



K24 Consequences of Introducing a Zero-Concentration Limit for Scheduled Drugs in Blood of Drivers: The Swedish Experience

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The goal of this presentation is to give an overview of driving under the influence of drugs in Sweden before and after a zero-concentration limit was introduced for scheduled drugs in blood of drivers.

This presentation will impact the forensic community and/or humanity by bringing to the attention of the forensic community how a simple change in legislation impacts on traffic law enforcement and the crime of driving under the influence of drugs (DUID).

This presentation gives an overview of driving under the influence of drugs (DUID) in Sweden before and after a zero-concentration limit was introduced for controlled substances in the blood of drivers. The zero-concentration limits apply to illicit as well as prescription drugs if the latter are included on the list of controlled substances. However, medicinal drugs are exempt from the zero-limit law if they were being used in accordance with a physician's prescription. This raises the tricky question of interpreting a measured blood-concentration of a sedative-hypnotic or painkiller and concluding that the person was over-dosing or abusing the substance. This requires careful scrutiny of controlled studies relating C_{max} to the dose and other factors that influence C_{max} e.g., gender, age, adiposity, and disease state. Another confounding factor arises when a drug concentration measured in whole blood, the specimen submitted for forensic toxicology, is compared with concentrations in serum or plasma derived from therapeutic drug monitoring programs. The plasma/whole blood distribution ratios for many drugs of abuse are not well documented.

In connection with the zero-concentration law for controlled substances, the police were allowed to examine the driver's eyes to gather evidence of being under the influence of a psychoactive substance. A small flashlight and pupillometer device were available to measure pupil size and reaction to light and to document any gaze nystagmus that might have existed. In addition, the suspect's behaviour and ability to walk, talk and answer questions were also recorded. Depending on the outcome of these roadside tests, a decision is made to proceed with sampling blood and urine for forensic toxicology.

When urine was submitted for analysis, this specimen was screened for various drug-classes by immunoassay methods (EMIT and CEDIA) and all positive findings were verified by quantitative analysis of blood specimens with GC-MS and GC-NPD detection. The concentration of carboxyTHC and 6-acetyl morphine in urine was determined by LC-MS and GCMS respectively. Finding a banned substance in blood above the LOQ of the method is sufficient to initiate a prosecution for DUID under the new zero-limit law. The LOQ is different for different substances and might change depending on future developments in the analytical methodology.

The typical DUID suspect in Sweden is a poly-drug user who might combine a stimulant like amphetamine or methamphetamine with a depressant like alcohol or diazepam. Because the punishment for DUID is the same regardless of the number of banned substances identified in blood, this has prompted researchers to re-evaluate analytical routines and in the future plan to verify only a single illicit substance. Since the new law was introduced (July 1999) the number of blood samples submitted by the police for toxicological analysis has increased more than 8-fold. About 90% of specimens contain one or more banned substance. The spectrum of drugs found in blood of drivers has not changed since the new law came into force. Illicit drugs like amphetamine (~50%) and tetrahydrocannabinol (~25%) dominate, followed by diazepam and its metabolite nordiazepam (~15%), then morphine and codeine (~10%), the metabolites of heroin, and flunitrazepam.

Different countries have their own traditions for dealing with the problem of drug-impaired driving and in European countries the trend is towards zero-concentration limits for illicit drugs. Hitherto, prosecution for DUID required evidence that drugs impaired the person and each suspect was examined by a physician or a drug-recognition expert (mainly in USA). The unequivocal finding of a psychoactive substance in the person's blood and the concentration present provided additional evidence for the prosecution case. Finding an illicit drug in urine was not sufficient to bring a charge of DUID. Because of the development of tolerance and also the short half-life of some drugs, the toxicological results often conflicted with the signs and symptoms reported by the police or the physician. Many prosecutions for DUID were unsuccessful and the police authorities became unwilling to proceed with arresting and charging a person for DUID in borderline cases.

The zero-concentration limit has done nothing to deter people from driving under the influence of drugs. Alcohol and drug abuse are facts of life in modern society and people found guilty of DUID are mostly criminal elements who lack a valid driving permit and have committed other offences. Recidivism is a major problem in DUID suspects in Sweden with over 50% of individuals re-offending within 4 years of their first



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conviction. How to deal with these traffic delinquents is a major dilemma for the criminal justice system. The zero-limits for controlled scheduled drugs have stimulated police efforts to apprehend offenders and many more successful convictions have been obtained. This has also meant an appreciable increase in the workload for forensic toxicology.

Drugs, Driving, DUID