year project to collaborate with agencies and experts across Canada to identify and recommend a set of national indicators to better measure the impact of DID. To facilitate these efforts, this project has two phases:

1. **Phase 1: Conduct consultations with various agencies and experts across Canada** to determine what data agencies and jurisdictions are already collecting about DID, identify recommendations for indicators and potential barriers to data collection, and summarize the findings in a report.
2. **Phase 2: Establish a DID Indicators Advisory Committee**, consisting of members from the various agencies and experts consulted, to develop a set of recommended national priority indicators and summarize these into a final report of recommendations.

This summary report is the product of Phase 1 consultations with agencies and experts from various Canadian jurisdictions, and provides the foundation for the Advisory Committee to develop the priority DID indicators during Phase 2. It also provides government agencies, policy and decision makers, practitioners, researchers and analysts important insights into the current state of, and recommendations for, measuring the impact of DID from those professionals who directly work on the issue every day. The purpose of the final project report is to inform decision makers in policy, government, law enforcement, transportation, health and public safety sectors of the measures that experts and frontline personnel recommend these agencies use as the most valuable to better understand and reduce DID.

Consultations

CCSA contacted 163 professionals, frontline practitioners, researchers, analysts and experts in DID across Canada, of whom we consulted with 106. The remaining individuals either were unable to meet or did not think they were the best person to speak with and referred us on to others. For the purposes of this report, individuals consulted are referred to as experts, while federal, provincial, territorial and municipal agencies, organizations and businesses are referred to as agencies. The agencies and groups represented in this consultation included justice departments, law enforcement, emergency room and trauma doctors, coroners and medical examiners (MEs), public insurance, jurisdictional statistics bureaus and health, as well as others.

Four overriding questions were used to guide discussions with the experts:

1. What type of indicators does your jurisdiction already use to collect data on or to measure drug-impaired driving?



2. What indicators or data do you think would be useful to measure the impact of drug-impaired driving (i.e., recommendations)?
3. What are the barriers that would prevent or are preventing jurisdictions from collecting the suggested data (e.g., capacity, infrastructure, budget, etc.) and are there potential solutions?
4. Is there anything else you think we should know?

Key Results

The majority of DID data regularly collected and reported on in Canada are derived from two primary sources: 1) law enforcement DID incidents, arrests, charges and suspensions; and 2) coroner or ME toxicology reports on fatalities. The majority of other agencies (e.g., motor vehicle agencies, Statistics Canada, transportation agencies, public safety agencies, etc.) use these data, meaning that Canada's overall understanding of DID is largely defined by two processes — criminal and death investigations. Other important DID data typically missing or inconsistently reported include hospitalization data (e.g., toxicology reports) from injured drivers, driver population data (e.g., roadside surveys), property damage only collisions and data from non-highway vehicles.

Only a limited amount of data are collected and reported across Canada, and not all are consistently or systematically collected. Some of the basic national data collected and reported include impaired driving charges, suspensions, drug type causing impairment (type not always identified, depending on agency), number of drug evaluations conducted by Drug Recognition Experts (DREs), number of fatalities, age, sex and concentration levels when a blood or urine test is conducted. Importantly, much of the data reported provides details on the incidents, but do not contribute enough to prevention and education efforts to reduce DID. Examples of data that could help reduce DID include roadside survey data that can provide information on the types of drivers and the substances they might have consumed and injury data that can improve understanding of the broader impact of DID. At an operational level, most law enforcement, coroners and MEs and courts stop DID investigations and processes when alcohol is detected, resulting in under-reporting of DID. Additionally, lack of or outdated technology for collecting, communicating or analyzing DID data has resulted in large amounts of lost, incomplete or inaccessible data on the issue.

The most frequent recommendation for developing national indicators was to collect the following types of data:

- Hospitalization data on injured drivers (specifically toxicology data);
- Regular roadside survey data in all jurisdictions (prevalence data);
- Data on all drivers who pass impaired driving tests (not just fails);
- Toxicology data on all injured and fatally injured drivers and non-injured drivers in a crash;
- Data on polysubstance use, particularly for other substances combined with alcohol; and
- Data on populations other than youth.

In terms of barriers and solutions, the most frequent need identified by almost every individual and agency consulted was for interagency coordination and data sharing (see the following table). Most agencies reported that working in silos prevented them from coordinating and obtaining data that could improve overall responses to DID. Technology and infrastructure were another issue.

**Table: Barriers and potential solutions to developing DID indicators**

Barrier	Potential Solution
Lack of access to data from other agencies	Integrate and link or centralize data from the various agencies working on DID issues (e.g., law enforcement, coroners and MEs, hospitals, road safety, courts, etc.). There are opportunities to analyze large amounts of data to obtain a better picture of the DID issue. Consider housing centralized data with statistics bureaus and having health agencies manage the data.
Minimal interagency coordination	Coordinate more effectively among agencies. Many experts reported the need to know what other agencies are doing in DID and to be able to work with other agencies to improve consistent and unified approaches to addressing the issue.
Lack of, or outdated, digital data collection tools	Implement or update digital data collection. Specifically, capture in digital format detailed or descriptive data from paper reports (e.g., law enforcement reports), update internal computer systems so they can communicate with each other (e.g., police car systems with office systems) and improve computer system linkages among agencies (e.g., court and law enforcement systems). Reduce the number of separate systems.
Limited agency capacity, infrastructure and budget	Balance the extent and type of data needed to measure the impact of DID. Some agencies do not have the capacity, infrastructure, budget or mandate to measure a wider range of indicators, so it will be necessary to clearly define the intended purpose behind developing national indicators and ensure they do not overtax agencies.
Inconsistent definitions and data collection methods among frontline personnel and agencies	Standardize data definitions and methods of collection across primary data sources (e.g., law enforcement, coroners and MEs, etc.). Collect data according to the World Health Organization recommendations for drug screening (see World Health Organization, 2016).
Limited labs and oral fluid testing capabilities	Invest in increasing the number of labs and the ability to test oral fluids in Canada. Currently, labs are several months behind and oral fluid samples must be sent to U.S. labs for testing.
Lack of confidence in detection techniques (e.g., SFSTs) or devices (e.g., ADSEs); inconsistent success rates or support of DID evidence	Increase familiarity with, and scientific and legal knowledge about, the use of methods and tools to detect DID. Currently, some judicial or law enforcement agencies do not fully understand the validity and legal basis for these options and are less inclined to use or rely on them. Analyze DID conviction rates to identify reasons behind lower success rates in comparison to conviction rates for other crime related deaths.
Lack of importance, appeal and motivation to address DID among some personnel	Increase recognition, career opportunities, value and support among law enforcement to address DID. Provide more training, best practices and education on the issue.

Agencies recommended making the improvements described above, particularly those for computer system integration and upgrading, in order to be able to support effectively efforts to capture and monitor national DID data. To implement some of the other recommendations towards national indicators, experts also recommended that additional officers be trained to conduct standardized field sobriety tests (SFSTs) to detect impairment or trained as DREs to evaluate drug impairment, as well as qualifying more toxicologists. Although some agencies are receiving additional support and funding to address and monitor the impact of DID (e.g., Public Safety Canada initiated a five-year program to increase the number of officers trained in detecting and assessing impairment and to hire analysts to report on DID data collected in the different jurisdictions), more capacity building is required across various agencies.



Conclusion

The purpose of this summary report is to provide the DID Indicators Advisory Committee with insights from experts across Canada on measuring DID in Canada. The report also provides government agencies, policy and decision makers, practitioners, researchers and analysts important insights into the current state of, and recommendations for, measuring the impact of DID from those professionals who directly work on this issue every day. Discussions with experts revealed that numerous useful data are already collected to measure the impact of DID, but there are critical gaps where additional and better data are needed (e.g., unreported DRE evaluation data, hospitalization injury data and roadside survey data). Although beyond the scope of the Advisory Committee's mandate, experts suggested improvements in interagency coordination, data sharing, technology and infrastructure, and more qualified professionals to better monitor and address issues of DID.

Over the next two years, the Advisory Committee will use the insights in this report and their expertise to develop a final report of recommended indicators, for release in 2021. Lack of broad, consistent and accessible data on the issue of DID limits the ability of frontline personnel, practitioners, researchers and the public to address or properly understand the issue. The overall goal of the project and the work of the Advisory Committee is to help fill this gap in measuring the impact of DID in Canada in order to help reduce the associated risks and occurrences of DID.



Introduction

Canada lacks a standardized set of comprehensive and informative national indicators to adequately measure the full impact of drug-impaired driving (DID).¹ Although important information is available through some data, such as number of fatalities and arrest rates,² these data are limited, not always collected, or only provide information on the presence of a drug and not impairment factors. Other national data that could help broaden our understanding of the issue of DID are also missing. For instance, data on injured drivers who are hospitalized and might have been impaired by drugs are not systematically collected, or studies that measure the prevalence of drivers using drugs (i.e., roadside surveys) are only conducted in some jurisdictions and not regularly. Overall, DID is under-reported, inconsistently collected or reported, or not reported across a range of possible agencies that collect data.

The risks, harms and costs associated with driving while impaired by substances are serious. For instance, fatality data from coroners and medical examiners (MEs) reveal that among the 81.9% of fatally injured drivers tested for substances in 2014, 42.4% of those drivers tested positive for drugs (Brown, Vanlaar, & Robertson, 2017).³ After alcohol, cannabis is the most frequently detected substance in drivers. For instance, a 2014 roadside survey in Ontario found that among drivers who tested positive for drugs (10.5%), 82.1% were found positive for cannabis (Beirness & Beasley, 2017). Nonetheless, while the above data reflects the presence of drugs in the body, which may or may not be impairing, it does not provide sufficient information on DID incidents. In 2012, the costs associated with cannabis-related collisions that were reported in Canada were estimated to be \$1.09 billion (Wettlaufer et al., 2017). However, as indicated by the study, the true costs are likely higher, as the costs arrived at in the study were based on extrapolations from limited data (e.g., data from a British Columbia roadside survey were used to make comparable estimates for other jurisdictions, traffic collision cost estimates were derived from Ontario values and applied to other jurisdictions, costs did not include minor collisions, etc.). Law enforcement officers trained as Drug Recognition Experts (DREs) have also reported detecting similar and sometimes higher numbers of drivers impaired by depressants, stimulants and narcotic analgesics in comparison with cannabis.⁴ Detailed data from DRE reporting are valuable, but are generally not easily accessible for further analysis. Overall, this summary of the data draws on a variety of important sources, but also illustrates the limitations that impede our ability to provide a clearer picture of the true extent and impact of DID. These limitations reduce our ability to address the risks and issues of DID.

To effectively reduce harms, prevent collisions, better understand the true extent of the problem and improve overall approaches to addressing DID, a national set of targeted, standardized indicators that use data collected regularly from various sources are required. In response to this need, the Canadian Centre on Substance Use and Addiction (CCSA) initiated a three-year project to collaborate with agencies and experts across Canada to identify and recommend a set of national indicators to

1 Although alcohol is considered a type of drug, within the impaired driving field, alcohol is often separated out and treated independently from other psychoactive substances (e.g., cannabis, cocaine, opioids). For the purposes of this report, the term drugs will refer to psychoactive substances not including alcohol.

2 For instance, for fatalities see the publicly available reports published annually by the Canadian Council of Motor Transport Administrators (CCMTA) on driving impaired by alcohol and other substances (e.g., Brown, Vanlaar, & Robertson, 2017); or the database on incident-based crime statistics managed by Statistics Canada. Data on DID arrests, charges and suspensions are not readily available to the public, but are tracked through various law enforcement reporting.

3 At the time of writing, 2014 was the year for which the most recent data were available.

4 See the annual reports produced for the International Drug Evaluation and Classification Program by the International Association of Chiefs of Police, available at <https://www.theiacp.org/working-group/section/drug-recognition-expert-section-dre>.



better measure the impact of DID. CCSA's expertise in substance use issues, its evidence-based approach and its national multi-sector partnerships and stakeholder connections place CCSA in an ideal position to bring together broad expertise to reduce the harms and impact of impaired driving. To facilitate these efforts, this project has two phases:

1. **Phase 1: Conduct consultations with various agencies and experts across Canada** to determine what data agencies and jurisdictions are already collecting about DID, identify recommendations for indicators and potential barriers to data collection, and summarize the findings in a report.
2. **Phase 2: Establish a DID Indicators Advisory Committee**, consisting of members from the various agencies and experts consulted, to develop a set of recommended national priority indicators and summarize these into a final report of recommendations.

This summary report is the product of Phase 1 consultations with agencies and experts from various Canadian jurisdictions, and is intended for use by the Advisory Committee to develop the priority DID indicators during Phase 2. It briefly discusses the consultation process, the results and closes with considerations for the Advisory Committee. This report also provides government agencies, policy and decision makers, and practitioners important insights into the current state of, and recommendations for, measuring the impact of DID from those professionals who directly work on the issue every day. The purpose of the final project report is to inform decision makers in policy, government, law enforcement, transportation, health and public safety sectors of the measures that experts and frontline personnel recommend these agencies use as the most valuable to better understanding and reducing DID.

Consultation Process

CCSA researchers contacted 163 professionals, frontline practitioners, researchers, analysts and experts in DID across Canada, of whom we consulted with 106. The remaining individuals either were unable to meet or did not think they were the best person to speak with and referred us on to others. Those consulted represented provincial, territorial and municipal agencies and organizations from eight jurisdictions (Yukon, British Columbia, Alberta, Saskatchewan, Ontario, Quebec, Nova Scotia, and Newfoundland and Labrador), including some federal agencies. Individuals were identified and contacted through several approaches, including the research team's network of DID professionals (e.g., managers in motor vehicle licensing agencies, coroners and MEs,⁵ subject-matter experts, etc.), through referrals and through internet searches (e.g., provincial and territorial websites, Google search engine). For the purposes of this report, individuals consulted are referred to as experts, while federal, provincial, territorial and municipal agencies, organizations and businesses are referred to as agencies.

Most discussions were conducted in person and a few by telephone or email. Discussions ranged from one individual to groups of up to 10 experts from different agencies. The agencies represented in this consultation included:

- Assistant Deputy Minister, Justice and Public Safety
- Cannabis secretariats

⁵ Although there are differences between coroners and MEs, for the purposes of this report they will be discussed together. In Canada, coroners and MEs conduct investigations "to determine the cause and circumstances surrounding unexpected, unnatural or unexplained deaths" (Canadian Centre on Substance Use and Addiction, 2018). Some jurisdictions use coroner systems and some use ME systems (Statistics Canada, 2012). MEs must be medical doctors, while coroners are often appointed and can come from various backgrounds. Coroners use the evidence from investigations "to make recommendations to prevent future deaths under similar circumstances" (Canadian Centre on Substance Use and Addiction, 2018).



- Coroners and MEs
- Departments of justice or attorneys general
- Departments of motor vehicles or licensing agencies
 - This group included driver fitness and driver control divisions, medical review doctors
- Drug treatment courts (DTCs)
- Emergency room and trauma centre doctors
- Injury prevention agencies
- Law enforcement at municipal, regional, provincial and federal levels, as well as commercial trucking compliance officers
 - This group included frontline officers, DREs, DRE provincial coordinators, managers, supervisors, administrative officers, drug-impaired driving units, etc.
- Lawyers
- Poison centre agencies
- Public insurance agencies
- Public health agencies
- Public safety agencies
- Road and traffic safety agencies
- Statistics bureaus
- Subject-matter experts (SMEs; e.g., researchers, analysts, epidemiologists, cannabis researcher from the United States)
- Toxicology departments
- Transportation departments and ministries

For reporting purposes, these agencies were collapsed into 10 categories that combined some agencies based on similar operations (e.g., public safety, road safety and injury prevention were merged). In the Results section of this report, below, the subsection on Canadian Context for DID Indicators has been organized according to the following categories.

- | | |
|------------------------------------|---|
| • Law Enforcement Agencies | • Jurisdictional and Drug Treatment Courts |
| • Coroners and Medical Examiners | • Hospitals, Emergency Rooms and Trauma Centres |
| • Motor Vehicle Licensing Agencies | • Safety and Injury Prevention Agencies |
| • Transportation Agencies | • Subject-Matter Experts |
| • Statistics Bureaus | • Public Insurance Agencies |

Four overriding questions were used to guide discussions with the experts:

1. What type of indicators does your jurisdiction already use to collect data on or to measure drug-impaired driving?
2. What indicators or data do you think would be useful to measure the impact of drug-impaired driving (i.e., recommendations)?
3. What are the barriers that would prevent or are preventing jurisdictions from collecting the suggested data (e.g., capacity, infrastructure, budget, etc.) and are there potential solutions?
4. Is there anything else you think we should know?

To ensure a comprehensive perspective and to help identify possible interagency or systemic-level data gaps and needs, experts were asked to provide feedback on potential data issues (real or perceived) associated not only with their own agencies, but with other agencies as well. Likewise, to ensure recommendations were as broad and as creative as possible, experts were encouraged to provide suggestions for additional data collection or implementation, regardless of feasibility. By



broadening the scope in these ways, the researchers hoped that consultations would reveal insights, data gaps and issues beyond the agency level and novel approaches to barriers and solutions.

The consultations took place in the fall of 2018, so some experts were interviewed within a few months before or after the new cannabis and impaired driving laws and regulations were put into force. No interview occurred long enough after the law coming into force to enable any expert to report on experiences with the new laws and regulations, but the consultations did reveal differences in interpretation and enforcement of the laws. It will take time and experience working with the new laws for agencies across Canada to develop a common understanding and approach. Many agencies are already holding joint meetings, conferences and workshops to share ideas and lessons learned.

Given the evolving legislative environment, some agencies could find that aspects of their procedures and approaches differ from what is described in this report. There will also be jurisdictional differences as each province and territory enacts administrative laws, regulations, procedures and practices specific to their jurisdiction. Nonetheless, the researchers made efforts to ensure the results described in this report represent commonly accepted best practices and procedures across different agencies. Furthermore, individuals representing different agencies in various jurisdictions across Canada provided a critical review of the report to help verify and clarify information.



Results

Results from the discussions with the experts are reported in three sections, depending on the overriding questions they address. The first section discusses findings related to existing data, the limitations experienced by different agencies and the current Canadian context for DID indicators (Question 1). The second section discusses recommendations from experts about useful indicators (Question 2). The third covers findings related to barriers and potential solutions (Question 3). Additional comments from the experts (Question 4) are reported where appropriate in the above sections. A summary of the results can be found in Appendix A: Summary Table of Existing and Recommended Data Indicators.

Data Currently Collected to Measure DID

Primary versus Secondary DID Data

Although many agencies reported collecting DID data, the majority do not collect primary source data related to incidents involving DID (e.g., crashes, roadside surveys). Instead, they rely on secondary data from a few primary data sources or they collect some primary source data but only on issues related to DID (e.g., public opinion surveys) and not data from actual driving incidents. Primary data refers to information that is raw, original and collected directly from the source (Hox & Boeije, 2005), such as the record of charges laid by law enforcement officers on impaired drivers or the test results from samples of drivers' bodily fluids recorded by toxicologists. Secondary data are those data collected from other sources through techniques sometimes referred to as data mining, such as motor vehicle licensing agencies licence suspensions that are based on police data or road safety agencies that use coroner and ME fatality data to report on crash risks.

There are several reasons for understanding the distinction between primary and secondary data when considering the issue of DID, but the most prominent reason brought up by experts was scope. Data typically reflect the purpose for which they are collected, which means that the absence of other sources of data or only using data collected to fulfill the needs of one agency can result in important gaps in understanding the broader extent of the problem of DID. Consultations revealed that although there are several potential sources of primary data on DID, the majority of data regularly collected and reported on in Canada are derived from only two sources: law enforcement DID incidents, charges and suspensions and coroner and ME toxicology reports on fatalities (see Table 1).

Other potential sources of primary data could include toxicology tests from injured drivers taken to hospitals, toxicology tests from fatalities examined by medical practitioners (whose investigative procedures would need to be standardized with coroners and MEs), driver population data (e.g., roadside surveys, discussed below), property damage only collisions and are not reported to police or fall below insurance reporting thresholds, DID data from non-highway vehicles (e.g., boats, all-terrain vehicles, snowmobiles, etc.), digital data from vehicle computer systems, data from commercial trucking incidents, and data on others involved in collisions (e.g., vulnerable road users such as pedestrians and bicyclists, passengers, etc.). For practical reasons, not all of these data can be collected (e.g., unreported property damage), while data for some of these sources are sometimes collected, but not on a regular basis or consistently (e.g., roadside surveys or other individuals involved in collisions). Experts reported that although law enforcement, coroner and ME data are highly valued as a primary source, they are not broad enough to understand the full issue of DID in Canada and additional sources of primary data are needed. In particular, many experts would like to



see data from driver hospitalizations and roadside surveys, and more data on all individuals involved in collisions. These recommendations are discussed in greater detail below.

Table 1: Summary of available primary source DID data and the extent these data are collected

	Primary source data	Extent of data collected
Regularly collected	Law enforcement (e.g., DID incidents, charges, suspensions, DRE reports)	Most data collected and reported, some exceptions
	Coroner and ME (e.g., fatalities, toxicology results)	Most data collected and reported, some exceptions
Potential sources, irregularly collected	Hospitalization of drivers (e.g., injuries, toxicology results)	Not systematically collected
	Roadside surveys (e.g., prevalence, driver characteristics)	Collected in only some jurisdictions and not regularly
	Non-injured drivers (e.g., drivers of large commercial vehicles)	Not consistently collected; usually conducted when there is suspicion of substance use
	Non-drivers (e.g., passengers, pedestrians, cyclists)	Sometimes collected but not consistently, systematically, or regularly
	Recreational vehicles (e.g., non-highway data, boats, skidoos)	Rarely collected, difficult to monitor
	Property damage (e.g., damage under reporting thresholds)	Rarely identified, likely not possible to collect

Another source of primary data are public opinion surveys, focus groups and key informant interviews that collect data on public perceptions, self-reported behaviours and knowledge about DID. These data are valuable in that they can provide additional contextual or explanatory information such as potential reasons for driving drug-impaired, identifying what substances people consume before or while driving, or revealing incorrect public knowledge, among many other useful purposes. However, these data are typically self-reported and thus subject to potential reporting errors, including recall errors and response biases, and these data do not typically relate to actual incidents of DID. Nonetheless, they are important and many agencies reported using public opinion surveys.

Law Enforcement Agencies⁶

Data collected by law enforcement on DID incidents are one of the two primary sources of national information used and wanted by many Canadian agencies. These data typically include criminal charges, administrative sanctions and suspensions, DRE evaluations, results of oral, urine or blood tests, and failed roadside tests (e.g., standardized field sobriety tests [SFSTs] used to detect impairment, but not yet systematically used for drugs). They also include limited data on the driver (e.g., age, sex/gender, prior charges, etc.) and, in some cases, the driving context (e.g., weather, location, vehicle type, etc.). Some agencies also track law enforcement and agency time and costs spent to monitor DID.

In the motor carrier and commercial vehicle context (e.g., large trucks, commercial buses, heavy trucks), commercial compliance divisions manage operator, driver and vehicle compliance with

⁶ Law enforcement agencies discussed here include the RCMP, provincial police, municipal police and commercial compliance enforcement. Military police and other potential forms of police agencies are not represented here.



Canada's commercial transportation regulations.⁷ The Royal Canadian Mounted Police (RCMP) or highway patrol, in collaboration with commercial compliance law enforcement officers, investigate crashes involving commercial vehicles. The crash or inspection report data usually include collision information (e.g., location, vehicles involved, vehicle information, etc.), as well as driver and carrier information, and charges laid. The commercial compliance officer cannot lay impaired driving charges, which are instead applied by law enforcement. Law enforcement officers will lay these charges regardless of whether other charges are also laid (e.g., speeding). The commercial inspection reports, however, do not record the type of substances identified during the investigation.

Law Enforcement Data Collection Process

Law enforcement agencies typically encounter impaired drivers in one of three ways:

- In response to suspected impaired driving (e.g., observation of a vehicle driven inappropriately, responding to a citizen report of potential impaired driving);
- Through an incident (e.g., collision investigation); or
- Through a roadside check stop.⁸

The investigation and collection of DID data typically begins when an officer has reasonable grounds to suspect that the driver of a vehicle has a drug in their body (e.g., driver behaviour, physical indications such as red eyes, etc.).

1. Drivers under reasonable suspicion of having drugs in their system can be tested using the SFST to identify impairment or an oral fluid test with approved drug screening equipment (ADSE) to determine the presence of certain drugs or both. Officers might also take a breath sample through an approved screening device (i.e., a breathalyzer) to screen for potential blood alcohol concentration.⁹ If the officer has reasonable grounds to believe that the operator of a vehicle is impaired by a drug, the officer can proceed to a DRE evaluation or breath demand (demand a breath sample) to test for alcohol.
2. If it is determined that the driver is impaired or committing an impaired driving-related offence, or if the officer immediately proceeds to arrest the driver (in situations where impairment is apparent), the officer can apply provincial/territorial administrative sanctions or arrest the driver (or both), require a DRE evaluation (if this has not been done already) or demand a blood test to determine concentration levels of a drug or drugs present or a combination of the above.

The above tests and procedures produce different types of data. At the time of writing, two ADSEs had been approved for use by the Government of Canada (the Dräger DrugTest® 5000 STK-CA and the Abbott SoToxa™), although other devices are expected to be reviewed and approved for use in

7 Transport Canada oversees the national program, while jurisdictions apply and monitor commercial compliance at regional levels. The compliance system is part of a North American initiative that monitors commercial compliance across Canada, the United States and Mexico. Generally, points are levied against operators if certain safety or other compliant measures are violated. The three countries coordinate activities and inspections, and violations are reported to the home jurisdiction of the driver or company. CCMTA manages the reporting system. DID charges affect a carriers' safety rating.

8 Random locations, dates and times where police set up check points, stop drivers and use questioning, observation and possibly further screening to identify potential impaired driving.

9 In contrast to drug-impaired driving investigations, officers no longer require suspicion to investigate a driver impairment by alcohol. The mandatory alcohol screening (MAS) law came into effect on December 18, 2018. As such, officers can demand a breath sample without suspicion of alcohol consumption.



the future. The former has been approved for the detection of cannabis and cocaine and the latter has been approved for the detection of cannabis. The only data produced by the ADSE are detected/not detected for the specific substance. Under the zero tolerance law for some substances, the detection of cocaine is enough to lead to an arrest, but the detection of cannabis requires an SFST. SFSTs are a series of behavioural tests (i.e., one-leg stand, walk-and-turn and horizontal gaze nystagmus) to detect impairment, but do not identify substance type. The two possible outcomes are the individual is determined to be not impaired (commonly referred to as a pass) or determined to be impaired (commonly referred to as a fail).

An SFST fail, a positive oral fluid drug screen (depending on the jurisdiction) or both can lead to the demand for a blood test or an evaluation by a DRE. DREs are select law enforcement officers specially trained in the 12-step Drug Evaluation and Classification (DEC) Program,¹⁰ which is a valid and reliable program to identify impairment by different drug categories (Canadian Centre on Substance Use and Addiction, 2019). Part of the DRE examination involves administering psychophysical tests (which include the SFST tests), behavioural observations and a physical examination, and can conclude with the collection of a blood (preferred), urine or oral fluid¹¹ sample for analysis, among other data. The National Forensic Laboratory Services, part of Canada's National Police Service, analyzes blood and urine samples collected as part of law enforcement investigations, except for in Ontario and Quebec which have their own forensic laboratories, the Centre of Forensic Sciences and Laboratoire de sciences judiciaires et de médecine légale, respectively.

Data Limitations

Law enforcement agencies collect a number of useful data on DID, but there are various limitations. When investigating impaired driving and alcohol is detected, most law enforcement agencies reported that officers will typically pursue the alcohol charge and stop investigating potential drug impairment. This is largely due to there being established alcohol investigation procedures, clear alcohol *per se*¹² limits, a breath testing device, an established history supporting apprehension of alcohol-impaired drivers and easier convictions in court. For these reasons, drug impairment or polysubstance use when alcohol is present are under-detected and under-reported.

When drug impairment is pursued, technological limitations usually mean that only the most basic data are reported. Police investigations are typically conducted on paper and can contain a rich source of data (e.g., driving context, road conditions, witness accounts, crash descriptions, etc.); however, only select pieces of data (e.g., location, number of people involved in collision, outcome of impaired driving tests — almost exclusively fails, etc.) from these reports will be entered into computer systems. Furthermore, input of data by officers is often done at a later time after the incident, when there is potential to forget information and it can delay reporting to other agencies (e.g., licensing agencies).

DREs complete a Drug Influence Evaluation sheet (also known as an evaluation sheet or facesheet), a narrative report and a DRE Evaluation Report (also referred to as a tracking form) for each evaluation. The facesheets include a large amount of detailed information, but none of it is captured digitally and sometimes they are incomplete. The narrative report may be completed on the back of the facesheet, scanned or completed separately and attached to the facesheet. Officers submit these

10 For more information on DREs, see the RCMP [Drug Recognition Expert web page](#), for the 12-step DEC Program see the [Drug Recognition Expert Evaluations web page](#) or CCSA's [Drug Evaluation and Classification Program](#) (2019) policy brief.

11 Given that oral fluid collection for drug detection is new and that blood tests are considered the standard for confirmation of the presence of a substance, in practice, oral fluid tests are not part of common DRE procedures.

12 In the context of impaired driving, *per se* laws refer to the concentration of alcohol or drugs in the body that are at or above a certain specified or "per se" threshold and are deemed an automatic violation of the law. Impairment is assumed and it is not required to prove it. For example, a driver found with a blood alcohol level of 80 mg/dL (.08%) or greater is automatically considered in violation of the law.



items to the jurisdictional DRE Coordinator, but they are not submitted to the National DRE Administrator at RCMP Headquarters. The tracking form is digital and is designed to be submitted to the National DRE Administrator (as well as to the DRE Coordinator). It is the only item sent to Headquarters. This report contains basic information from the facesheet such as the file number, DRE conclusion, toxicology results and court results. The outcomes on the report are entered into a database at RCMP Headquarters. Accessing information from facesheet data (paper format) would require mining the data, which is both expensive and time consuming, and would also involve meeting privacy requirements (e.g., anonymizing the records).

Law enforcement data are also entered multiple times into different computer systems, sometimes a time-consuming process (some systems are not designed to communicate with each other) and increases the chances for errors or incomplete information. Many of the systems are not set up to capture details on drugs (e.g., some systems only allow for reporting of impaired driving and do not allow differentiation between alcohol and drugs or different drug types). With respect to the SFST, it has the potential to provide insights into impairment and law enforcement processes by comparing passes and fails. Yet, drivers who pass the test are currently not recorded by most agencies, nor is there a procedure to do so. Overall, a large amount of detailed law enforcement data on DID is missing because it may be lumped together under the general heading of impaired driving, not investigated or is lost.

Another limitation reported by law enforcement was that these agencies (as well as many courts) rely heavily on results of fluid tests, particularly blood tests. For those tests that must be analyzed in a lab, there are a limited number of facilities in the country that can run toxicology analyses and the backlog for conducting such tests can be six or more months. Once criminal charges have been laid on a driver, officers and lawyers are expected to produce evidence and go to trial in a certain amount of time (approximately six to 18 months). This time constraint originated as a result of the Jordan Case (see text box). As such, some law enforcement agencies have opted to postpone arresting drivers until they receive the toxicology reports.¹³ This allows for building a stronger case but results in some impaired drivers being able to “disappear” and evade formal charges. Another complication with relying too much on fluid tests is that delays in obtaining samples from drivers, which can be several hours after the DID incident, can result in lowered concentrations or absent levels of substances in the blood. DRE evaluations are very important in this regard as their evaluation for drug impairment and driver behaviour would be the most reliable. Despite DRE evaluations having validity, some law enforcement agencies and courts prefer fluid tests. Due to potential misunderstandings of the DRE process, and a

The Jordan Decision

The Jordan Decision has affected the timelines in which a court can try a case. In 2016, the Jordan Case set a precedent by stipulating specific timelines to complete certain court processes, such as between the laying of charges and carrying out a trial (i.e., 18 months). Other court cases have used the Jordan Case to enforce timely trials, although exceptions have been made when those involved in the case appear to be intentionally causing delays. As a result, courts, law enforcement agencies, coroners and MEs are expected to complete their investigative pieces in a timely manner in order for DID charges in the court system to move forward. Lengthy delays, particularly in coroner or ME investigations and testing due to their high workload and backlog, run the risk of DID cases being dropped or dismissed. Some agencies have modified their processes to ensure they meet timelines (see the Law Enforcement section). The lengthy delays or agencies that have modified their processes means that criminal offences for DID are under-represented in judicial data.

¹³ Some jurisdictions reported that by law they had to wait until the toxicology screen had been produced before serving a driver, it was not an option to wait.



tendency to be more comfortable with a physical test that can produce concentration levels, some agencies may view DRE evaluations as subjective rather than objective.

Issues of DID are also under-reported due to implementation issues. According to many experts, there are insufficient numbers of law enforcement officers trained in SFST or DRE processes, resulting in lowered ability to respond to potential DID incidents. Additionally, DRE evaluations can take several hours to conduct depending on the location and situation,¹⁴ which means that DREs are not available for their other duties during these times, including other DRE calls. This can have a large impact in areas where there are only one or two DREs present, such as lower population areas.

There is also a hesitancy among some officers to pursue or enforce DID-related activities. The reasons for hesitancy include:

- Some officers do not view traffic policing, under which DID sits, as a desirable career path.
- The DRE process is complicated to learn.
- Training to maintain ongoing expertise in DRE is demanding.
- Officers feeling insufficiently trained to conduct SFSTs or DRE evaluations.
- Some officers are uncomfortable with being referred to as an “expert.”
- Some officers dislike having to defend their expert opinion in court.

This last issue of expertise is hoped to be reduced in the future now that Bill C-46 is in place. The bill legally recognizes DRE evaluations as admissible and the result of a 2017 Supreme Court of Canada decision helped reinforce DREs as expert witnesses.¹⁵

The new oral ADSE for roadside drug testing is relatively quick and easy to conduct, and the use of this device will likely increase. The addition of ADSEs along with SFSTs and other traditional methods for detecting impairment will increase the demand for DRE evaluations and policing resources overall. At the same time, Public Safety Canada initiated a five-year program to support implementation of the new DID legislation, including to bolster DID data collection efforts.¹⁶ This support will likely increase the use of ADSEs, SFSTs and DREs, as well as provide additional assistance to meet some demands. It is difficult to predict what the full impact of legalization will be on driving while impaired by cannabis. Although it is expected there will be increased use of cannabis among the population, increased enforcement efforts to detect drug impairment will also raise the number of cases found. The expansion of law enforcement efforts might also result in increases in other drugs detected among drivers. Increased law enforcement activity on DID will also increase demands on other agencies involved in the DID process, such as labs conducting testing, courts prosecuting drivers, and transportation and licensing agencies managing driver sanctions.

As a point of comparison, consultations with the U.S. expert, who spoke to the experience of Colorado, Washington and other states that had legalized cannabis, suggested that Canada could expect to see increases in DID arrests due to increased population use and relaxing of norms, but also due to increased police detection capabilities and enforcement activity (see Subject-Matter Expert subsection below). For instance, studies such as the U.S. National Roadside Survey found increases in cannabis-impaired driving in Colorado and Washington after legalization (Davis et al., 2016). However, variability in cannabis availability (e.g., Washington strongly limited the number of cannabis stores, Colorado did not; Colorado allowed home grown products, Washington did not) or

¹⁴ For instance, the location of the driver, location for the evaluation and obtaining an available and approved medical practitioner or technician to perform a blood draw (blood tests are preferred over urine) can all take time, particularly if they are far apart from each other.

¹⁵ For more information on the Supreme Court of Canada decision, see [R. v. Bingley, 2017 SCC 12, Case 36610](#).

¹⁶ Some of the additional funding and support to provinces and territories includes training more law enforcement officers in SFSTs and DRE evaluations and hiring and helping train data analysts to monitor and report on DID data.



the priority placed on enforcing cannabis laws (e.g., 79% of Colorado policing agencies placed average or high priority on enforcement of cannabis laws in comparison to Washington agencies, which placed only 18% average priority and no high priority efforts on cannabis enforcement) affected interpreting the impact of legalization (Valen, Bogstrand, Vindenes, & Gjerde, 2017; Wiens Lenk, Fabian, & Erickson, 2018).

An area of under-reporting for both alcohol- and drug-impaired driving, of importance to rural and less populated areas, involves non-highway vehicles. It is difficult to monitor and respond to those drivers operating recreational vehicles such as boats, snowmobiles, jet skis or all-terrain vehicles, yet the exposed nature of these types of vehicles can result in serious injury or death. This issue is compounded by the fact that most of these activities take place in locations at greater distances from medical facilities or other types of assistance. In general, less is known about DID and non-highway vehicles.

Coroners and Medical Examiners¹⁷

Coroners and MEs collect the other major primary source of data used by jurisdictions and nationally to measure the impact of DID incidents as it relates to driver fatalities. They use forensic data from different body specimens (e.g., blood, urine, hair, bone or organ tissue) to analyze toxins in the individual's body; however, blood is the preferred sample for toxicology screening. Screening can range from small spectrum (e.g., 1,000 toxins) to large spectrum tests (e.g., 5,000 toxins). Often a small-spectrum test is used before deciding to proceed to a large spectrum test. With respect to substances, tests can detect illicit drugs, prescriptions, over-the-counter medications and metabolized substances. Not all substances can be detected as some break down and are absorbed quickly or some are too new to be detected (e.g., designer drugs).

One of the major limitations to coroner and ME data is that not all driver fatalities are tested for drugs. The practice varies from one jurisdiction to the other; some agencies run tests on all fatalities, but several jurisdictions do not. For instance, similar to law enforcement, some coroners and MEs reported that if they detect alcohol concentrations at or above impairing levels, they will not run further tests to determine if drugs are present. Many coroners and MEs might also choose to not run any tests if the cause of death is obvious and there does not appear to be any other factors involved in the death.

The decision of whether to test is partly based on reasoning, but budgetary costs and limited capacity are also a major factor in decision making for most agencies that may not be able to examine all deaths. In particular, toxicology screens can be expensive and some agencies reported that there were not enough qualified toxicologists to run the tests. These issues mean that there is under-reporting of potential drug impairment or drug presence in fatally injured drivers. Analyzing tests and assembling reports often takes time and can result in long waits for results. Furthermore, due to capacity issues, some jurisdictions send their fluid samples to labs in the United States. Although sometimes more expensive, U.S. labs can run larger spectrum tests and return results in a shorter period. This means that there could be differences in the DID data processed by some jurisdictions using U.S. companies in comparison with data processed by jurisdictions that use Canadian labs. Overall, the different procedures across jurisdictions for determining cause of death, methods for analyzing toxicology screens and the variation in companies used to conduct screening mean that DID data will be under-reported and will be subject to inconsistencies.

¹⁷ For the purposes of this report, coroners and MEs are discussed together. For an explanation of their differences, see footnote 5 in the Consultation Process section.



Another important limitation to coroner and ME data is that they are not captured in an accessible digital format for use by other agencies. Similar to law enforcement reports, many details about the fatality are recorded in coroner and ME reports (e.g., medical history, prescriptions, past injuries, etc.), but they remain in paper or PDF format and are not captured digitally; only high-level pieces of data are recorded digitally or digital data might only be accessible through the coroner and ME systems. Agencies from different jurisdictions who rely on these data (e.g., law enforcement, courts) receive coroner and ME reports in different ways and the reports can include varying information. For instance, some agencies reported receiving data on substance types, but not concentration levels, while others reported receiving very detailed and sometimes complicated test results with narratives that could sometimes be difficult to review and understand. In the former, some agencies reported needing additional details from coroners and MEs to help with their own DID work, while in the latter, some reported that they did not have the capacity or expertise to filter through complex reports. This can mean that some coroner and ME DID fatality data are not being connected to DID-related data from other agencies or that some toxicology information might be lost due to lack of expertise by other agencies to find or make use of it.

In terms of reporting, some experts stated that lack of clarity about thresholds for drug impairment levels has made it difficult for coroners and MEs to report on possible contributing factors or causes of death. For instance, alcohol has clear cut-off levels for impairment, so it can be easier to make conclusions about alcohol-impaired driving as a contributing factor or potential cause of death in a driver fatality. In contrast, the presence of a drug in the body does not necessarily indicate impairment and not enough is known about what levels constitute impairment for some drugs. Nonetheless, some coroners and MEs stated that with the new *per se* laws, they might be able to make conclusions or more informed decisions about impairment as a potential factor based on these limits. Others, however, were not as confident in the federal limits and there was some concern that these limits are too conservative. Furthermore, *per se* limits currently correlate to population level analysis of data, but more information is needed to better understand potential differences at the individual level and the impairment effects of different substances. Regardless of whether concentration levels exceed *per se* limits, some coroners and MEs reported that there is no option to record DID as a cause of death, only as one of the potential contributing factors. Yet, for national reporting, cause of death data are transmitted up to national levels (Statistics Canada) and not contributing factors. Currently, this means that the only way to capture drug data pertaining to fatalities is to mine coroner and ME reports and, equally important, some data may only indicate the presence of a substance and not whether it was at impairing levels.¹⁸

Motor Vehicle Licensing Agencies

Motor vehicle licensing agencies typically collect secondary data from law enforcement and sometimes from judicial agencies (courts), but can also collect their own primary data. Data used by licensing agencies include licence suspensions, criminal charges, fines, court dispositions, vehicle impoundment, repeat offences, some medical data, data on specific driver populations (e.g., new and young DID offences) and limited demographic data. Licensing agencies may be able to combine and analyze secondary data collected from other agencies within their computer systems to better understand

¹⁸ As an example, this issue is seen in efforts that attempt to capture DID fatality data. The Traffic Injury Research Foundation (TIRF) mines coroner, ME and law enforcement data for almost all jurisdictions as part of their National Fatality Database. However, these data are subject to various limitations such as how coroners and MEs collect and report data and the way in which some drugs re-distribute in the body post-mortem. The TIRF reports only include fatal injuries within 30 days of the collision. A key limitation, however, is that the results only indicate the presence of a drug or drugs and not whether the drug was impairing or a contributing factor to the collision, partly due to the challenge of associating concentration levels to impairment for certain substances.



certain driving populations, such as monitoring licence suspensions, charges or repeat offences by age, sex/gender, residency or potentially other information.

Although licensing agencies do not collect primary source data on actual DID incidents, they do collect other valuable primary source data that contributes to understanding the broader context of DID. These primary data can include suspensions administered by the licensing agency, such as when a medical professional recommends suspending a driver for being unfit to drive due to medical issues (e.g., drug-related issues). Depending on the jurisdiction, licensing agencies can also collect detailed medical data on drivers from medical practitioners, such as International Classification of Diseases codes. These codes record medical diagnoses and symptoms of a wide range of medical conditions including substance use and conditions related to prescription medications. Some agencies reported that they also collect data on drivers in treatment or who are in remedial programs, and the driver's progress and decisions about whether a licence can be reinstated or restrictions removed. Some licensing agencies also conduct studies on driver perceptions and behaviours to better understand the driving population in their jurisdiction. These activities typically included public opinion surveys, but some agencies have also conducted interviews, focus groups and analyses of pre-/post-campaigns to address DID.

Licensing agencies also face certain limitations. Much of their data relies on accurate and consistent data collection by other agencies. For instance, delayed data from law enforcement can hinder the licensing agency's ability to apply appropriate and timely measures to driver licences. Law enforcement and court data can contain errors or may be incomplete. Most of the data received from law enforcement is usually very basic, such as only indicating an impaired driving arrest or suspension. Licensing agencies do not typically receive information on the type of substance, concentration levels, or other drug- or driving-related information. So although licensing agencies to a certain extent are one potential hub of DID data, their data are limited and can contain errors transferred from the primary agencies supplying data. In terms of medical data, several licensing agencies indicated that medical practitioners are reluctant to recommend driving restrictions for their patients, to report concerns to agencies or to require further driving assessment. This means data on at least some of the driving population who may potentially be driving impaired, such as those using certain prescriptions or those affected by substance use, are not being captured through the driver medical reporting system.

Transportation Agencies

All Canadian jurisdictions have some form of a transportation ministry or department responsible for aspects related to transportation (e.g., road infrastructure, public transit, commercial vehicle operations, etc.). Driver licensing, motor vehicle registration and commercial vehicles are large divisions within these agencies that engage in a broad range of activities related to DID. Given that licensing agencies are primarily focused on driving, they are discussed separately under the Motor Vehicle Licensing Agencies section above.

The majority of the data collected by transportation agencies are secondary source data, but these agencies do sometimes collect primary source data. At the provincial/territorial level, these agencies will often receive impaired driving data from different agencies; however, this process varies widely across jurisdictions. Data can include any of the data collected by licensing agencies (see above), as well as DRE data, fatality data, data on administrative sanctions, collision data, self-report surveys and road safety data. With the legalization of cannabis, some transportation agencies have also begun collecting data on cannabis sales from other agencies in order to monitor for potential impact on road safety, such as potential retail density effects. Transportation agencies can also conduct public opinion surveys on issues within their jurisdiction.



At the national level, Transport Canada collects data on motor vehicle crashes from provincial/territorial motor vehicle departments for aggregation in a National Collision Database, but this does not include DID data. Instead, for DID data, Transport Canada generally supports other agencies in collecting this type of information. For instance, Transport Canada provides support to conduct roadside surveys (see Subject-Matter Experts subsection), has supported the National Fatality Database (see Coroners and Medical Examiners subsection) and has supported the Canadian Council of Motor Transport Administrators (CCMTA) production of the Alcohol and Drug-Crash Problem reports. Transport Canada may also conduct independent research such as public opinion surveys and other studies.

Jurisdictional and Drug Treatment Courts

Jurisdictional courts (provincial/territorial) and drug treatment courts (DTCs)¹⁹ are the two possible courts through which most drivers arrested for DID proceed. Both of these courts use secondary source data — arrest reports from law enforcement and toxicology reports from coroners and MEs. Generally, both types of courts collect very little primary source data on DID, and the data that are collected tend to focus on cases and not be related to DID incidents. This is largely because DID data do not feed into court mandates and are not necessarily pertinent to judicial processes. The data these courts do collect includes the length of time a case requires, basic demographic data on the driver and the outcomes of the cases (dispositions) such as acquittals or convictions. However, these decisions are not captured according to case type (e.g., DID, alcohol-impaired driving, dangerous driving, etc.), meaning that data cannot be easily tracked according to whether the case involved impaired driving.

Most courts and law enforcement agencies can share a limited amount of data digitally through a linked computer program. However, experts from both agencies reported that data input is subject to issues of accuracy, consistency and completeness from both sides. These issues sometimes affect each other's own data collection and processing activities.

Although jurisdictional courts might not collect additional DID data, other agencies are interested in jurisdictional court data. For instance, some law enforcement agencies use court outcomes to compare against officer arrests. These data help law enforcement agencies understand the reasons behind DID cases that do not make it to court or that do not result in a conviction. If the reason is due to law enforcement practices, some law enforcement agencies will use the information to help make improvements in DID training and in their arrest processes. Using this data can be problematic, however, when it comes to cases of polysubstance use that includes alcohol impairment. In cases of both alcohol- and drug-impaired driving charges, some lawyers prefer to pursue the alcohol charge for the same reasons as law enforcement: it is easier to convict. Furthermore, experts also reported that some lawyers prefer physical evidence, such as fluid samples, over behavioural evidence, such as DRE evaluations, and might not pursue cases with absent or minimal physical evidence. For these reasons, any DID data that could be available from jurisdictional courts will be under-reported.

Like jurisdictional courts, DTCs do not collect substantial data on DID incidents and do not usually see DID cases due to the danger to public safety associated with impaired driving.²⁰ From the cases that do proceed through the DTCs, however, data are collected that can be useful to understanding

19 DTCs are currently available in seven provinces and operate within the criminal justice system as an alternative to regular courts. DTCs offer individuals affected by a substance use disorder that is connected to their criminal offence (e.g., drug trafficking, possession, crime committed to support their drug use such as theft, etc.) an opportunity for judicially supervised treatment instead of incarceration (Canadian Centre on Substance Abuse, 2007). To be eligible to enter the DTCs, individuals must be affected by a substance use disorder and must participate in the treatment program prescribed, and can be required to meet additional requirements set out by the DTC.

20 See the Public Prosecution Service of Canada Deskbook, Part VI, Sentencing Matter, 6.1, Drug Treatment Courts, [2.3, Eligibility for drug treatment court](#), for more information.



the broader context of DID issues. These data can include substance type, information on the driver, polysubstance use, outcomes of treatment programs, recidivism, offender history, results of risk assessments, education attained, family situation, family history, employment status, history of addiction, and social and financial assistance. If more DID cases proceed through DTCs, there may be opportunities to use these data to improve prevention and education efforts in addressing DID.

Hospitals, Emergency Rooms and Trauma Centres

When drivers and other road users are injured and taken to the hospital, conducting routine blood testing for substances and concentration levels could provide important, additional insights into the issue of DID. For instance, many hospitals routinely measure alcohol levels on all major trauma patients and this has helped improve the recognition of associations between alcohol intoxication and injury. These tests have also helped identify injured patients who potentially have alcohol use problems and might benefit from additional screening, counselling and referral to treatment. Patient management decisions have also benefited from blood alcohol tests by providing hospital personnel explanations for abnormal levels of consciousness (e.g., no signs of head injury) or abnormal vital signs, as well as by identifying patients who might be at risk of alcohol withdrawal. Similarly, substances such as cannabis, stimulants, opioids, central nervous system depressants and other substances can be associated with injury. Identifying patients who have used these substances could have an impact on hospital or trauma management decisions. However, most hospitals do not routinely conduct toxicology testing other than for alcohol in trauma patients. Data collected from injured drivers potentially impaired by substances, particularly drug type and concentration levels, could expand knowledge on DID risks, impact and prevention. Currently no government or other types of agencies that systematically collect data from hospitals for the purpose of monitoring DID.

Most experts explained that Canadian law prioritizes privacy and respect of individual rights over collecting hospitalization data, although some thought that the public good should take precedence in potential impaired driving cases. Since screening for alcohol is routinely conducted for injured drivers, similar procedures for maintaining privacy could be used for screening for other substances and sharing data.²¹ Some experts also pointed out that the first responsibility of medical staff is to treat the patient and that identifying impairment by drugs is not their priority. However, identifying drug impairment could be important for explaining abnormal clinical findings such as altered mental state or abnormal vital signs, as well as for identifying patients affected by a substance use disorder and needing further treatment.

Despite the lack of official data from hospitals, there are some independent studies underway that are beginning to provide insights into injured drivers and drug impairment (described under Subject-Matter Experts subsection). Additionally, law enforcement officers sometimes issue warrants to collect blood from hospitalized drivers for drug or alcohol testing, but these are specific requests and would yield insufficient numbers to provide broad information on drug-impaired drivers. Furthermore, blood warrants are only requested when there is a strong suspicion of drug or alcohol use and would present a biased picture of the true prevalence of substance use in this population. There could also be other useful information gleaned from hospitalized drivers, if it were possible to collect, such as demographic data. Furthermore, if hospital data could be linked to police report data (through an established anonymous method), the results would likely provide richer data and knowledge on driving context, possibly driver decision making and possibly background information leading up to the crash.

21 For instance, anonymized medical data are already shared through some data sources such as the National Ambulatory Care Reporting System or the Discharge Abstract Database, both managed by the Canadian Institute of Health Information.



For hospitalization data to be useful, a consistent and accepted toxicology procedure would need to be developed, as some experts reported that many hospitals lack the proper training for this type of screening. To manage potential capacity issues and maintain efficiency, it was suggested that a select group of drugs be screened for in whole blood using a set of basic standardized procedures that could be developed for this purpose. Lack of hospitalization data on those involved in DID was reported by experts as one of the largest gaps in measuring the impact of DID, and understanding and addressing the issue in Canada.

Safety and Injury Prevention Agencies

A variety of safety-related agencies —road safety, traffic safety, public safety and injury prevention agencies — examine and report on different types of data that could be used to broaden the understanding and prevention of DID. Collectively, their objective is to reduce harms, including harms to road users affected by drug-impaired drivers. However, with the exception of conducting public opinion surveys, these agencies typically use data from other agencies (i.e., secondary source data) to develop their insights on education and prevention strategies. For instance, some collect data pertaining to road users, types of transportation, mechanism of injury and basic police reporting data, and some agencies monitor hospitalization and emergency room data when drug information is available.

Although these agencies typically do not collect primary data, some have access to restricted data (e.g., hospitalizations related to DID) and some focus on unique populations such as vulnerable road users. Due to their reliance on secondary data, many agencies reported that they receive very little data on drugs, especially in comparison to the data they receive on alcohol. Nonetheless, an important function of these agencies is that they often bring together and analyze different sources of data to provide a broader picture of safety issues and to help develop educational resources.

Subject-matter Experts

Subject-matter experts (SMEs) in the field of impaired driving and, specifically DID, that were consulted included academics, medical practitioners, researchers, policy analysts and a U.S. expert. Some of these experts worked within some of the agencies discussed in this report (e.g., law enforcement, motor vehicle licensing agencies, injury prevention agencies, etc.), but the majority worked for other independent research institutions or organizations.

SMEs usually conduct studies to investigate specific issues. They may collect primary source data, such as testing bodily fluids from drivers or interviewing drivers at roadside check stops, or they may access existing secondary data, such as from law enforcement or previous research. The benefits of SME research are that they may examine new issue areas or harder to study areas, or may validate previous research. For instance, Dr. Jeffrey Brubacher and colleagues are currently conducting studies of interest to various agencies working to reduce DID. His research involves examining toxicology results from blood samples of injured drivers involved in crashes. (The blood samples consist of excess blood that remains after clinical testing from samples collected as part of routine trauma centre procedures when treating patients.) The studies he has led have reported on the relationship between toxicology results of drivers involved in collisions and police reports (Brubacher et al., 2018) and on the prevalence of substances in injured drivers (Brubacher et al., 2016).



Roadside surveys²² are another type of study that collects primary source data and, like hospitalization data, experts considered these data among the most important to understanding DID and currently among the largest gaps in DID data. These surveys examine the prevalence of substance use among drivers, types of substances, and demographic and contextual information to provide a picture of the driving population. Since roadside surveys usually involve a lead researcher or research team, they are discussed under SMEs, but they always involve various agencies and organizations depending on the year and jurisdiction the survey is conducted.²³

Although roadside surveys offer one of the best sources of true driver population data, there are some collection limitations. It is difficult to conduct surveys during the day on a weekday since people are likely to refuse participation if it means they could be late for work or an appointment. Drivers can communicate the presence of these police stops to warn other drivers or they could have an app that can warn or redirect other drivers, resulting in some drivers avoiding the survey. These surveys are also difficult to conduct in small population areas where there are insufficient numbers of drivers to provide data. One of the largest data collection limitations is related to implementation challenges. Roadside surveys are costly to conduct and thus are not carried out very often nor in jurisdictions that cannot support some of the funding.

Despite the advantages of data from SME work, the main limitations are that the research is not conducted on a regular basis (e.g., annually) and that it is often, but not always, focused on a specific region, issue area or agency, meaning that the results might not be broad enough to extend to national levels. The U.S. experience also highlights some challenges Canada faces when SMEs and non-SMEs collect and report on data to measure the impact of DID. For instance, some U.S. studies have not considered implementation issues such as measuring cannabis use after legalization rather than according to when it became available to the public after legalization, or taking into consideration the availability of illegal cannabis prior to legalization. Additionally, some studies have not accounted for technological differences among data collected (i.e., which methods and devices were being used to test for substances), improvements in assessment methods over time (i.e., increased officer detection capabilities) or differences in enforcement (e.g., how one jurisdiction enforces DID incidents can differ from another jurisdiction, producing different outcomes).

Public Insurance Agencies

Public insurers (provincially run auto insurance companies in some jurisdictions) generally do not collect primary data, but instead receive data from other agencies. They often receive information pertaining to driver licensing, violations, charges and sanctions, and some agencies receive SFST (when reported) and DRE results. In terms of primary source data, some public insurers will conduct public opinion surveys. Some agencies will also receive court dispositions on drivers (i.e., conviction, acquittal, etc.). Some experts pointed out that, with improvements in vehicle technology, there might be opportunities for insurers (or motor vehicle manufacturers) to collect data on driver behaviours through onboard computer systems. Before this type of data can be collected or reported on, issues related to driver privacy must be addressed.

22 Roadside surveys involve randomly selecting drivers from traffic and asking them to provide a breath sample to test for alcohol and an oral fluid sample, which is subsequently sent to a toxicology lab to test for drugs. The survey is voluntary and completely anonymous.

23 Previous surveys have included support from CCMTA, Transport Canada, the licensing or transportation agency of the jurisdiction where the survey is taking place, law enforcement, jurisdictional ministries of public safety, MADD Canada and CCSA, among others.



Statistics Bureaus

With the exception of occasional surveys, including public opinion surveys, national²⁴ and jurisdictional statistics bureaus generally only collect secondary data reported by other agencies. These data often include collision data (e.g., law enforcement, licensing agencies) or fatality data (e.g., coroner and ME agencies). Additionally, the secondary data provided to statistics bureaus are usually limited to project objectives and often lack detail. For instance, a jurisdictional agency might collect data on impaired driving arrests or charges, but very little else, such as substance type, unless the additional data are required for a specific project. As a result, statistics agencies often are only able to report on large data categories (e.g., numbers of impaired driving collisions) rather than details (e.g., number of driver fatalities due to cannabis).

²⁴ It was not possible to consult with experts from Statistics Canada for this report. However, provincial/territorial statistics agencies and other experts provided general information about data collected at the national level.



Recommendations for National Indicators

In terms of recommendations for national indicators, experts across Canada generally had the same suggestions, demonstrating consistent observed needs for measuring impact. There were also some recommendations specific to jurisdictions and agencies. Among the suggested indicators, experts recognized that not all would be possible for use at this time, but many thought that some of these suggestions were important to voice when considering potential long-term objectives and outcomes to reduce DID.

The following list identifies data that the experts recommended collecting. A few key recommendations are discussed in further detail below.

- Hospitalization data, specifically toxicology results on all drivers and others injured in a crash;
- Toxicology results on all fatally injured drivers and all other fatalities involved in a crash;
- Toxicology results on drivers not fatally injured (e.g., drivers of large commercial vehicles);
- Data on other individuals not fatally injured in crashes (e.g., passengers, pedestrians, bicyclists, etc.) to measure the impact of DID on others;
- Number of drivers who pass ADSE, SFSTs and DRE evaluations (not just fails);
- Data on polysubstance use, particularly for other substances combined with alcohol;
- Prescription drug use associated with DID incidents
- Regular (e.g., annual) roadside survey data collected in every jurisdiction; (There is a need to establish a baseline for DID across the driving population.)
- Prevalence of DID among commercial drivers;
- Capture law enforcement, coroner and ME data recorded in paper reports that are not recorded elsewhere (e.g., medical history, behavioural test results, collision details, etc.).
- Profiles of different types of drug-impaired drivers (e.g., data on adults and older adults and data on drugs other than cannabis);
- Data that correlates cannabis retail density and DID incidents;
- Data on effectiveness of deterrence methods (e.g., immediate sanctions, types of punishment, etc.);
- Data derived from rural and low-density population areas;
- More data from public opinion surveys, focus groups and interviews (knowledge, perceptions, behaviours, etc.);
- DID data for recreational vehicles (e.g., ATVs, snowmobiles, boats, cyclists, etc.).
- Costs of DID to individuals, agencies and society;
- Data from onboard vehicle technology (e.g., GPS data on driving patterns such as speed, time-of-day, lane keeping, etc.); and
- Poison centre data as a different perspective for monitoring changes in population substance use issues.

Among the data listed above that agencies recommended be collected, the most frequent recommendations were to collect:

- Hospitalization data on injured drivers (specifically toxicology data);
- Regular roadside survey data in all jurisdictions;
- Data on all drivers who pass impaired driving tests (not just fails);
- Toxicology data on all injured and fatally injured drivers and non-injured drivers in a crash;
- Data on polysubstance use, particularly for other substances combined with alcohol; and
- Data on populations other than youth.



Almost all agencies viewed the lack of hospitalization data and roadside survey data as the largest gaps in measuring the impact of DID in Canada. Since most data on DID comes from two sources (law enforcement and coroners and MEs), hospitalization data and roadside surveys would greatly broaden what is known about DID. Hospitalization data that includes toxicology and other DID-related data could provide insights into drivers at-risk for more serious collisions, improve opportunities to learn more about driving context and driver reasons for impairment if linked with police reports, and provide a truer picture of the harms (e.g., serious injury) and costs (e.g., ongoing medical care) of DID.

Roadside surveys were also frequently raised as critical to understanding DID and how to develop measures to mitigate the issue. Roadside surveys can provide an improved picture of the actual DID issue. For instance, these surveys provide an indication of the number of drivers on the road who are impaired by drugs at various times and who may not otherwise come to the attention of law enforcement. The data also provide a better picture of changes in the prevalence of DID, increased knowledge on the drivers driving impaired (e.g., demographic information such as age or sex/gender), prevalence of different drug types in drivers and potentially areas at-risk for different types of DID.

Similar to roadside surveys for understanding the broader context of DID, experts suggested to record those drivers who pass impaired driving screens and tests, such as SFSTs. This record would provide more data on passes compared to fails, as well as the efficiency and effectiveness of officers to conduct these tests. For instance, if a driver is suspected of being impaired, yet passes a screen or test, it might be necessary to investigate the effectiveness of the tools and procedures used.

Most agencies also recommended that toxicology screens should be run on all fatally injured drivers. Many experts were concerned that impaired drivers are being missed, which could be skewing the results of what is known about DID. For example, if the contributing factor to a fatality is recorded as losing control of a vehicle in bad weather without testing for potential toxins, the results could miss those drivers whose judgment was impaired or who might have had impaired reaction times due to consuming drugs. Experts also recommended collecting toxicology data on other fatalities in a collision (e.g., bicyclists, pedestrians, passengers, etc.) since, if they were impaired, they might have been a contributing or the primary factor in the collision.

Many experts were also concerned about the frequent decision by various agencies (e.g., law enforcement, coroners, MEs and lawyers) to stop investigating potential impaired driving cases when alcohol was detected. Given that, in cases of polysubstance use, alcohol is often used in combination with other drugs (particularly cannabis), several experts recommended that drug impairment always or at least more often be investigated or pursued in conjunction with alcohol cases. This change could help reduce under-reporting of drug impairment, but also improve knowledge about (e.g., profiles of drivers using multiple substances) and reduction of (e.g., prevention, education) polysubstance use and driving.

Relative to other age groups, youth and young adults (16–25 years old) are over-represented in collisions due to their inexperience as drivers (Brown, Vanlaar, & Robertson, 2017; Mayhew, Simpson, & Singhal, 2005). They also represent the largest proportion of fatally injured drivers who test positive for some impairing substances, such as alcohol or cannabis. Given the combined risks of inexperience and use of impairing substances, youth and young adults are often the primary focus of data collection, as well as prevention and education efforts to reduce impaired driving. Although agencies were appreciative of the data and information available on youth, many reported that this focus was too narrow and more data are required on other populations, especially the aging driver population. It was suggested that this would not only provide a more complete picture of the range of drivers using substances, it would likely broaden knowledge on substances used other than cannabis, particularly prescription and over-the-counter drugs, and help in prevention and harm reduction efforts.



Barriers and Potential Solutions

Experts described barriers and potential solutions to these barriers, both regarding data that are currently collected and data they recommended be collected to measure the impact of DID. Table 2 lists expert input followed by a discussion of some of the key barriers and solutions.

Table 2: Barriers and potential solutions to developing DID indicators

Barrier	Potential Solution
Lack of access to data from other agencies	Integrate and link or centralize data from the various agencies working on DID issues (e.g., law enforcement, coroners and MEs, hospitals, road safety, courts, etc.). There are opportunities to analyze large amounts of data to obtain a better picture of the DID issue. Consider housing centralized data with statistics bureaus and having health agencies manage the data.
Minimal interagency coordination	Coordinate more effectively among agencies. Many experts reported the need to know what other agencies are doing in DID and to be able to work with other agencies to improve consistent and unified approaches to addressing the issue.
Lack of, or outdated, digital data collection tools	Implement or update digital data collection. Specifically, capture in digital format detailed or descriptive data from paper reports (e.g., law enforcement reports), update internal computer systems so they can communicate with each other (e.g., police car systems with office systems) and improve computer system linkages among agencies (e.g., court and law enforcement systems). Reduce the number of separate systems.
Limited agency capacity, infrastructure and budget	Balance the extent and type of data needed to measure the impact of DID. Some agencies do not have the capacity, infrastructure, budget or mandate to measure a wider range of indicators, so it will be necessary to clearly define the intended purpose behind developing national indicators and ensure they do not overtax agencies.
Inconsistent definitions and data collection methods among frontline personnel and agencies	Standardize data definitions and methods of collection across primary data sources (e.g., law enforcement, coroners and MEs, etc.). Collect data according to the World Health Organization recommendations for drug screening (see World Health Organization, 2016).
Limited labs and oral fluid testing capabilities	Invest in increasing the number of labs and the ability to test oral fluids in Canada. Currently, labs are several months behind and oral fluid samples must be sent to U.S. labs for testing.
Lack of confidence in detection techniques (e.g., SFSTs) or devices (e.g., ADSEs); inconsistent success rates or support of DID evidence	Increase familiarity with, and scientific and legal knowledge about, the use of methods and tools to detect DID. Currently, some judicial or law enforcement agencies do not fully understand the validity and legal basis for these options and are less inclined to use or rely on them. Analyze DID conviction rates to identify reasons behind lower success rates in comparison to conviction rates for other crime related deaths.
Lack of importance, appeal and motivation to address DID among some personnel	Increase recognition, career opportunities, value and support among law enforcement to address DID. Provide more training, best practices and education on the issue.

In general, the barriers and solutions to data collection fell into three broad categories: interagency coordination and data sharing, technology and infrastructure, and qualified professionals.

Interagency Coordination and Data Sharing

The most frequent suggestion made by almost every individual and agency consulted was the need for interagency coordination and data sharing. Most agencies reported that working in isolation prevented them from coordinating efforts with each other and obtaining data that could improve



individual agency and overall responses to DID. For instance, law enforcement could benefit from access to more detailed court data, such as knowing which cases make it to court, which ones result in a conviction and which ones result in an acquittal, to improve their processes for addressing DID. Licensing agencies could use more detailed law enforcement, coroner, ME and court data to help in managing suspended drivers and in developing education and prevention campaigns tailored to their jurisdiction. Road safety, public safety and injury prevention agencies could benefit from data obtained by law enforcement, hospital injury and transportation agencies (i.e., traffic flow, geospatial, temporal) to improve public safety.

Despite the need for access to each other's data, all agencies recognized several challenges to coordinating and sharing data. There are potential ethical concerns, such as who would have access to what data and, if a central repository of data was used, how data would be kept secure. For instance, legally there is a need to balance maintaining public safety with the protection of individual rights to privacy. Another issue raised was the lack of technology and infrastructure available to many agencies that would enable recording and accessing interagency data digitally, which might be the most feasible way to share information. Some agencies also raised the concern about what data are important to capture and share without overtaxing the source agency. For example, the priority for an emergency room doctor is to address life-threatening injuries and not necessarily to collect toxicology data. The method of collecting data for national indicators was also mentioned as a potential challenge. For example, it would be necessary to develop shared definitions and consistent methods of data collection and record keeping for all agencies to be able to record, link and properly use each other's data.

Most agencies reported that, even with the challenges, interagency coordination and data sharing was critical to addressing issues of DID and should be made a priority. Some ideas were put forward. To address ethical concerns, many suggested centralizing the data into one system that allows access to data depending on the purpose. Among those agencies that need to share driver-specific information in order to fulfil their mandates, allow these agencies to share and access only data related to their operational needs. For instance, law enforcement, toxicology, licensing and court data could form a shared case file on one driver. Among those agencies that seek to address broader, societal needs, such as injury prevention, risk areas, safety issues, public education and prevention campaigns, allow them access to anonymized and potentially aggregated data from multiple agencies. For example, injury prevention or licensing agencies could choose to access anonymized and aggregated data from hospitals and law enforcement to develop resources or programs for high-risk drivers pertinent to their jurisdiction. These suggestions would likely require significant financial, technological, infrastructural and procedural commitments and contributions.

In terms of housing the data, some agencies suggested that provincial and territorial statistics bureaus could be the custodian since they already manage similar types of sensitive data and already have the legal mandate to do so. In this context, it was suggested that, alongside statistics bureaus, certain other jurisdictional agencies without a conflict of interest (e.g., health agencies) could collaborate with the bureaus and take the lead in determining how large databases are shared and analyzed. Another suggestion was to examine DataBC as a potential model for developing interagency data sharing.²⁵ This integrated data system housed and managed by the provincial government contains a wide range of data sources from across the province that are available through the Open Government Licence. One expert also suggested Stats NZ Tatauranga Aotearoa as

25 For more information, see DataBC at <https://www2.gov.bc.ca/gov/content/data/about-data-management/databc>.



a potential model. Its Integrated Data Infrastructure houses and links or integrates data collected from different government agencies and non-government organizations, and has procedures in place to maintain the security and anonymity of data.²⁶ Some experts also suggested transportation agencies could be a choice to house and manage DID-related data. However, they might not have the mandate or legal structure to manage some personal information. Further investigation into this option is needed.

Technology and Infrastructure

Technology and infrastructure were reported as a barrier to data sharing. Although this issue is beyond the scope of this project, which is to recommend what data should be collected to measure the impact of DID, it presents a barrier to implementing recommendations. Agencies explained that it is difficult to capture and report digitally the data they currently collect, and that without improvements they might not be able to implement further efforts to measure the impact of DID. Suggestions to address this issue included updating and streamlining existing systems; providing digital record systems (e.g., tablets, computers) to agencies, frontline personnel or jurisdictions lacking them; and, if possible, develop a new, shared interagency system (see above) across agencies to reduce redundant input. Even with good technology and infrastructure, agencies advised that it is important to be cognisant of the type and extent of data being collected, since more data and certain types of data might require additional time or human resources to collect and input. For example, adding additional data pieces to law enforcement agencies investigating impaired-driving incidents might not be practical when law enforcement officers are also managing various other activities at a crash scene. Some agencies noted that the funding and resources (e.g., data analysts, officer trainers) that will be provided by Public Safety Canada to the jurisdictions (see above) could help address some of these issues.

Qualified Professionals

Another barrier frequently raised was the insufficient number of qualified professionals. Several agencies reported inadequate numbers of trained DREs and toxicologists, and officers trained in SFST to fulfill DID monitoring or processing needs. Although some of the funding provided by Public Safety Canada will be used to bring the complement of law enforcement officers trained in SFST and DRE evaluations to 33% will be helpful, it will be necessary to also address the complicated nature of this training and the appeal of becoming a DRE officer. Other issues will need to be addressed, such as maintaining law enforcement training and increasing numbers of trained professionals in low-density areas. Some agencies that had success in addressing these issues recommended surveying officers to find out what was appealing and discouraging about this work, implementing ongoing training and initiating a recognition program to ensure officers were acknowledged for their work. To appeal to career objectives, another agency pointed out to its officers that, as the leading cause of criminal death in Canada, they were more likely to gain skills and experience investigating fatalities due to impaired driving than they would investigating other types of criminal deaths (Government of Canada, 2019). Experts also pointed out that other agencies such as courts may need education on the validity of DRE evaluations and Bill C-46 to improve their reliance on this resource. The lack of toxicologists in labs appears to be partially a budgetary issue and partially a training and security clearance issue,²⁷ and more information is required.

²⁶ For more information, see Integrated Data Infrastructure, Stats NZ at <https://www.stats.govt.nz/integrated-data/integrated-data-infrastructure>.

²⁷ One expert commented that toxicologists in their jurisdiction require security clearance from law enforcement that can take up to six months. Some toxicologists cannot wait that long and may find other employment.



Conclusion and Considerations for the DID Indicators Advisory Committee

Discussions with DID experts across Canada revealed that much useful data are already collected to measure the impact of DID, but that there are critical gaps where additional data are needed and there are potential barriers and possible solutions to collecting these data.

To develop national indicators, the DID Indicators Advisory Committee will need to consider indicators based on existing data (e.g., DRE evaluations, toxicology reports), on existing but not officially recorded data (e.g., information in paper reports), and on potentially available data that is not monitored (e.g., drivers who pass SFSTs). To obtain a more accurate picture of the DID issue, the limitations associated with these data will need to be addressed or at least accounted for in reporting (e.g., under-reported data, inconsistent collection of data, inaccessible data, etc.). Some of the limitations are procedural, where it might be possible to establish useful national indicators if clear definitions, appropriate methods and additional training are developed for data collection and analysis. However, other limitations derive from financial, technological or infrastructural barriers. These varied limitations mean that not only will it be necessary to determine which existing data would be useful as national indicators, but it will also be necessary to identify which measures could be readily implemented with minor adjustments or support (e.g., recording SFST passes), and which ones would require major adjustments, support and more time (e.g., standardizing coroner and ME reporting). Given the wide variations in capacity among agencies and jurisdictions, creating national indicators should also consider how they could support agency and jurisdiction objectives, as well as minimize additional layers of work, process, cost or time.

The Committee also needs to be aware of major gaps in national data. The majority of Canada's data on DID comes from only two primary sources, law enforcement (i.e., drivers who are caught) and coroners and MEs (i.e., drivers who are fatally injured), which only provide partial information on the actual risks posed by DID. To provide a more complete picture of the DID issue, experts recommended collecting data on those who are treated in hospital for road trauma injuries, data on prevalence of DID derived from roadside surveys, and data on all individuals involved in a crash, particularly all drivers and not just those fatally injured. However, the major barriers to using these data are legal and cost issues. Experts posed some potential solutions to these issues, but recognized that some of the challenges required higher-level intervention, particularly at the federal level and within Canada's legal contexts. Nonetheless, given the importance experts placed on these data gaps, it could be helpful for the Committee to consider examining potential models or approaches used in other countries, such as Australia, New Zealand, or countries in the European Union.

Another important finding from the consultations was that much of the focus of DID data relates to identifying and reprimanding drivers. Although important, these data are subject to their own limitations, which will be reflected to a certain extent in the work of all other agencies using this data. Additionally, it was revealed that these types of data are only partially useful to agencies involved in road safety, education and prevention efforts, and that more data in other related areas are needed, such as geospatial and traffic-related data, demographic data and more data on types of substances being used by drivers. National indicators should also consider including data that not only measures the magnitude of DID, but that could be used to help educate on and reduce the impact of DID.

Cannabis-impaired driving was a prominent discussion point raised by experts, but they had equally important concerns about the effects of prescription and over-the-counter drugs, cocaine and opioids, as well as impaired driving among older adults. The Advisory Committee should consider



developing indicators that specifically examine cannabis-impaired driving. However, this approach might need to take into consideration the different ways in which cannabis is made available across jurisdictions (e.g., brick and mortar stores, online), the different ways in which it is consumed (e.g., inhaled, vaped, eaten) and the different ways in which DID laws are implemented in jurisdictions (e.g., different limits or fines). The Committee will also need to consider indicators that include other drugs given that jurisdictions have found some of these substances more problematic than cannabis. National indicators that capture information on driving populations beyond youth will also need to be considered, such as for sex and gender, which may differ across different drugs, or for an aging population. Experts and agencies made it clear that these data could be more difficult to collect, in part because some of the substances used by other populations will not be measured by oral fluid ADSE and only identified through DRE evaluations and toxicology screens.

Jurisdictional differences, such as population density or differences in implementing impaired-driving laws, will have an important impact on the utility of any national indicator. National indicators must not take a top-down approach, but must be useful to the work of agencies and jurisdictions. Although the feedback across jurisdictions was similar, jurisdictions raised issues specific to them. When developing indicators, the Committee might wish to consider challenges specific to jurisdictions such as population differences, rural–urban differences, different capacity levels or types of vehicles (e.g., highway vehicles versus recreational vehicles). It is also necessary to keep in mind that, due to financial and time constraints, it was not possible to consult all jurisdictions and relevant agencies for this project and there might be additional considerations not captured in this report. However, the consultations were considered relatively comprehensive and the consistency of responses across all those consulted indicates that the consultations likely hit on the major recommendations and considerations for national indicators.

Beyond data collection, the consultations revealed that developing national indicators will be substantially affected by capacity, technology, infrastructure and finances. Some agencies are receiving additional support and funding to address and monitor the implementation of measures to deal with DID. For example, Public Safety Canada's initiatives to enhance training of law enforcement officers to detect DID and to fund provinces and territories to hire data analysts align well with CCSA's work with the Advisory Committee. It is anticipated that more capacity building will be required across agencies. This work goes beyond the purview of the Advisory Committee to address, but will need to be taken into consideration when developing indicators. For instance, the Committee might need to recommend a core set of indicators that could be reasonably implemented immediately and recommend other indicators that could be rolled out over time as their feasibility increases. Nonetheless, if an indicator is deemed critical to measuring the impact of DID, but faces serious barriers (e.g., hospitalization data versus legal, capacity and financial concerns), the Committee might wish to recommend the indicator with a plan for addressing the barriers for consideration by key decision makers.

Concluding Remarks

The purpose of this summary report is to provide the DID Indicators Advisory Committee with insights from experts across Canada on measuring DID and its impact. This purpose includes providing information on the current state of indicators used across Canada and their limitations, articulating recommendations from experts for indicators to measure the impact of DID, and identifying the barriers to these recommendations and potential solutions to the barriers. The report also provides government agencies, policy and decision makers, practitioners, researchers and analysts important insights into how those professionals who work on this issue every day currently measure the impact of DID and recommendations from them.



Through facilitation and support from CCSA, the Advisory Committee will use the results from this report and their own expertise to deliberate on and develop a set of recommended national indicators to measure DID and its the impact. The final report of recommended indicators will be available in 2021. The importance of developing meaningful and effective measures is critical to addressing the issue of DID. With the changes in the legal status of cannabis, the opioid crisis and an aging population, Canadians could be at increased risk for DID incidents. Lack of broad, consistent and accessible data on the issue of DID limits the ability of frontline personnel, practitioners, researchers and the public to properly understand and address the issue. The goal of the overall project and the work of the DID Indicators Advisory Committee is to help fill this gap in measuring the impact of DID in Canada and so contribute to reducing DID and its associated risks.



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Appendix A: Summary Table of Existing and Recommended Data Indicators

Data Mechanism	Data Collected	Data Limitations	Implementation Limitations	Recommendations from Experts
Law Enforcement				
Oral fluid ADSE (At time of writing, only the Dräger DrugTest® 5000 STK-CA and the Abbott SoToxa™ were approved for oral fluid testing)	Detection of substance, drug category (cannabis and cocaine – Dräger, cannabis – SoToxa), number of tests administered	<ul style="list-style-type: none"> Conservative fail limits, some drivers could be impaired and still pass due to higher thresholds Current devices only detect two substances 	<ul style="list-style-type: none"> Some law enforcement agencies will not use the Dräger, waiting for other devices Device must be level to operate (a potential challenge in certain road environments); although devices sit inside heated vehicles, saliva test piece (cassette) may freeze if stored improperly, making them unusable and requiring more 	<ul style="list-style-type: none"> Would like other ADSE approved for use Share some data between agencies (open with those agencies legally entitled to the data, e.g., courts; or anonymized in other cases, e.g., public safety agencies)
SFST Measure for impairment	Results of each of the tests (walk and turn, one-leg stand, horizontal gaze nystagmus); law enforcement officer observations	<ul style="list-style-type: none"> Only individuals who are determined as impaired (fail) are reported; tracking can be inconsistent and is not standardized Individuals determined to not be impaired (pass) typically not reported, no method to record or track Paper format, not digital database SFSTs designed to detect general impairment; cannot identify what is causing impairment If impairment is determined and officers decide to use an approved screening device and find alcohol impairment, they usually stop investigating and do not continue a drug investigation 	<ul style="list-style-type: none"> Not digital, fail outcomes recorded later in computer system Not enough officers trained in SFST Some officers hesitant to use training and avoid conducting SFSTs Impaired driving training not always desirable or considered an upward career move Results must be input into numerous other programs for other reporting Time consuming, different systems and potential for errors 	<ul style="list-style-type: none"> Report SFST results of those not impaired (passes) Share some data between agencies (open with those agencies legally entitled to the data, e.g., courts; or anonymized in other cases, e.g., public safety agencies) Work towards a digital system Encourage and motivate officers to use SFST and improve training



Data Mechanism	Data Collected	Data Limitations	Implementation Limitations	Recommendations from Experts
<p>DRE Drug Influence Evaluation sheet (i.e., evaluation sheet or facesheet)</p> <p>Sheet used to record results of DRE evaluation</p>	<p>A variety of data are collected including driver information, crash information, basic medical information, prescriptions, psychosocial tests, behavioural observations, suspected drugs</p> <p>Report typically filed with local RCMP agency or DRE Coordinator, not sent to RCMP Headquarters</p>	<ul style="list-style-type: none"> Paper format, not digital database These data are not reported to RCMP Headquarters and remain uncaptured digitally; only basic outcomes of the evaluation are reported using the DRE Evaluation Report (see below) If alcohol impairment is determined, DREs may stop further investigation (i.e., no drug data collected) 	<ul style="list-style-type: none"> DRE processes are complicated to learn Not enough trained DREs; costly to train Some DREs hesitant to use training and avoid conducting evaluations Evaluations take DREs out of action for several hours Blood tests take time because they require an approved medical practitioner or technician to draw blood Not enough RCMP labs to conduct toxicology analyses, results can be delayed several months Some DREs reluctant to record their opinion, do not want to be challenged in courts Quebec operates its own DRE program, which may not be consistent with other jurisdictions Impaired driving sits under traffic policing, which is not always desirable or considered an upward career move, often resulting in officer reluctance to pursue impaired-driving training 	<ul style="list-style-type: none"> Record and report facesheet results digitally, in a database Share some data between agencies (open with those agencies legally entitled to the data, e.g., courts; or anonymized in other cases, e.g., public safety agencies) Consider developing Canadian-based DRE training rather than U.S. Increase number of trained DREs Encourage and motivate officers to use DRE training Increase resources for testing



Data Mechanism	Data Collected	Data Limitations	Implementation Limitations	Recommendations from Experts
DRE narrative report	Officer written description (narrative) of the incident that includes some of the data reported on the facesheet, but also additional contextual and observational data (e.g., recount of events, others involved in the incident, etc.)	<ul style="list-style-type: none"> Written descriptions can be incomplete, are subject to extent the officer describes details or is able to report information depending on incident Not recorded digitally but may be scanned; written on back of facesheets, attached to facesheet Only submitted to DRE Coordinator, not to the National DRE Administrator 	<ul style="list-style-type: none"> Not digital thus data not captured beyond DRE Coordinator and must be mined 	<ul style="list-style-type: none"> Explore options to record narrative digitally so data can be mined Share some data between agencies (open with those agencies legally entitled to the data, e.g., courts; or anonymized in other cases, e.g., public safety agencies)
DRE Evaluation Report (i.e., tracking form) Sheet used to report DRE evaluation results	<p>Contains basic information from the facesheet such as the file number, DRE conclusion, toxicology results and court results</p> <p>Report sent to DRE Coordinator and to National DRE Administrator at RCMP Headquarters</p> <p>The form is digital and designed to be emailed to the administrator</p> <p>Data are compiled, uploaded and stored at RCMP HQ in one system</p>	<ul style="list-style-type: none"> Only captures a few pieces of data from the facesheet, no impaired driving or other details 	<ul style="list-style-type: none"> Results must be inputted into other programs for other reporting Time consuming, different systems and potential for errors 	<ul style="list-style-type: none"> Create one system for reporting all data, not multiple Share some data between agencies (open with those agencies legally entitled to the data, e.g., courts; or anonymized in other cases, e.g., public safety agencies)
Arrests, charges, administrative sanctions, check stops	Incident details, driver details, type of charge	<ul style="list-style-type: none"> Only provides basic arrest-related data 	<ul style="list-style-type: none"> Several agencies use paper reporting and must input data into computer system at later time, potential for errors Delayed reporting to motor vehicle divisions 	<ul style="list-style-type: none"> Make digital for all agencies Share some data between agencies (open with those agencies legally entitled to the data, e.g., courts; or anonymized in other cases, e.g., public safety agencies)



Data Mechanism	Data Collected	Data Limitations	Implementation Limitations	Recommendations from Experts
			<ul style="list-style-type: none"> Some agencies intentionally delay reporting to judicial systems while waiting for test results Must enter arrests into multiple computer programs and systems 	<ul style="list-style-type: none"> Need regular and national roadside surveys conducted (see SMEs) Make digital for all agencies Make interagency systems digital or capable of sharing information more easily
Motor carrier, commercial vehicle, carrier compliance	<p>Collect some data from RCMP crash reports. Includes crash, driver and commercial carrier information. Collect court disposition data</p> <p>Data from all jurisdictions housed in one system managed by CCMTA. Collect and monitor commercial carrier safety rating data</p>	<ul style="list-style-type: none"> Data typically collected by RCMP Most data collected in paper format Do not receive data on substance type 	<ul style="list-style-type: none"> Paper reports could be a source of additional data, but they must be mined 	<ul style="list-style-type: none"> Collect data on specific substances and other impairment issues to see if correlations or to identify potential drug routes in Canada Share some data between agencies (open with those agencies legally entitled to the data, e.g., courts; or anonymized in other cases, e.g., public safety agencies) Safety rating data on commercial carriers may be able to provide additional insights into DID
Coroner and ME				
Toxicology screen	Driver information, crash information, medical history, toxicology screen results	<ul style="list-style-type: none"> Paper or PDF format when reporting to other agencies Not all fatalities are investigated Not all fatalities are screened for drugs Some agencies do not report concentration levels If alcohol impairment determined, some agencies stop investigating for other substances Newer and modified substances not always detectable Some agencies use small-spectrum testing and only large-spectrum if needed, may miss some drugs 	<ul style="list-style-type: none"> Methods and practices of investigation are inconsistent between jurisdictions Some tests are sent to U.S. agencies to screen, either due to limited capacity or inability to test certain samples There is no option to report drug impairment as a cause of death for death certificates or reporting to Statistics Canada Without thresholds for impairment, some coroners and MEs reluctant to or will not report drug impairment as a causal or a contributing factor 	<ul style="list-style-type: none"> Establish consistent standards and methods across agencies Make digital for transmission to other agencies Share some data between agencies (open with those agencies legally entitled to the data, e.g., courts; or anonymized in other cases, e.g., public safety agencies) Invest in Canadian labs to be able to screen all types of samples and to employ more toxicologists



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Medical history	Some coroners and MEs will conduct varied types of medical histories into the fatality Some will go back years into a person's history to determine any earlier causal or contributing factors	<ul style="list-style-type: none"> Not all driver fatalities are investigated in detail Data are generally not shared 	<ul style="list-style-type: none"> Not always possible to obtain medical or driver history Can be costly and timely to conduct an investigation 	<ul style="list-style-type: none"> Establish consistent standards and methods across agencies Share some data between agencies (open with those agencies legally entitled to the data, e.g., courts; or anonymized in other cases, e.g., public safety agencies)
Motor Vehicle Licensing Agencies				
Driver licensing system	As the custodian of driver information, these agencies will have various demographic (e.g., sex/gender, age, place of residence, novice driver, etc.) data and some may have driver history data	<ul style="list-style-type: none"> Little data on recreational vehicle incidents. 	<ul style="list-style-type: none"> Some agencies have very detailed reporting systems (e.g., multiple options for reporting an impaired novice driver, multiple options for reporting an impaired regular driver, multiple options for reporting an impaired senior driver, etc.) that can be cumbersome and complex for licensing agencies to manage across all of the possible driver-related issues Insufficient capacity to adequately monitor drivers Not all agencies have the infrastructure or technology to collect or analyze DID; some data must be entered into multiple systems, making it time consuming 	<ul style="list-style-type: none"> Simplify the process for tracking DID offences to reduce complexity, repetition and resource use Share some data between agencies (open with those agencies legally entitled to the data, e.g., courts; or anonymized in other cases, e.g., public safety agencies) Would like hospitalization data connected to drivers/driver incidents in accordance with established privacy laws where applicable. If not possible, then aggregate data may be beneficial Improve agency ability to respond to DID
Data collected from law enforcement agencies and courts	Collect basic information from law enforcement (arrests, suspensions, impoundment) and court dispositions (convictions)	<ul style="list-style-type: none"> Information is basic, typically an impaired driving arrest or suspension, but no other data (e.g., substance type) Court dispositions only include outcome (outcomes might not be related to the DID case where outcomes could be a result of other factors) 	<ul style="list-style-type: none"> Data from law enforcement or courts can be delayed, preventing licensing agencies from applying driver restrictions in a timely manner 	<ul style="list-style-type: none"> Make interagency systems digital or capable of sharing information more easily Share some data between agencies (open with those agencies legally entitled to the data, e.g., courts; or anonymized in other cases, e.g., public safety agencies). Specifically, share more data from



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				<p>these agencies such as substance type, other people involved in incident, etc.)</p> <ul style="list-style-type: none"> • Would like all drivers in a collision tested or evaluated by a DRE • Would like law enforcement and courts to not stop at alcohol, but continue investigation of possible drug incidents
Licence suspensions	Some licensing agencies receive data from medical practitioners for potential medical concerns, including substance use. Some receive data on International Statistical Classification of Diseases-10 codes or other medical details.	<ul style="list-style-type: none"> • Some agencies work with a medical practitioner and will receive a lot of data; while other agencies may not have these partnerships 	<ul style="list-style-type: none"> • Medical practitioners are generally reluctant to report their patients to licensing agencies 	<ul style="list-style-type: none"> • Improve the capacity and requirement for medical practitioners to report drivers affected by medical/substance use issues
Public opinion surveys / Focus groups / Interviews	Collect detailed information on drivers in their jurisdiction. Can provide a useful picture of issues specific to a jurisdiction. Data will be dependent on the issue the agency is investigating.	<ul style="list-style-type: none"> • Self-report data can be subject to issues of participants not remembering properly, not wanting to participate, reporting incorrectly, etc. • Survey data collected are not typically about specific incidents, but general self-report population experiences, perceptions and behaviours 	<ul style="list-style-type: none"> • Cost and capacity to conduct surveys 	<ul style="list-style-type: none"> • Need regular and national roadside surveys conducted (see SMEs) • Jurisdictional statistics bureaus could be an option as an agency to conduct these types of investigations • Need more data on adult drivers and older adult drivers (seniors) • Need more data on drugs other than cannabis
Transportation Agencies				
National: Transport Canada	Generally does not collect data, but may receive data from other agencies	<ul style="list-style-type: none"> • National Collision Database does not include impaired driving data 		<ul style="list-style-type: none"> • Need regular and national roadside surveys conducted (see SMEs) • Share some data between agencies (open with those



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	Produces the National Collision Database.			agencies legally entitled to the data, e.g., courts; or anonymized in other cases, e.g., public safety agencies)
Jurisdictional transportation agencies	Generally collect data from other agencies (e.g., licensing agencies, health agencies, etc.)	<ul style="list-style-type: none"> Some jurisdictional transportation agencies are the motor vehicle licensing agencies for their region and will collect data as described above 		<ul style="list-style-type: none"> Need regular and national roadside surveys conducted (see SMEs) Share some data between agencies (open with those agencies legally entitled to the data, e.g., courts; or anonymized in other cases, e.g., public safety agencies)
Jurisdictional Courts				
Court system	<p>Generally do not collect data pertaining to DID incidents</p> <p>Collect disposition data and some data from law enforcement arrests</p>	<ul style="list-style-type: none"> In polysubstance cases, lawyers typically pursue alcohol over drugs Lawyers are more reluctant to take on DID cases and will drop them 	<ul style="list-style-type: none"> DID data are not generally collected because it is not their mandate Not all lawyers or courts are sufficiently educated in the validity of DREs and tend to over rely on physical (e.g., fluid tests) data over DRE expertise Database systems in some jurisdictions are not set up to record data related to the new impaired driving laws The Jordan decision has put pressure on courts to prosecute within 12–18 months of a charge, which is challenging if info delayed from law enforcement or coroners and MEs 	<ul style="list-style-type: none"> Share some data between agencies (open with those agencies legally entitled to the data, e.g., courts; or anonymized in other cases, e.g., public safety agencies). Particularly law enforcement, coroner, ME data Other agencies would like court data
Drug Treatment Courts				
DTC system	<p>Due to the danger associated with DID, these types of cases rarely go to DTCs</p> <p>Collect data from law enforcement, coroners and MEs</p>	<ul style="list-style-type: none"> Most DID cases do not go to DTCs Not all jurisdictions have a DTC 		<ul style="list-style-type: none"> Share some data between agencies (open with those agencies legally entitled to the data, e.g., courts; or anonymized in other cases, e.g., public safety agencies). Particularly law enforcement, coroner, ME data



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	Collect data on age, sex/gender, substance use data such as type of substance used, polysubstance use (including alcohol), outcomes of treatment programs, recidivism, offender history and risk assessment data			<ul style="list-style-type: none"> Consider moving more DID charges based on substance use disorders through DTCs Develop a clear definition on what recidivism accurately means Make interagency systems digital or capable of sharing information more easily
Hospitals, Emergency Rooms and Trauma Centres				
Use their own data systems	<p>No DID data are systematically collected (e.g., toxicology screens) and reported on non-fatally injured drivers or other injured individuals</p> <p>One exception is law enforcement investigations (usually with a warrant)</p>	<ul style="list-style-type: none"> If data were collected, a standardized procedure for collection and reporting would need to be collected 	<ul style="list-style-type: none"> It is not the mandate of medical professionals to collect DID data Individual privacy rights partially prevent collecting DID data 	<ul style="list-style-type: none"> Hospitalization data (e.g., toxicology screens, injury data, etc.) should be collected on all injured drivers and on all others injured in a collision All agencies would like some form of hospitalization data. Share some data between agencies (open with those agencies legally entitled to the data, e.g., courts; or anonymized in other cases, e.g., public safety agencies)
Safety and Injury Prevention Agencies				
Use their own data systems	<p>Road safety, traffic safety, public safety and injury prevention agencies generally collect data from various agencies, link data and analyze for education and prevention efforts</p> <p>For primary data, some conduct public opinion surveys and some collect data from poison centres on drug poisonings</p>	<ul style="list-style-type: none"> Public opinion surveys: self-report data can be subject to issues of participants not remembering properly, not wanting to participate, reporting incorrectly, etc. Survey data collected are not typically about specific incidents, but general self-report population experiences, perceptions and behaviours 	<ul style="list-style-type: none"> Cost and capacity to conduct surveys Limited access to data from other agencies Difficult to obtain detailed incident or driver data, which prevents these agencies from addressing DID through education or prevention 	<ul style="list-style-type: none"> Share some data between agencies (open with those agencies legally entitled to the data, e.g., courts; or anonymized in other cases, e.g., public safety agencies) Collect more data on DID incidents and profiles of drivers in order to be able to target DID education and prevention with at-risk groups



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Subject-matter Experts				
Use their own data systems	<p>SMEs collect data for their specific areas of DID study, which can vary widely</p> <p>Can provide nuanced data that can include both primary and secondary data</p> <p>Roadside surveys (conducted in conjunction with various other agencies) are a common example, but also hospitalization data, public opinion, focus group, interview data, literature reviews, etc.</p> <p>Roadside surveys collect a wide range of data specific to DID (e.g., driver data, substance details, etc.)</p> <p>National Fatality Database collects data on drivers fatally injured within 30 days of collision from coroners and MEs, reports on presence of substances in drivers</p> <p>U.S. experience of legalizing cannabis can help inform Canadian experience.</p>	<ul style="list-style-type: none"> Data generally only collected on a one-time basis or not regularly <p>Roadside surveys</p> <ul style="list-style-type: none"> Collect data at specific times and locations in order to maximize data collection, which limits use in low population or low traffic areas Difficult to conduct surveys during the day time on weekdays as drivers less likely to participate Drivers can refuse to participate Not conducted on a regular basis or in all jurisdictions <p>National Fatality Database</p> <ul style="list-style-type: none"> Accuracy dependent on coroner/ME data collection, distribution of drugs in the body post-mortem Only reports on presence of substance, not able to indicate impairment Only examines drivers, fatalities and within 30 days Does not include data from all jurisdictions Raw data not typically available for analysis by other agencies <p>U.S. Experience in Cannabis Legalization</p> <ul style="list-style-type: none"> Studies measure impact in various ways, inconsistent and many cannot be compared Various types of methods to measure impairment (e.g., different types of ADSE, DREs, fluid tests) mean differences in 	<ul style="list-style-type: none"> SMEs often only receive one-time funding Roadside surveys are very costly and take time, often requiring the resources of multiple agencies National Fatality Database data are not digital, must be mined from reports For any study or agency examining DID, it can be difficult to collect fluids immediately after a collision 	<ul style="list-style-type: none"> Need regular and national roadside surveys conducted Collect data from other sources (e.g., Canadian Institute of Health Information trauma data, Canadian Community Health Survey, private insurer data, vehicle manufacturer data, etc.) Look to other countries for their approaches in measuring DID (e.g., Spain, Australia, New Zealand, etc.) For the National Fatality Database, make coroner and ME data digital so that it can be standardized, analyzed more easily; share and make more accessible raw data for other agencies for analysis Develop profiles of drug-impaired drivers Collect hospitalization data (e.g., toxicology screens, injury data, etc.) on all drivers and on all others injured in a collision Train more DREs and train more officers to conduct SFSTs; provide more officer training on impaired driving Collect data according to the WHO recommendations for drug screening Research studies need to be clear about what is being measured and take into consideration contextual differences (e.g., legalization date and actual availability of cannabis may not coincide, use of different measurement tools, learning curve of law enforcement, etc.)



Data Mechanism	Data Collected	Data Limitations	Implementation Limitations	Recommendations from Experts
		<p>data, reporting and ability to make comparisons</p> <ul style="list-style-type: none"> • Methods measuring assessment improved and increased over time, can affect results of studies conducted immediately after legalization and those conducted later • Impact of legalization was often measured after laws were passed and not after actual availability of, or access to, cannabis in various states 		
Public Insurers				
Use their own data systems; exist in only four jurisdictions, remainder are private companies	<p>Data are usually collected from other agencies (e.g., law enforcement or licensing agencies)</p> <p>Insurer data includes demographic and other data on drivers. Some agencies collect data on law enforcement efforts (e.g., tickets issued), conduct public opinion surveys</p>	<ul style="list-style-type: none"> • Receive only basic data from other agencies • Public opinion surveys: self-report data can be subject to issues of participants not remembering properly, not wanting to participate, reporting incorrectly, etc. • Survey data collected are not typically about specific incidents, but general self-report population experiences, perceptions and behaviours 	<ul style="list-style-type: none"> • There are some potential useful data collected by insurers, but it may need to be mined or, if already digital, the data may be housed in multiple computer systems • Driver data are subject to privacy limitations 	<ul style="list-style-type: none"> • Share some data between agencies (open with those agencies legally entitled to the data, e.g., courts; or anonymized in other cases, e.g., public safety agencies) • Potential to use insurance data to monitor DID, particularly in collision investigations or if the insurer collects GPS or driver behaviour data using digital systems in vehicles • Insurance data connected to other data sources may be able to fill some gaps in driver information • Examine if deterrence measures have an impact on reducing DID • Collect more data on DID incidents and profiles of drivers
Statistics Bureaus				
Use their own data systems	<p>Generally these agencies collect data from other agencies (e.g., law enforcement, coroners/ MEs, etc.), but they</p>	<ul style="list-style-type: none"> • The DID data collected from other agencies are very basic and sometimes do not differentiate types of impaired driving (i.e., between alcohol and drugs) 		<ul style="list-style-type: none"> • Statistics bureaus could be explored as an option to be the custodian of interagency data. They have the legal status, data management knowledge and capacity to collect and house data. It was also suggested that other



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	conduct their own studies including public opinion surveys	<ul style="list-style-type: none">Public opinion surveys: self-report data can be subject to issues of participants not remembering properly, not wanting to participate, reporting incorrectly, etc.Survey data collected are not typically about specific incidents, but general self-report population experiences, perceptions and behaviours		agencies, such as health or transportation agencies, could potentially manage how the data are used.