SCREENING FOR DRUG USE AMONG DRIVERS SUSPECTED OF DRUNKEN OR DRUGGED DRIVING.

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Summary. 270 blood samples selected at random from Norwegian drivers apprehended on the suspicion of drunken or drugged driving were screened for the presence of amphetamine, benzodiazepines, cannabinoids, tetrahydrocannabinol (THC) and cocaine. In 223 cases, the primary suspicion was drunken driving only (A-cases), in 47 cases drugged driving was also suspected (D-cases). Benzodiazepines were found in 17% and 53%, cannabinoids in 26% and 43%, THC in 13% and 43%, amphetamine in 2% and 13% of the A- and D-samples, respectively. Cocaine was not detected in any sample. One or more drugs were found in 38% of the A-samples and 77% of the D-samples. For about 15 - 20% of the A-cases with BAC below 0.05%, drugs were detected at concentrations which may cause driving impairment.

INTRODUCTION.

Each year about 12000 Norwegian drivers are apprehended suspected of driving under influence of alcohol (A-cases). In addition approximately 2500 drivers are suspected of driving under influence of other drugs alone or in combination with alcohol (D-cases). Blood samples from all drivers are sent to the National Institute of Forensic Toxicology (NIFT) for determination of drug concentrations. Samples from the former group (A-samples) are analysed for ethanol only. Accordingly, little has so far been known about use of other drugs in this group. Blood samples from the second group (D-samples) are first analysed for ethanol, and then screened for drugs when the alcohol concentration is below the legal limit 0.05% (w/w). Thus in this group too, no systematic screening for drugs has been performed. By this approach without systematic screening, NIFT detected tetrahydrocannabinol (THC) in 270 D-samples in 1986. Corresponding figures for the detection of either diazepam, flunitrazepam, amphetamine or other drugs, were between 150 and 200 for each of these four subgroups of the D-cases (1).

Many drugged drivers who may represent traffic hazard are probably not discovered. The main reason is a lack of apprehension. A second reason is that drugs may not be suspected by the police, and a third cause is that due to limited laboratory capacity, D-samples with alcohol concentration above the legal limit are usually not analysed for other drugs.

The present study was performed to gain more information about the extent of drug use among Norwegian drivers suspected of drunken or drugged driving (both A- and D-cases). A representative randomly selected population of the samples sent to NIFT was, regardless of primary suspicion, screened for the presence of
ethanol, benzodiazepines, cannabinoids, amphetamine and cocaine.

MATERIALS AND METHODS.
Randomly selected blood samples (N=270) and corresponding documents submitted to NIFT were studied. 223 (83%) of the samples were from A-cases and 47 samples were from D-cases. 70 samples were selected during the period from November 1986 to February 1987. These samples were analysed for benzodiazepines, cannabinoids and ethanol. The next 200 samples were chosen among those submitted during the period from July 1987 to February 1988, and were analysed for amphetamine and cocaine in addition to benzodiazepines, cannabinoids and ethanol. All samples which were positive on radioimmunoassay (RIA) screening for cannabinoids, were also analysed for THC by a specific method.

Analytical procedures.
Gas chromatography and radioimmunoassay (RIA) were used for drug screening as described earlier (2). Gas chromatography/mass spectrometry was used for the quantification of THC (3).

RESULTS AND DISCUSSION.
The frequency of drug detection in samples from A-cases and D-cases are presented in Table 1.

Amphetamine was detected in 2% of the A-cases and in 13% of the D-cases. Cocaine was not detected in any sample from Norwegian drivers at the time of this investigation. Benzodiazepines were found in 17% of the A-cases and in 53% of the D-cases. Diazepam was the drug most frequently encountered (51 out of 62 positives in all samples screened). Several cases were also positive for more than one benzodiazepine, most frequently in D-cases (11 out of 25 positive).

Cannabis was the most commonly used drug which was detected in 26% and 43% of A-cases and D-cases, respectively. Particularly surprising was the high incidence of cannabinoid positives among A-samples.

The frequency of THC positive A-cases in our material showed that 13% of drivers suspected of alcohol influence only, had the psychoactive compound THC present in their blood during driving, indicating very recent cannabis smoking (4). The corresponding percentage was 43 in D-cases, demonstrating that all subjects with positive cannabis RIA screening were recent smokers.

As outlined in Table 1, 38% of all the A-cases were found to be positive for either one or more drugs besides ethanol. The corresponding value for D-cases was 77%, indicating that drugs are more often found in these cases. It is worth noticing that opiates, antihistamines and other drugs which may also cause driving impairment, have not been included in this study. Accordingly, the proportion of drug positive samples might have been even higher. Even in the absence of such results, it is obvious that apprehended drunken drivers (A-cases) constitute a group with unusually frequent drug use besides ethanol.

Combination of drugs and alcohol.
BAC above the legal limit 0.05% were found in a large number of the drug positive samples (Table 1). BAC above 0.05% was found in 80% of the drug positive A-cases indicating that combined use of drugs and alcohol is common
for this group. BAC above 0.05% were less frequent (28%) in the drug positive D-cases (Table 1).

Frequency of drug detection in different age groups and geographical areas.

The most frequent findings of benzodiazepines were among drivers above 25 years compared to drivers below 25 years (p < 0.001). Cannabinoids and THC were more often found among drivers below 35 years compared to the drivers from the older age group (p < 0.05).

No significant variation in drug use among apprehended drivers from different geographical areas in Norway was observed in this study.

Cases where drugs caused driving impairment.

All drug positive cases were evaluated with regard to possible driving impairment based on drug concentrations according to principles earlier described (5).

Drugs at blood concentrations which might lead to driving impairment according to these criteria, were found in 17% (n=7) of the A-cases with BAC below 0.05% . The respective value for D-cases with BAC below 0.05% was 79% (n=22) (Table 2). Of all A-cases, 31 subjects (14%) might have been influenced by one or more drugs. For all D-cases, the number of subjects influenced by drugs only, was 32 (68%) (Table 2). The real frequencies of possible drug impairment might have been even higher due to other drugs not analysed in this study. The study revealed a marked difference in frequencies of detection and possible impairment by drugs other than alcohol between A- and D-cases. Due to the much higher number of A-cases in the routine samples, the findings in A-cases are still of considerable interest. Thus in 1987, NIFT received about 12000 blood samples from suspected drunken drivers (A-cases) in which only alcohol analysis was requested and performed. Extrapolating from our present results suggest that approximately 1700 cases of possible additional drug impairment were lost due to limitation of analyses. Particulary important are the cases with BAC below 0.05% . They constituted approximately 15% of the 12000 samples (n=1800). Extrapolating from our present results would give about 300 cases in 1987 with a conclusion of probable impaired driving which have been missed. In addition to this figures comes an unknown number of drug positive alcohol negative subjects from whom blood has not been collected due to a negative roadside breathtest.

CONCLUSIONS.

Our results showed high incidences of drug detection in Norwegian drivers suspected of drunken or drugged driving.

Analysis of alcohol only might therefore often be insufficient to reveal the degree of driving impairment. This should be borne in mind also when performing alcohol breath testing. The results from this study strongly indicate that all blood samples with a BAC below the legal limit should also be screened for other drugs.
References


TABLE 1.
Frequency of drugs detected in samples from suspected drunken drivers (A-cases, n=223) and frequency of drugs detected in suspected drugged drivers (D-cases, n=47)

<table>
<thead>
<tr>
<th>Drug</th>
<th>A-cases frequency (%)</th>
<th>D-cases frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amphetamine</td>
<td>2*</td>
<td>13**</td>
</tr>
<tr>
<td>Cocaine</td>
<td>0*</td>
<td>0**</td>
</tr>
<tr>
<td>Benzodiazepines</td>
<td>17</td>
<td>53</td>
</tr>
<tr>
<td>Cannabinoids</td>
<td>26</td>
<td>43</td>
</tr>
<tr>
<td>THC</td>
<td>13</td>
<td>43</td>
</tr>
<tr>
<td>Samples positive for one or more drugs (besides ethanol)</td>
<td>38</td>
<td>77</td>
</tr>
<tr>
<td>BAC &gt; 0.05%</td>
<td>81</td>
<td>40</td>
</tr>
<tr>
<td>BAC &lt; 0.05% and drug negative</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>BAC &gt; 0.05% of drug positive</td>
<td>80</td>
<td>28</td>
</tr>
</tbody>
</table>

* 169 samples screened  
** 31 samples screened

TABLE 2.
Evaluation of drug impaired driving in subjects arrested on suspicion of drunken or drugged driving.

<table>
<thead>
<tr>
<th>Total</th>
<th>Cases considered to drive under influence of drugs number other than ethanol</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>A-cases, BAC &lt; 0.05%</td>
<td>42</td>
</tr>
<tr>
<td>D-cases BAC &lt; 0.05%</td>
<td>28</td>
</tr>
<tr>
<td>A-cases, all</td>
<td>223</td>
</tr>
<tr>
<td>D-cases, all</td>
<td>47</td>
</tr>
</tbody>
</table>

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