Oral Fluid Drug Screening

Key Considerations

- Screening for drugs in samples of oral fluid collected at roadside provides a viable means of enhancing the detection of drug use by drivers.
- Oral fluid screening devices are currently only valid for the detection of a limited number of substances and will not eliminate the need for behavioural testing for impairment and the Drug Evaluation and Classification program.
- The introduction of oral fluid screening at roadside will require new legislation, policies and procedures, and training.

The Issue

In July 2008, revisions to the Criminal Code of Canada were implemented that provided police with the tools and powers to enhance the enforcement of laws against drug-impaired driving. Police were given the authority to demand a suspected drug-impaired driver submit to a Standardized Field Sobriety Test (SFST) and a drug influence evaluation by a Drug Recognition Evaluator (DRE), and to provide a sample of blood, urine or oral fluid to test for the presence of impairing substances.

Although these changes were widely regarded as an improvement to the system and would enhance the likelihood of drug-impaired drivers being detected and arrested, several challenges remained. For example, the number of officers trained and certified as DREs in Canada is well below the estimated 1,800 to 2,000 required to meet demand.\(^1\) Other issues have been raised, including concern about the expense of training DREs, the length of time required to conduct a drug influence evaluation, and the apparent hesitancy of the courts to accept evidence of drug influence collected by a DRE.

Anticipated changes to the legal status of non-medical cannabis use have prompted calls for a means to screen drivers for cannabis use at roadside in a manner comparable to a roadside breath test for alcohol. At this point, the most viable technology involves the collection of a small sample of oral fluid that is tested for the presence of specific drugs.

Background

The search for a rapid drug-screening device has been ongoing for many years. Ideally, drug tests should be based on a sample of blood that is 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. The collection and analysis of blood samples is intrusive and time-consuming, and not appropriate for roadside applications.
Urine can also be used as a medium for conducting screening tests for drugs. Although urine tests have been shown to have a high degree of accuracy, there are privacy issues associated with the collection of urine samples; roadside collection would require that special facilities be available. 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 driver was affected by drugs at the time of driving.

The next generation of on-site drug screening devices were developed to detect the presence of drugs in oral fluid, often referred to as saliva. Oral fluid is actually a mixture of saliva and other materials found in the mouth, such as food and beverage residue, bacteria, epithelial cells and fluid passively transferred from the oral mucosa into the oral cavity (oral mucosal transudate). 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 advantages of oral fluid as a testing medium include the ease of sample collection, the absence of privacy issues, and minimal health and safety concerns. Oral fluid can be collected and screened for drugs quickly and easily at the side of the road with minimal training. In addition, whereas urine drug screens typically detect the presence of drug metabolites, oral fluid drug screening equipment generally detects the presence of the active drug.

Drugs in the body can enter the oral fluid through a process of excretion and partitioning. The extent to which this occurs depends on the chemical properties of the drug and the oral fluid itself. Hence, the rate and extent of transfer of different drugs into oral fluid varies. For example, drugs such as cocaine and methamphetamine are transferred relatively well from blood to oral fluid, but cannabis (i.e., THC) is not easily passed into oral fluid.

Drugs also enter the oral fluid from residue deposited in the oral cavity as a result of recent oral consumption. It is also possible for drugs to enter the oral fluid through passive exposure— for example, from inhaling cannabis smoke from others’ use. THC can be detected in oral fluid following relatively high passive exposure, but the concentrations are generally low and dissipate quickly.

Drugs can generally be detected in oral fluid shortly after consumption. However, there is no necessarily direct relationship between drug concentrations in oral fluid and blood. Many factors specific to the drugs themselves and the individual can affect the transfer of drugs to oral fluid. The period of time in which drugs can be detected in oral fluid is also dependent on a number of factors, including the drug, dose, route of administration, the cutoff (detection) threshold of the oral fluid screening equipment and the individual’s drug use history. For example, individuals who use heavy amounts of methamphetamine on a chronic basis could test positive for several days after use. Similarly, individuals who use cannabis chronically could test positive the 12–18 hours following use.
Drugs in oral fluid can be detected using common toxicological methods known as immunoassays. This process uses antibodies to bind to specific target chemicals and produce a colour change. A familiar consumer product that uses immunoassay technology is a home-based pregnancy test. The success of an immunoassay lies in the ability of the antibody to bind to the target compound and not to other compounds.

Over the past several years, immunoassays have been developed to recognize chemical configurations to identify various drugs. This method has been adapted to produce portable, easy-to-use devices to screen for drug use wherever an individual happens to be — for example, in a workplace, at a police station, or at the side of a road. The accuracy of these devices has improved and available devices can reliably detect recent use of certain drugs at clinically relevant concentrations.

**What the Evidence Says**

The first major study of oral fluid drug screening devices was conducted in Europe and the United States, and concluded that none of the devices 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.4

The most recent large-scale evaluation of oral fluid screening devices was conducted as part of the DRUID (Driving Under the Influence of Drugs, Alcohol and Medicines) project in Europe.5,6 Eight on-site devices were evaluated for their ability to accurately detect amphetamines, cannabis, cocaine, opiates, benzodiazepines (e.g., anxiety medication), methamphetamine, MDMA and phencyclidine (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.

**Limitations and Gaps**

Not all drugs are detected accurately in oral fluid. For example, benzodiazepines do not transfer well into oral fluid and so are difficult to detect. Other substances, such as new psychoactive substances, require the development of specific immunoassays. Still other substances are so infrequently encountered (e.g., PCP, LSD) that the inclusion of an immunoassay on an oral fluid screen would not be reasonable. The limited number of substances screened for means that tests of behavioural impairment (i.e., SFST) will still be required to establish grounds for further evidential drug testing when the officer suspects drug use, but the oral fluid screening test is negative.

Although the accuracy of oral fluid screening devices has been improving, they are not perfect. Some drivers who have used drugs will test negative and there remains a small probability that some drug-free drivers will test positive. 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. Keeping error rates to a minimum is a priority in the development of drug screening equipment.

Oral fluid drug screening does not provide the concentration of the drug, but only detects the presence of particular substances. Whereas breath tests for alcohol can provide a relatively accurate assessment of the concentration of alcohol, oral fluid drug screening equipment does not.

Oral fluid drug screening is significantly more expensive than breath testing for alcohol. Once specific devices have been approved for use, police services will need to become familiar with new policies and procedures for use, acquire testing equipment and supplies, and train officers in their use. Each stage in this process will require significant investments of time and money.
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. However, the detection thresholds for the three drugs of interest (cannabis, amphetamines and ecstasy) have been set relatively high to avoid false positives. The liability of this approach is that some drivers who have used these substances might not be detected.

Several countries in Europe have also adopted the use of oral fluid screening for drugs (e.g., France, Belgium and 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.

Current Status

At present, oral fluid screening devices have not been approved for use in Canada. However, Bill C-46 provides for the use of oral fluid drug screening to test for the presence of THC, cocaine and methamphetamine. In preparation for the enactment of this legislation, the Drugs and Driving Committee of the Canadian Society of Forensic Science has prepared a set of standards that oral fluid screening equipment would have to meet to be approved for use in Canada. This process parallels that used for the approval of alcohol test devices in Canada.

Options for Improvement

Currently, if a police officer suspects a driver has used drugs, he or she can demand that the driver submit to an SFST. Poor SFST performance can lead to a subsequent evaluation by a DRE. In some provinces, it can result in an immediate short-term license suspension. (See the CCSA Policy Brief, Short-term Administrative Sanctions for Alcohol and Drug Use by Drivers.)

It is anticipated that oral fluid screening equipment would likely be used in a manner similar to that of alcohol screening devices. Whereas suspicion of alcohol use leads to a request for a breath sample using an approved alcohol screening device, suspicion of drug use would lead to a request for an oral fluid sample that would be analyzed at roadside. A positive result from the screening device could lead to further testing at the police station or immediate short-term administrative licence suspension. This protocol would reduce the need for officers to conduct field sobriety tests at roadside and provide an objective indication of drug use that would be grounds for further investigation.