

# Drugs and Driving on Strathclyde Roads – An Update

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## 1. Introduction

The misuse of drugs, both licit and illicit, is an increasing problem in Scotland and one that is reflected in the drugs and driving scene. A recent study highlighted an increased number of samples being analyzed for the presence of drugs from drivers suspected of impairment in the West of Scotland (1). Trends in drugs detected paralleled those that were responsible for drug related deaths in the same region at that time. Most notably there was an increase in morphine, diazepam and Dihydrocodeine positive cases as well as an increase in Temazepam positives in the latter year of the study following a decline in the incidence of that drug due to a legislation change in 1996. This paper presents the analysis of the toxicological investigation of biological samples taken from drivers charged under Section 4 of the Road Traffic Act 1988 for the year 1999.

## 2. Material and Methods

In Scotland, a driver suspected of impairment is taken to the police station where a police surgeon is summoned to examine the driver to ascertain the extent (if any) of impairment. If impairment is suspected through drugs or alcohol, two 10 millilitre blood samples are obtained. One of these is given to the driver for independent analysis and the other one is given to the police. It is an offence to refuse the assessment and/or refuse or fail to provide a sample of either blood or urine. The police send the sample to the Department of Forensic Medicine and Science, University of Glasgow for analysis. All samples were routinely analysed for the presence of alcohol and drugs. Benzodiazepines, opiates, LSD, cannabinoids, amphetamines, Buprenorphine and methadone were analysed using enzyme-immunoassay. Blood was screened for acidic, basic and neutral drugs using gas liquid chromatography and high-performance liquid chromatography. All positive samples were confirmed and quantified by gas chromatography mass spectrometry. Drug levels were measured using stable isotope reference materials where available or by internal standard procedures.

## 3. Results

For the year 1999, a total of 312 biological samples were received from Police forces throughout Scotland. The majority of these (69%, n = 214) were submitted by Strathclyde police force and were primarily blood samples (85%, n = 181). It should be noted that at the time of writing, toxicological investigation was incomplete in 31 cases

(25 blood, 6 urine). Therefore, the results relate to the 183 completed cases. Of the 156 blood samples, drugs were detected in 126 cases (81%), four of which also tested positive for alcohol. Alcohol alone was detected in 10 cases and the remaining 20 cases tested negative for both drugs and alcohol. Drugs were found to be present in 89% (n = 24) of the 27 urine samples and alcohol alone was detected in the remaining three cases (Table 1).

### **3.1 Drug Involvement**

Polydrug use was detected in 69% (n = 87) of all drug positive blood cases (excluding alcohol). All drugs detected are summarised in Table 2. Benzodiazepines were the most frequently encountered medicinal drug with diazepam and Temazepam being detected in 82% and 58% of drug positives respectively. Morphine was the most frequently detected illegal drug followed by cannabis. The concurrent use of morphine with Temazepam or diazepam was detected in one and five cases respectively and in combination with both these Benzodiazepines either alone or in combination with other drugs in 20 cases. Morphine, diazepam and cannabis were detected in one case and morphine together with Temazepam and methadone were found to be present in another case. The co-ingestion of diazepam and Temazepam accounted for 32 cases. The remaining 27 combinations of drugs detected are summarised in Table 3, all of which involve diazepam and/or Temazepam. Thirty-nine cases involved the detection of one drug only and this was primarily a benzodiazepine. Diazepam was detected in 23 cases and Temazepam in six cases. Morphine and cannabis were found to be present in four cases each and finally cocaine and gammhydroxybutyric acid (GHB) accounted for one case each.

A high percentage of urine samples tested positive for drugs (89%). Although the level of impairment of these individuals cannot be evaluated, the presence of drugs in urine is indicative of drug use. The number of drugs in the urine samples in this study sample is rather alarming. As can be seen from Table 4, polydrug use was evident with morphine and Temazepam each being present in 71% of drug positive samples.

### **3.2 Alcohol Involvement**

Alcohol alone was detected in 10 cases. The blood alcohol concentration (BAC) measured ranged from 79 to 293 milligrammes per 100 millilitres (mg/100ml). The average value was 153mg/100ml, almost double the legal driving limit. In 80% of cases, the individual was over the legal driving limit of 80mg/100ml and could have been charged under Section 5 of the Road Traffic Act 1988, a prescribed limit offence that does not require certification of impairment. In the four cases where alcohol was detected along with drugs, the average BAC was 33mg/100ml, range 21 – 48mg/100ml. Diazepam and Temazepam were also present in three of these cases and the fourth case involved diazepam alone.

### **3.2 Time Sample was Obtained**

In accordance with the previous study in the region (1), the majority of samples were

obtained between 2100 hours and 0600 hours (56%, n = 103). A further breakdown shows that 65% (n = 67) of these samples were taken between midnight and the early hours, a time when people are likely to be in transit to or from an entertainment establishment, such as a public bar or nightclub.

## **Discussion and Conclusion**

The number of samples submitted to the department of Forensic Medicine and Science from suspected impaired drivers has increased over the years with the highest number received occurring in 1999. Findings were similar to previous years in that polydrug use was prevalent particularly the concurrent use of morphine with Benzodiazepines (88% of all blood morphine positive cases). This combination of drugs has been reported to be the major factor conducive to drug related deaths in the region (4) in the early nineties and remains the favored cocktail of abuse today. Benzodiazepines remained the most common legal drug detected in impaired drivers. From the levels measured, however, it is more than likely that its use was illicit in the majority of cases. Morphine was the most frequently encountered illegal drug followed by cannabis, which is in contrast to previous years where the latter drug was the most common. Overall, the findings are similar to that of other countries who seem to experience the same trends as Scotland (5). The average drug concentrations all fell within the therapeutic range level except for Dihydrocodeine that was slightly higher. This opiate has emerged as a drug of misuse in the West of Scotland and was involved in a significant number of drugs related deaths in 1999. From the range of drug levels it can be seen that there were a few which were consistent with levels reported in fatalities. For future research it would be useful if a synopsis of the individuals age and drug use history be documented at the time of sample procurement. This would separate those abusing drugs and those who are legitimately taking them, particularly when Benzodiazepines are involved. The commencement of a training programme for police officers in the West of Scotland has heightened their awareness with regards drug taking and its effects on driving ability. The implementation of a rapid roadside drug-testing programme will prove to be a useful tool for the police and hopefully discourage individuals from getting behind the wheel following the recent use of drugs.

## **References**

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**Table 1 :** Breakdown of Toxicological Investigation of Biological Samples Received by the Department of Forensic Medicine and Science.

	<b>Blood</b>	<b>Urine</b>
<b>Drugs Only</b>	122	24
<b>Alcohol Only</b>	10	3
<b>Drugs and Alcohol</b>	4	0
<b>All Negative</b>	20	0
<b>Total</b>	<b>156</b>	<b>27</b>

**Table 2:** Drugs detected in Blood Samples.

<b>Drug Detected</b>	<b>No. of cases</b>	<b>Level Measured (mg/l) Ave (low-high)</b>	<b>Therapeutic Level (mg/l) (Stead and Moffat, (2))</b>
<b>THC<sup>a</sup></b>	6	3.5 (1.65 – 7.0) <sup>c</sup>	
<b>THC-COOH<sup>b</sup></b>	22	61.1 (10 – 190) <sup>c</sup>	
<b>Amphetamine</b>	1	0.05	0.05 – 2.0
<b>Chlordiazepoxide</b>	3	0.48 (0.05 – 1.16)	1.0 – 8.0
<b>Desmethyldiazepam</b>	102	1.0 (0.02 – 8.53)	
<b>Diazepam</b>	104	0.92 (0.04 – 3.37)	0.05 – 2.0
<b>Temazepam</b>	73	0.79 (0.05 – 4.02)	0.36 – 0.85
<b>Morphine</b>	32	0.05 (0.01 – 1.0)	0.04 – 0.5
<b>Methadone</b>	8	0.13 (0.024 – 0.26)	0.05 – 1.0
<b>Dihydrocodeine</b>	3	0.3 (0.18 – 0.52)	0.03 – 0.25 <sup>d</sup>
<b>Other<sup>e</sup></b>	19		
<b>Positive Drug Samples</b>	<b>126</b>		
<b>Total Drugs Detected</b>	<b>373</b>		

<sup>a</sup> Delta-9-tetrahydrocannabinol

<sup>b</sup> 11-nor-delta-9-tetrahydrocannabinol-9-carboxylic acid

<sup>c</sup> nanogrammes per milliliter

<sup>d</sup> Repetto and Repetto, 1997 (3)

<sup>e</sup> Other drugs included: Benzoylcegonine (5), Methylecgonine (5), cocaine (4), Gammahydroxybutyric acid (1), Phenytoin (1), Methylenedioxymethylamphetamine (3).

**Table 4:** Drugs Detected in Urine Samples.

<b>Drug Detected</b>	<b>No. of cases</b>
<b>THC<sup>a</sup></b>	0
<b>THC-COOH<sup>b</sup></b>	13
<b>Amphetamine</b>	6
<b>Chlordiazepoxide</b>	1
<b>Desmethyldiazepam</b>	16
<b>Diazepam</b>	10
<b>Temazepam</b>	17
<b>Morphine</b>	17
<b>Methadone</b>	10
<b>Dihydrocodeine</b>	7
<b>Other<sup>c</sup></b>	20
<b>Positive Drug Samples</b>	<b>24</b>
<b>Total Drugs Detected</b>	<b>117</b>

<sup>a</sup> Delta-9-tetrahydrocannabinol

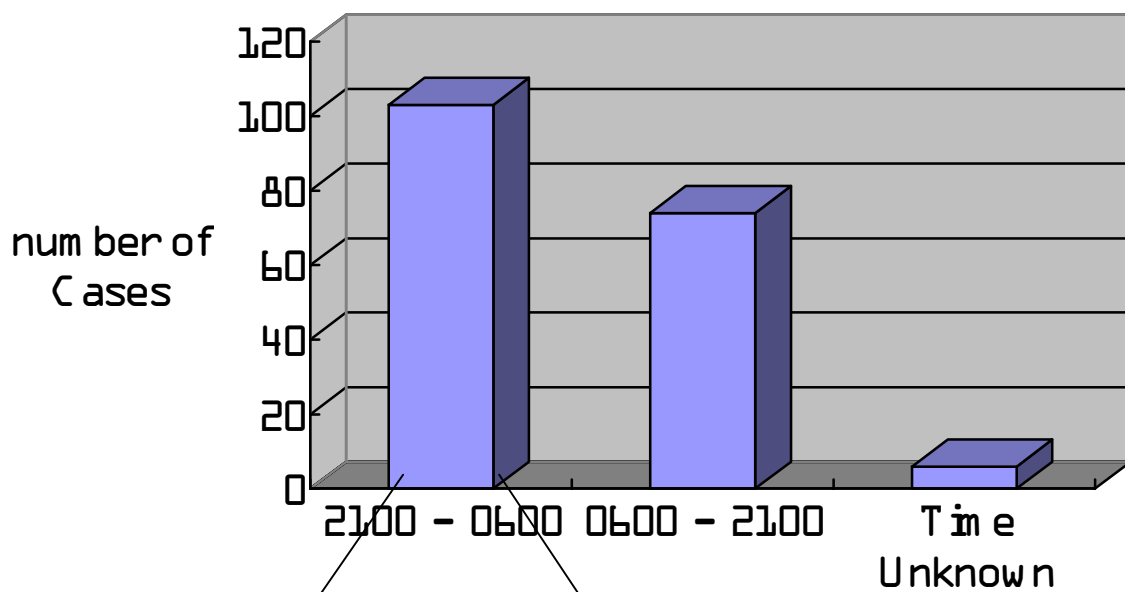
<sup>b</sup> 11-nor-delta-9-tetrahydrocannabinol-9-carboxylic acid

<sup>c</sup> Other drugs included: Benzoylcegonine (6), Methylecgonine (6), Cocaine (4), Paracetamol (1), Citalopram (1), Methylenedioxymethylamphetamine (1), Trimethoprim (1).

**Table 3:** Drug Combinations of 27 drug positive cases Comprising of Benzodiazepines and other drugs.

<b>Drug Combinations (Number of Cases)</b>		
<i><b>Diazepam Plus</b></i>	<i><b>Temazepam Plus</b></i>	<i><b>Diazepam + Temazepam Plus</b></i>
Cannabis (7)	Phenytoin (1)	Cannabis (5)
Methadone (2)	Cannabis (1)	Methadone (3)
Cocaine (1)		Chlordiazepoxide (1)
Chlordiazepoxide (1)		Cannabis + Cocaine (1)
MDMA (1)		Chlordiazepoxide + Methadone (1)
Cannabis + MDMA (1)		
Amphetamine +MDMA (1)		
<b>Total = 14</b>	<b>Total = 2</b>	<b>Total = 11</b>

**Figure 1:** Time when Sample was Obtained.



Time Sample was taken

