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More Reliable On-Site Detection of Cannabis in Oral Fluid

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Guest:
Dr. Alain Verstraete is Head of the Toxicology Laboratory of the Department of Laboratory Medicine at Ghent University Hospital in Belgium.

Bob Barrett: This is the podcast from *Clinical Chemistry*. I am Bob Barrett.

Law enforcement throughout the world use small handheld devices to assess driver impairment due to alcohol, but driver impairment can be the result of drugs other than ethanol.

In the October 2012 issue of *Clinical Chemistry*, Marilyn Huestis and her team at NIH evaluated an on-site test device for cannabinoids in oral fluid. The article was accompanied by an editorial by Dr. Alain Verstraete, Head of the Toxicology Laboratory of the Department of Laboratory Medicine at Ghent University Hospital in Belgium. He is our guest in this podcast.

Dr. Verstraete, Huestis and her colleagues evaluated a piece of equipment called the Dräger DrugTest 5000. Tell us something about this device.

Dr. Alain Verstraete: Well, the Dräger DrugTest 5000 is a kind of small machine, a little bit the size of a coffee maker that can analyze and reach more disposable devices that will test for drugs in oral fluid or saliva.

So a sample is taken from the mouth of the subject and then, like I said, it's put into the machine and the machine will do a few manipulations and read the results in about ten minutes.

Bob Barrett: What types of analyses can this device be used for?

Dr. Alain Verstraete: This device analyzes for drugs in oral fluid, the classical drugs, like amphetamine, cannabis, cocaine, opiates, and also benzodiazepines.

Bob Barrett: Are there other on-site oral fluid tests available on the market now?

Dr. Alain Verstraete: Yes, there are about 10-15 different on-site oral fluid tests that are available. We have evaluated them as part of a large European research study that was called DRUID, which is the acronym for Driving Under the Influence of Drugs, Alcohol, and Medicines.

And they were first evaluated by the police at the roadside in four different countries, and then based on the operational characteristics - how long it took, how much sample they needed, etcetera - they made a selection of promising devices and less-promising devices.

And in the second analysis, we evaluated about seven of these more promising devices, more analytically, where we compared the screening result with the confirmation result performed in the lab.

And also in that study, we have seen that the Dräger DrugTest 5000 was the most promising device that was the most sensitive and the most specific. There were two other devices that also gave similar results, but were a little bit less good, and these were the Securetec DrugWipe and the Mavand Rapid STAT.

Bob Barrett: How widespread has this become? In which countries do police use on-site drug testing devices to detect drivers who are under the influence of drugs?

Dr. Alain Verstraete: Well, it's becoming more and more popular. The police forces in many countries would like to use these devices. Currently they are used in all the Australian states. They are used in Belgium and in France. And I have recently heard that also in Spain, the police will start using on-site drug testing devices.

This is on a national basis where there is a legislation, but I know that also in many other countries, like Finland and Germany, some local police forces started using them.

In some other countries, like the United Kingdom and Switzerland, the use of testing in oral fluid is already in the legislation, but they are still trying to select the best device to use at the roadside.

Bob Barrett: Well, let's talk about timing. Your editorial raises the issue of cutoffs. How long after smoking marijuana can cannabinoids be detected in oral fluids and can they be detected in concentrations where there is no impairment or from passive contamination?

Dr. Alain Verstraete: Well, based on the results of Marilyn Huestis and her colleagues, with the Dräger drug test, smoking of cannabis can be detected at least for 4 hours in all the subjects; in some subjects for 6 hours; and in some, 3 out of 10 subjects, for 22 hours. But they had only a few measuring points and not all subjects were measured at 22 hours, so maybe this is an underestimation.

Generally, it is accepted that after smoking a joint, one is impaired for a few hours, although in some studies, some deficits have been measured 24 hours after taking the drug. So with the device that detects tetrahydrocannabinol or THC at the concentration of 5 nanograms per milliliter, it's at least 4 hours, and I think there is quite a good correlation with impairment.

The issue of passive contamination is a tricky one, because some studies have shown that if you are in a room while a lot of cannabis is smoked but you don't smoke, you will have some THC in your oral fluid and sometimes above the cutoff of the device, so this is a possibility.

But at this time, in most countries, the police does the first screening in oral fluid when they do it and then there will be a confirmation in blood. And there have been no indications that the THC can be detected in the blood at the cutoffs that are currently used after passive smoking of marijuana.

Bob Barrett: Well, finally, let's look ahead. How do you think the Dräger DrugTest 5000 could be further improved?

Dr. Alain Verstraete: I think two aspects could be improved. The first one is that the time for the analysis is about ten minutes, which is quite a long time at the roadside, and the police has to keep someone busy so that he doesn't think he is losing too much time. So police would like to have devices that give results at a shorter time, like five minutes, or ideally even two minutes, so there's certainly room for improvement there.

And then the second thing is that at this time, the device can only analyze one sample, so during that time the police cannot start another test. So they can do about six subjects an hour. So if there could be a device where you can add a few different samples and that can be read one after the other, that might also be a nice improvement.

Bob Barrett: Dr. Alain Verstraete is Head of the Toxicology Laboratory of the Department of Laboratory Medicine at Ghent University Hospital in Belgium. He has been our guest in this podcast from *Clinical Chemistry*.

I am Bob Barrett. Thanks for listening!