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Oral Fluid Drug Screening

Key Considerations

- Changes to the *Criminal Code* of Canada allow police to use approved oral fluid drug screening equipment to test drivers for the presence of cannabis (tetrahydrocannabinol), methamphetamine and/or cocaine.
- Screening for drugs in samples of oral fluid (saliva) collected at roadside provides a viable means of enhancing the detection of drug use by drivers.
- Oral fluid drug screening equipment will not eliminate the need for the Standardized Field Sobriety Test and the Drug Evaluation and Classification program.

The Issue

For the past four decades, the police in Canada have had the authority to use approved alcohol screening devices (ASDs) to check drivers for alcohol consumption. These devices are a quick and easy means of obtaining an indication of a driver's alcohol consumption, providing the officer with information to help decide what further action should be taken, if any. The overall efficiency and effectiveness of ASDs has prompted calls for a comparable device that could screen for the presence of drugs.

In preparation for the legalization of non-medical cannabis, the Government of Canada passed legislation that would allow the use of oral fluid drug screening equipment that could test for the presence of tetrahydrocannabinol (THC), cocaine and/or methamphetamine. Having established a reasonable suspicion that the driver has a drug in their body, the officer can demand the driver provide a sample of oral fluid to be tested by approved drug screening equipment. The result would provide the officer with an indication of the presence or absence of one or more of the three target substances in the driver's body. A positive test would be sufficient evidence for the officer to proceed with further enforcement action.

Background

The search for a means to quickly and easily screen drivers for drug use has been ongoing for many years. Currently, the best means of determining the extent of drug use is to have a blood sample analyzed in a toxicology laboratory. Obtaining a blood sample from a driver is an intrusive procedure that must be conducted by a trained medical professional. These challenges render the collection and analysis of blood samples inappropriate for roadside applications.

Initial drug screening tests were based on urine samples. Although urine tests were shown to have a high degree of accuracy,[1] the collection of urine samples required appropriate facilities to be available at roadside; otherwise, the driver had to be taken to a suitable facility. In addition, the interpretation of positive urine test results could be challenged on the basis that urine tests typically

detect the presence of drug metabolites, which can persist in the urine long after the active drug has disappeared from the body. The presence of metabolites does not provide conclusive evidence that the person was adversely affected by drugs at the time of driving. Urine testing is not well-suited to roadside situations.

The next generation of on-site drug screening devices were developed to detect drugs in oral fluid samples. Oral fluid is actually a mixture of saliva and other materials found in the mouth. Saliva is produced primarily by three pairs of salivary glands (i.e., parotid, submandibular and sublingual) in the oral cavity. A number of minor salivary glands are also located in the lining of the mouth and throat. The main constituent of saliva is water, but it also contains electrolytes such as sodium, calcium and magnesium, along with small amounts of proteins.

The first major study of oral fluid drug screening equipment was conducted in Europe and the United States, and concluded that none of the equipment was sufficiently accurate to be recommended for drug screening at roadside. In addition, the failure rate of the screening devices was high, exceeding 25% for six of the nine devices tested.[1]

A subsequent large-scale evaluation of oral fluid screening equipment was conducted as part of the DRUID (Driving Under the Influence of Drugs, Alcohol and Medicines) project in Europe.[2] Eight on-site devices were evaluated for their ability to accurately detect amphetamines, cannabis, cocaine, opiates, benzodiazepines, methamphetamine, MDMA (i.e., ecstasy) and phencyclidine (i.e., PCP). The accuracy for different drug types and the various devices varied considerably. Some of the devices showed good performance characteristics for several drugs, but no device was deemed adequate for all drugs.

The accuracy of oral fluid drug screening equipment has continued to improve and available devices can reliably detect recent use of specific drugs at clinically relevant concentrations. A recent study examined the performance of oral fluid screening equipment in the detection of cannabis, cocaine, methamphetamine, amphetamine, opioids and benzodiazepines.[3] Overall, the devices performed well, with sensitivity (i.e., the extent to which the screening device detected drug presence) and specificity (i.e., the extent to which the device correctly identified the absence of a drug) values over 80%. The exceptions were benzodiazepines and amphetamine, which were not detected well.

The advantages of oral fluid as a test medium include the ease of sample collection, the absence of privacy issues, and minimal health and safety concerns. Oral fluid can be collected and tested within a few minutes at the side of the road. Perhaps more importantly, it is the active drug that is generally present in oral fluid, which provides a good indication of recent drug use.

Detecting Drugs in Oral Fluid

Drugs in the body can enter the oral fluid through a process of excretion and partitioning, and can generally be detected in oral fluid shortly after administration. The extent to which this occurs depends on the chemical properties of the drug and the oral fluid itself. For example, drugs such as cocaine and methamphetamine are transferred relatively well from blood to oral fluid, but cannabis (THC) does not transfer well.

Drugs also enter the oral fluid from residue deposited in the oral cavity as a result of recent oral consumption, including smoking. It is also possible for drugs to enter the oral fluid through passive exposure; for example, from inhaling cannabis smoke from others' use. The extent to which passive inhalation might contaminate the oral fluid would not be extensive and the contaminate would be expected to dissipate quickly.[4]

Drugs in oral fluid can be detected using common toxicological methods known as immunoassays. This process uses antibodies to bind to specific target chemicals to produce a measureable effect, such

as colour change. A common use of immunoassay technology that is familiar to many is in home pregnancy tests.

Limitations and Gaps

At present, oral fluid screening equipment used in Canada will only detect the presence of cannabis, cocaine and/or methamphetamine. This means that tests of behavioural impairment such as the Standardized Field Sobriety Test will still be required to establish grounds for further evidential drug testing when the officer suspects drug use but the oral fluid screen is negative or when oral fluid screening equipment is not available.

Although the accuracy of oral fluid screening devices has been improving, they are not perfect. Some drivers who have used drugs will test negative (i.e., false negatives) and there remains a small probability that some drug-free drivers will test positive (i.e., false positives). When a driver who has used drugs is missed by the screening procedure, it has implications for road safety; if a drug-free driver tests positive, it can result in a false accusation of drug use and an inefficient use of officer time and resources. Officers should note inconsistencies between observed signs and symptoms of drug use and the results of oral fluid drug screens to help avert such situations.

Oral fluid drug screening does not provide the concentration of the drug, but only detects the presence of particular substances in concentrations that exceed an established threshold. Whereas roadside breath tests can provide a reasonably accurate assessment of the concentration of alcohol, oral fluid drug screening equipment is unable to measure the concentration of drug in the person's body.

Oral fluid drug screening equipment also does not provide an indication of the extent of the driver's impairment. The mere presence of one of the target drugs is not evidence of impairment. Oral fluid screening is intended as a preliminary analysis, providing presumptive results only. More specific methods, such as those performed in a toxicology laboratory on blood samples, are required to confirm the results.

What Other Countries Are Doing

Oral fluid screening equipment is currently being used in several countries to identify drivers who have been using specific substances. Most notable is the state of Victoria in Australia, which has operated a high-visibility program of random drug testing using oral fluid screening for many years. Initial observations suggest that this program has resulted in considerable behaviour change because a high level of awareness among the public has increased the perceived probability of detection.[5] The detection thresholds for the three drugs of interest (cannabis, amphetamines and ecstasy) have been set relatively high to avoid false positives. The limitation of this approach is that some drivers may be impaired at very low drug concentrations that might not be detected.

Several countries in Europe have also adopted the use of oral fluid screening for drugs (e.g., France, Belgium. Spain). The United Kingdom has recently introduced roadside oral fluid screening for cannabis and cocaine. Depending on the country, a positive oral fluid screening test is followed by impairment testing or a confirmatory blood or oral fluid test or both.

In the United States, some jurisdictions allow the use of oral fluid drug screening (e.g., California, Michigan) whereas others are in the process of pilot testing and evaluating oral fluid screening for drivers. As of January 1, 2020, the U.S. Department of Health and Human Services implemented scientific and technical guidelines for the inclusion of oral fluid specimens in the guidelines for federal workplace drug testing programs. This allows the U.S. Department of Transportation to use oral fluid drug testing as part of the program of random testing of commercial operators.[6]

Current Status

Recent legislation has authorized the use of oral fluid screening equipment in Canada. The Drugs and Driving Committee of the Canadian Society of Forensic Science has established standards for oral fluid drug screening equipment that can test for THC, methamphetamine and/or cocaine.[7] These standards are designed to maximize the likelihood that at the time of testing positive on the drug screening equipment, the person has the target drug or drugs in their blood at or above any blood-drug concentration limit specified by the *Criminal Code* of Canada.

At present, the following drug screening equipment is approved for use in Canada to determine the presence of a drug in a person's body:

(1) Dräger DrugTest® 5000 when used with a Dräger DrugTest® 5000 STK-CA; and

(2) SoToxa™, an Abbot SoToxa™ Test Cartridge and an Abbot SoToxa™ Oral Fluid Collection Device when used together.

Oral fluid screening devices are used in a manner similar to that of approved ASDs. Drivers suspected of having a drug in their bodycould be required to provide an oral fluid sample that would be screened at roadside for the presence of THC, methamphetamine and/or cocaine. A positive result from the screen would lead to a demand for a blood sample or further testing by an officer trained and certified as a Drug Recognition Evaluator.

Roadside oral fluid drug screening is another tool for law enforcement to help reduce the problem of drug-impaired driving. It is not the answer to the problem but, when employed in conjunction with the Standardized Field Sobriety Test and the Drug Evaluation and Classification program, it can help to reduce the number of drug-impaired drivers.

Further information on oral fluid drug screening and its application in Canada can be found in a *Report on Drug Screening Equipment — Oral Fluid* prepared by the Drugs and Driving Committee of the Canadian Society of Forensic Science (2018)[8]

[1] Verstraete, A.G., & Raes, E. (2006). *ROSITA-2 project: Final report*. Gent, Belgium: Academia Press.

[2] Blencowe, T., Pehrsson, A., & Lillsunde, P. (Eds.). (2010). *Analytical evaluation of oral fluid screening devices and preceding selection procedures*. Helsinki, Finland: National Institute for Health and Welfare.

[3] Beirness, D.J., & Smith, D.R. (2017). An assessment of oral fluid drug screening devices. *Canadian Society of Forensic Science Journal, 50*, 2, 55–63.

[4] Cone, E.J. Bigelow, G.E., Herrmann, E.S., Mitchell, J.M., LoDico, C., Flegel, R., & Vandrey, R. (2015). Nonsmoker exposure to secondhand cannabis smoke. III. Oral fluid and blood drug concentrations and corresponding subjective effects. *Journal of Analytical Toxicology, 39*, 497–509.

[5] Boorman, M., & Owens, K. (2009). The Victorian legislative framework for the random testing of drivers at the roadside for the presence of illicit drugs: An evaluation of the characteristics of drivers detected from 2004 to 2006. *Traffic Injury Prevention*, *10*(1), 16–22.

[6] Mandatory guidelines for federal workplace drug testing programs— Oral/Fluid. (2019, Oct. 25) *Federal Register*, *84*(207), pp. 57555–57600.

[7] Drugs and Driving Committee. (2017). *Drug screening equipment — Oral fluid standards and evaluation procedures*. Ottawa: Canadian Society of Forensic Science. Retrieved from www.csfs.ca/wp-content/uploads/2017/11/Approval-Standards-for-Drug-Screening-Equipment.pdf

[8] Drugs and Driving Committee (2018). Report on Drug Screening Equipment – Oral Fluid. Ottawa: Canadian Society of Forensic Science. Retrieved from https://www.csfs.ca/wp-content/uploads/2018/10/Report-on-Drug-Screening-Equipment-%E2%80%93-Oral-Fluid.pdf

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Canadian Centre on Substance Use and Addiction

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