Roadside drug testing in oral fluid – the Saarland experience

THOMAS KRAEMER[1], KATRIN ETTMUELLER[1], EVA PRINZ[1], HANS-JUERGEN MAURER[2] and JOCHEN WILSKE[1]

1 Institute of Legal Medicine, Saarland University, Homburg, Germany;

2 Saarland State Police Department, Saarbruecken, Germany

AIMS: Roadside drug testing in oral fluid is claimed to be a very suitable tool for identification of drivers under the influence of drugs. In the German federal state of Saarland, the police tested four different oral fluid test devices for their suitability for routine police use. Oral fluid samples and –if available- blood samples should be analyzed using GC-MS for assessing the performance of the test devices.

METHODS: The following oral fluid test devices were used: DrugTest (Draeger Safety, Germany), Oralstat (American Bio Medica Corporation, provided by Mavand, Germany), Oralab (Varian Inc., provided by Draeger Safety, Germany) and finally Biosens (Biosensor, Sweden). For confirmation, a routinely used GC-MS procedure including mixed-mode solid-phase-extraction (HCX, Separtis, Germany) and silylation was used. Blood samples could only be taken in cases of obvious impairment of the driving ability (criminal offence) or within the bounds of the German zero-tolerance street traffic law (administrative offence).

RESULTS: All in all, 485 individuals were tested by one of the test devices each. None of the oral fluid test devices showed satisfying results for all analytes. Often technical problems with the devices lead to invalid tests: DrugTest 47 out of 189 (25%), Oralstat 16 out of 122 (13%), Oralab 29 out of 66 (44%) and Biosens 3 out of 17 (18%). Comparing data of the test devices and the GC-MS results in oral fluid, the sensitivities for opiates were 50% (Oralstat) or below, for cocaine up to 93% (DrugTest), for amphetamine they ranged from 70% (Oralstat) to 90% (Oralab), and for THC from 27% (Oralab) to 55% (Oralstat). For methamphetamine/designer drugs, the sensitivities were 100% for DrugTest, Oralab and Oralstat. Because of the limited numbers of tests, the corresponding data were not calculated for the Biosens device. The very short analysis time of the Biosens device of less than one minute was judged favourably by all users. Comparing GC-MS data of oral fluid and serum for opiates, amphetamine, methamphetamine/designer drugs, cocaine and THC, the sensitivities were 88%, 100%, 83%, 88% and 86%, respectively.

CONCLUSION: None of the oral fluid test devices worked sufficiently reliable for all analytes. Therefore, improvement of the test devices is necessary, which has already been anounced by the corresponding manufacturers.

KEYWORDS: *Oral fluid, Roadside drug testing*

Corresponding author: thomas.kraemer@uniklinikum-saarland.de