ELSEVIER

Forensic Science International 130 (2002) 167–173

Forensic Science International

www.elsevier.com/locate/forsciint

Drug recognition expert evaluations made using limited data

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Received 9 October 2001; accepted 20 September 2002

Abstract

The Drug Evaluation Classification (DEC) Program is used by Drug Recognition Expert (DRE) officers to determine whether a suspect is under the influence of a drug or drugs at the time of arrest, and, if so, what category of drug(s). The goal of this project was to investigate the relative importance of face-to-face interactions with the suspect, physical evidence (drugs or paraphernalia found), and confessions/statements made by the suspect (or others) in making these determinations.

Seventy records of DRE evaluations were selected from a database containing information from all evaluations conducted in Oregon between 1996 and 1998. Each of the 70 records represented a suspect who had either taken a drug from one of four categories (CNS depressant, CNS stimulant, narcotic analgesic, or cannabis) or who had not taken a drug. To be included, the original DRE evaluation and the subsequent toxicology analysis had to agree that the suspect was under the influence of a drug from one of the four categories or not under the influence of a drug.

Records from the 70 cases were submitted in written form to 18 Oregon DREs with statements made by suspects or arresting officers, confessions, toxicology results, and descriptions of drugs or paraphernalia found on the suspect omitted. Based only on the written reports of direct observations, and with physiological and psychophysical test results, the DREs attempted to determine whether each of the 70 suspects was under the influence of a drug or drugs, and, if so, what category of drug(s).

If the officers determined that a suspect was under the influence of a drug, their accuracy in specifying the drug category was 81% for cannabis, 94% for narcotic analgesics, 78% for CNS stimulants, and 69% for CNS depressants. Overall accuracy in recognizing drug intoxication was 95%. These percentages indicate that although face-to-face interactions, physical evidence, and confessions/statements can be useful adjuncts to DRE decision-making, the majority of drug category decisions can be made solely on the basis of recorded suspect observations and DRE evaluation results.

Keywords: Police; Law enforcement; Drug recognition expert; Drugs; DRE

1. Introduction

Situations arise in which a person drives a motor vehicle erratically, fails to pass standardized field sobriety tests, and is arrested for driving under the influence of intoxicants. However, when the suspect is given a breath test, the blood alcohol concentration (BAC) falls below the legal limit for intoxication and/or does not correspond with the degree of impairment observed by the arresting officer. When this happens, it is probable that the suspect is either medically impaired (e.g. suffering from a seizure, stroke, heart attack, diabetic episode, injury, or mental illness), or is impaired by a drug or drugs other than alcohol.

To confirm drug impairment, most states require that suspects provide blood or urine specimens that can be tested for drugs and/or their metabolites. However, if only metabolites are found in the specimen, it can be argued that they only indicate recent drug use and that the suspect was not actively under the influence of drugs at the time of arrest.

To refute this argument, many states and several countries outside the United States have implemented the Drug Evaluation Classification (DEC) Program (sometimes called the Drug Recognition Expert (DRE) Program) [1]. Using this

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0379-0738/02/$ – see front matter
PII: S0379-0738(02)00384-5

program, specially trained police officers, often referred to as Drug Recognition Experts (DREs), utilize a 12-step protocol to determine whether a suspect has a medical problem or is drug impaired at the time of arrest. Further, if the suspect is under the influence of drugs, a determination is made regarding the categories of drugs taken.

Field and laboratory-oriented research has demonstrated that DREs can accurately determine the intoxication/impairment status of suspects [2], but questions occasionally arise regarding the relative importance of physiological and psychophysical test results [3,4] as opposed to actual face-to-face interactions, confessions or drugs seized during the DRE evaluation.

Do DRE officers often make correct determinations regarding which drug a suspect has taken based on physical evidence (e.g. bags of white powder or green leafy material), confessions, and face-to-face interactions with the suspect as opposed to analysis of test data? The purpose of this study was to determine if analysis of the test data alone would allow a DRE to make correct determinations as to the presence of impairment and the possible drug category that produced the impairment.

2. Methods

In this project, written information on direct observations (e.g. track marks on the arms, breath odor, etc.), along with physiological and psychophysical test results from 70 suspects were provided to 18 Oregon DRE officers on paper forms typically used by the officers to record test results. Information on statements made by arresting officers, physical evidence (e.g. drugs or paraphernalia seized), and confessions made by the suspects were omitted. Using this limited information, the officers used their training and experience to determine whether each suspect was under the influence of drugs, and, if so, by what category or categories of drugs.

2.1. DRE evaluation procedures

The training program for DRE officers consists of 72 classroom instruction hours, 40–60 h of field experience in which officers evaluate suspects under supervision, and a comprehensive written examination. The program training materials have been developed by the National Highway Traffic Safety Administration [5], and graduates of the program are certified by the International Association of Chiefs of Police (IACP) and the State of Oregon for the DREs in this study.

DRE evaluations typically involve 12 steps that are administered in the same sequence and in the same manner so that test results can be compared across officers and jurisdictions. This uniform testing process also increases the court credibility of testimony from DRE officers.

DRE evaluation procedures are summarized in Table 1 and described in more detail elsewhere [1,5].

2.2. Drug categories

DRE testing is designed to determine whether the suspect is actively under the influence of a drug or drugs from one or more of the seven categories listed in Table 2. Signs and symptoms of intoxication produced by drugs in these categories are provided in pharmacology textbooks and in the DRE literature [5–8].

In step 11 of the DRE protocol, the officer uses test results and other evidence to form an opinion regarding which category or categories of drugs are influencing the suspect. For example, it is probable that a suspect with body tremors, rapid speech, increased muscle tone, elevated blood pressure, rapid internal clock, accelerated heart rate, and dilated pupils has taken a central nervous system (CNS) stimulant. This conclusion could be bolstered by finding methamphetamine or cocaine in the suspect's possession and/or by eliciting a confession.

2.3. Validity of DRE officers' opinions

Initially it might seem that matching a suspect's signs and symptoms with signs and symptoms listed on a DRE chart would make determining the drug causing impairment quite easy. This is often not the case, however. Drugs can have somewhat different effects depending on the suspect's tolerance, the amount of drug taken, and whether the drug is active or the suspect's body is in a rebound/withdrawal phase. Suspects also frequently take multiple drugs at the same time, which may have different time courses of actions and effects.

The validity of a DRE officer's opinion regarding a suspect's drug status is determined by comparing the opinion to the results of toxicology analysis. Confirmation can increase the credibility of court testimony by the DRE officer but lack of confirmation can mean that the officer made an error in interpreting the available data. It can also mean that the interaction of multiple drugs confused the findings, the subject reacted to the drug or drugs in an atypical manner, or that the toxicological testing was inadequate to detect the drug.

For these reasons, IACP criteria used for certifying DRE officers specifies that the officer has made a correct determination (sometimes referred to as a ''call'') if she or he specifies one drug category and its presence is confirmed by toxicology. Based on IACP criteria, a correct determination is also made if the officer specifies two drug categories and evidence of a drug from either or both categories is confirmed by toxicology. If three drug categories are specified, at least two must be confirmed by toxicology for the DRE to be considered correct [5].

2.4. Suspect evaluation data

Suspect information was drawn from a database containing findings from all DRE evaluations conducted in the State of Oregon between 1996 and 1998. All suspects represented in the database had been arrested for driving while intoxicated

Table 1
Summary of DRE evaluation procedures

Step	Procedure
Step 1, determination of BAC	A breath and/or a chemical test is used to determine whether the suspect has a BAC above the state limit. If so, testing typically stops and the suspect is charged with driving under the influence of intoxicants (alcohol). If the BAC is below the limit and impairment appears to exist, testing continues
Step 2, interview of arresting officer	The arresting officer typically does not have DRE training so must communicate field observations, statements made by the suspect, information on drugs found, etc. to a DRE officer who has been called to assist with the investigation. It is important to know that the arresting officer evaluates the suspect in the field whereas the DRE officer evaluates the suspect in the more controlled environment of the police station
Step 3, preliminary examination	The DRE conducts a brief interview inquiring about medical problems and generally assessing the behavior of the suspect. The first of three pulse rate measurements is taken
Step 4, eye examinations	Horizontal gaze nystagmus (HGN), vertical gaze nystagmus (VGN), and convergence testing are conducted
Step 5, divided attention and psychophysical tests	The ability to stand erect with eyes closed and mentally estimate the passage of time, walk and turn, stand on one leg, and touch the nose with the fingertip are determined
Step 6, vital signs	The second pulse rate, body temperature, and blood pressure are measured
Step 7, dark room examination	Pupil sizes and responses are determined, and the mouth and nose are inspected for evidence of drug use
Step 8, check for muscle tone	The muscle tone of the biceps and forearms are determined
Step 9, check for injection sites	The suspect's arms, legs, other body parts are checked for evidence of drug injection. The third pulse rate is measured
Step 10, suspect's statements	Suspects are given on opportunity to make statements/confessions regarding drug use. They may be presented with DRE test results at this time
Step 11, opinion of the DRE officer	Based on test data and other evidence, the DRE officer makes a determination regarding whether the suspect is impaired by drugs, and, if so, which category or categories
Step 12, toxicology evaluation	In most states, suspects must furnish a blood or urine specimen for toxicological evaluation. It is important to note that states vary with respect to the type of testing done and the sensitivity of equipment used

or impaired. Seventy cases were randomly selected for inclusion in the project based on the following criteria: the DRE who did the original analysis determined that the suspect was under the influence of a single drug category (or no drug), the opinion was confirmed by urine specimen toxicology, the BAC was 0.00%, and all test results had to be complete and representative. The distribution of drug categories in the 70 selected cases was also set to approximate the distribution of drug categories in the overall database (see Table 3). The proportions of cases with PCP, hallucinogen, or inhalant use in the overall database were too low to justify including any cases in the sample.

Information from these cases was copied by hand by one investigator onto standard State of Oregon DRE evaluation forms leaving out data from evaluation protocol steps 1–3 and 10–12. Omitted were arresting officer statements, preliminary evaluation data (except for the first pulse rate), descriptions of any physical evidence seized, incriminating suspect statements, opinions of the original DRE officer, and toxicology results.

Table 2
DRE-recognized drug categories and typical drugs

Drug category	Typical drugs
CNS depressants	Alcohol, tranquilizers, barbiturates, some antidepressants at high levels
CNS stimulants	Cocaine, methamphetamine
Hallucinogens	LSD, peyote, mescaline, ecstacy
PCP and analogs	Phencyclidine, ketamine
Narcotic analgesics	Heroin, opium, vicodin, oxycodone
Inhalants	Anesthetic gases, petroleum products, household chemicals
Cannabis	Marijuana, hashish

Table 3
Drug categories represented in the sample population

Drug category	Number and percentage of cases in each category ($n = 70$)
Cannabis	20 (29%)
CNS stimulants	19 (27%)
CNS depressants (other than alcohol)	14 (20%)
Narcotic analgesics	12 (17%)
No drug (possible medical problem)	5 (7%)
Phencyclidine	0 (0%)
Hallucinogens	0 (0%)
Inhalants	0 (0%)

2.5. DRE officers

Record sheets from the 70 cases accompanied by a letter from the State DEC Program Coordinator providing a brief project description and requesting participation were sent to 40 DRE officers certified in the State of Oregon. The letter contained the following instructions:

> ... data from ... suspects have been extracted from actual cases. For each suspect, the decision made by the DRE was confirmed by the lab. In other words, if the DRE said the suspect was not impaired, no drug was found in the urine. If the officer called one drug class, evidence of that drug class was found in the urine; if the officer called two drugs, one of the two was found in the urine; if three were called, at least two of the three were found, etc.
>
> Please study the information on each of the cases presented on Oregon DRE evaluation forms and determine whether there is evidence of drug impairment. If there is, please mark the drug or drugs you believe are causing the impairment on the record sheet. BAC for all suspects was 0.00%.

Eighteen of the 40 officers (45%) anonymously evaluated each suspect's data and returned their evaluations. Some officers who did not participate indicated that the time commitment (estimated to be over 10 h) was too great or that they had philosophical concerns about the project's outcome/design.

3. Results

Information on the accuracy of officers' determinations is presented category by category.

3.1. Cannabis

Eighteen officers analyzed 20 cases in which the suspect was determined by the original DRE officer and confirmed by toxicology to have taken only cannabis. These 360 analyses/calls are distributed as shown in Table 4. Using only the limited data provided to them, the 18 officers correctly specified only cannabis for 69% of the analyses and they specified cannabis in combination with one other drug category for an additional 11% of analyses. Based on IACP criteria, this yields an overall accuracy of approximately 80% (it should be noted that any call of three or more drugs was automatically wrong by IACP standards because only one drug was present for each suspect).

3.2. CNS stimulants

In 19 cases, CNS stimulant intoxication was specified by the original DRE officer and confirmed by toxicology. Calls made by the DRE officers in this study are shown in Table 5.

Table 4
Drug categories specified for suspects who had only taken cannabis

Drug category or categories specified	Number and percentage of calls (total $n = 360$)
Cannabis	249 (69.2%)
CNS stimulant	25 (6.9%)
No drug	19 (5.3%)
Hallucinogen	3 (0.83%)
Inhalant	1 (0.3%)
Cannabis and CNS stimulant	24 (6.7%)
CNS stimulant and narcotic analgesic	13 (3.6%)
Cannabis and CNS depressant	11 (3.1%)
Cannabis and narcotic analgesic	5 (1.4%)
CNS stimulant and CNS depressant	2 (0.6%)
Hallucinogen and narcotic analgesic	1 (0.3%)
Hallucinogen and CNS depressant	1 (0.3%)
Cannabis and hallucinogen	1 (0.3%)
Combination of three or more drugs	5 (1.4%)

Categories for which no calls were made are not shown.

The officers accurately specified CNS stimulant as the single drug category present approximately 55% of the time and specified CNS stimulant with another drug category an additional 23% of the time. Using DRE criteria, this gives an overall accuracy of approximately 78% for CNS stimulants.

3.3. CNS depressants

There were 14 CNS depressant cases in the sample population. Calls made by the DRE officers are shown in Table 6. They were 42% accurate in specifying CNS depressants as a single drug category with an additional 27% of two drug calls including the CNS depressant category. This yields a total accuracy of 69%.

Table 5
Drug categories specified for suspects who had only taken a CNS stimulant

Drug category or categories specified	Number and percentage of calls (total $n = 342$)
CNS stimulant	187 (54.7%)
Cannabis	37 (10.8%)
No drug	18 (5.3%)
Narcotic analgesic	5 (1.5%)
Hallucinogen	2 (0.6%)
CNS stimulant and narcotic analgesic	53 (15.5%)
CNS stimulant and cannabis	24 (7.0%)
Narcotic analgesic and cannabis	7 (2.0%)
CNS stimulant and CNS depressant	2 (0.6%)
CNS depressant and cannabis	2 (0.6%)
Three or more drugs	5 (1.5%)

Categories for which no calls were made are not shown.

Table 6
Drug categories specified for suspects who had only taken a CNS depressant

Drug category or categories specified	Number and percentage of calls (total $n = 252$)
CNS depressant	105 (41.7%)
No drug	16 (6.3%)
Inhalant	10 (4.0%)
CNS stimulant	7 (2.8%)
Cannabis	4 (1.6%)
PCP	2 (0.8%)
CNS depressant and cannabis	27 (10.7%)
CNS depressant and CNS stimulant	19 (7.5%)
CNS depressant and narcotic analgesic	19 (7.5%)
CNS stimulant and narcotic analgesic	10 (4.0%)
CNS depressant and inhalant	2 (0.8%)
CNS depressant and hallucinogen	1 (0.4%)
Hallucinogen and narcotic analgesic	1 (0.4%)
Narcotic analgesic and inhalant	1 (0.4%)
Narcotic analgesic and cannabis	1 (0.4%)
PCP and narcotic analgesic	1 (0.4%)
Three or more drugs	25 (9.9%)

Categories for which no calls were made are not shown.

3.4. Narcotic analgesics

For 12 of the sample cases, the original DRE officer specified a narcotic analgesic and this was confirmed by toxicology. Calls made by the DRE officers in this study are shown in Table 7. Correct specification of the single drug category was made 57% of the time and calls for narcotic analgesic with another drug category, most often CNS stimulant, were made an additional 37% of the time. Using DRE accuracy criteria, officers in this study correctly specified narcotic analgesics 94% of the time.

3.5. No drug

In five cases, no evidence of drug intoxication was found by the original DRE officers or by toxicology. Calls made by the 18 DRE officers in this study are shown in Table 8. The accuracy rate of approximately 66% indicates that officers had a problem assessing several suspects who presumably had not taken a drug. Care must be used in interpreting these data, however, because of the relatively small number of cases involved. It must also be considered that the suspects in this group might have been abnormal in some way to justify initially being stopped, arrested, and subjected to a DRE evaluation.

Table 7
Drug categories specified for suspects who had only taken a narcotic analgesic

Drug category or categories specified	Number and percentage of calls (total $n = 216$)
Narcotic analgesic	123 (56.9%)
No drug	8 (3.7%)
CNS stimulant	3 (1.4%)
Cannabis	1 (0.5%)
Narcotic analgesic and CNS stimulant	74 (34.3%)
Narcotic analgesic and cannabis	6 (2.8%)
Three or more drugs	1 (0.5%)

Categories for which no calls were made are not shown.

Table 8
Drug categories specified for suspects for whom the original DRE did not specify a drug and no drug was detected in the urine

Drug category or categories specified	Number and percentage of calls (total $n = 90$)
No drug impairment	59 (65.6%)
Cannabis	10 (11.1%)
CNS stimulant	4 (4.4%)
CNS depressant	1 (1.1%)
Narcotic analgesic	2 (2.2%)
CNS stimulant and narcotic analgesic	6 (6.7%)
CNS depressant and cannabis	3 (3.3%)
CNS stimulant and cannabis	1 (1.1%)
Narcotic analgesic and cannabis	4 (4.4%)

Categories for which no calls were made are not shown.

3.6. Individual officer accuracy

Using DRE criteria for correct calls (if one drug category is specified it must be verified by toxicology, if two are specified at least one must be verified, and if three are specified at least two must be verified), the officers in this study had a mean overall accuracy rate of 79% (S.D. = 8.0; range of accuracy for individual officers from 56 to 88%).

The accuracy percentages can be placed into perspective by comparing them to random guessing percentages. Based on the seven drug categories DRE officers are trained to evaluate, each suspect presented 64 possible conclusions. They were: no drug, seven single drug categories, 21 two-category combinations, and 35 three-category combinations. An officer guessing no drug or a single drug category at random would therefore have a 1 in 64 (1.6%) chance of being totally correct. Assuming the suspect had taken a drug from a single category, an officer guessing a random two drug category combination would be correct an additional 6 out of 64 times (9.4%). According to IACP criteria the officer would therefore be correct 11% of the time by chance alone. Clearly, the DREs in this study performed at well above chance levels.

4. Discussion

The goal of this project was to determine the relative importance to DRE officers of statements made by the arresting officer and suspect, face-to-face interaction with the suspect, confessions, and physical evidence such as drugs

Table 9
Summary of correct category call percentages and differences from 100% accuracy for each category

Category	Percentage of cases in which correct category was included in either a single drug or a two drug call	Percentage of cases specified incorrectly presumably because of limited information availability
Cannabis	80.7	19.3
CNS stimulants	78.4	21.6
CNS depressants	68.6	31.4
Narcotic analgesics	94.0	6.0
No drug	65.6	34.4
Average across categories weighted for number of subjects per category	78.9	21.2

and paraphernalia found in the suspect's possession. Based on the hypothesis that officers in the study would have been 100% correct if they had been given all of the information that was available to the DREs doing the original evaluations, the contributions of these factors can be obtained by subtraction from 100% (see Table 9; the 100% accuracy assumption is a reasonable one because all five of the suspects that were not under the influence of drugs denied drug use whereas 62 of the 65 suspects who had taken drugs confessed this to the DRE who did the initial evaluation).

The mean IACP criterion error rate combined for all drug and no drug categories weighted for the number of subjects per category is 21.2%. This percentage provides an indication of how important statements and physical evidence are to DREs making impairment and drug category determinations. Clearly, high accuracy rates can be obtained even without this information, but in theory they add 21.2% to the accuracy of the DREs determinations.

Table 9 also indicates that not all of the drug categories were equally easy for the DRE officers to detect. The officers had little difficulty detecting the results of narcotic analgesic intoxication, but CNS depressant intoxication posed a larger problem. Perhaps it is easier to detect the effects of narcotic analgesics because of their relatively obvious effect on pupil sizes, and cannabis is often detectable based on the presence of rebound pupil dilation. But the horizontal gaze nystagmus associated with CNS depressant use also should be relatively easy to detect for trained DREs, and it was present in 12 of the 14 suspects who had taken a CNS depressant. It is unclear why so many officers had problems with the CNS depressant category. Over 6% of them failed to detect the presence of a drug and almost 10% specified three or more drug categories when only CNS depressant was present (see Table 6).

Based on data from all suspects who had taken a drug, the DREs in this study made a correct positive call regarding presence of a drug (albeit sometimes they did not specify the correct drug category) 94.8% of the time. These are correct positive conclusions regarding impairment. For 5.2% of the calls from these subjects, the DREs specified no drug and made a false negative error.

For the data from the five suspects who presumably were not drug impaired, the officers made a correct positive call of no drug impairment 65.6% of the time and a false positive call of drug impairment 34.4% of the time. Once again, interpretation of these data require care because of the small number of suspects involved and the possibility that suspects were impaired by causes other than drug use.

5. Conclusion

In summary, this project demonstrated that DRE officers can make a correct positive identification of drug intoxication in almost 95% of cases, and that they can render correct drug category opinions with a mean accuracy of almost 80%, even when provided with limited information. The error rates in recognizing drug intoxication (5%) and specifying the correct drug category (21%) will be reduced if the DRE makes an opinion based on all of the relevant information. The tests used by DREs are robust indicators of drug intoxication status even when information on confessions, subject and arresting officer statements, physical evidence, and face-to-face interactions are denied to the DRE making the evaluation.

Acknowledgements

We thank the 18 Oregon DRE officers who contributed their personal time to complete the evaluations. Their efforts are greatly appreciated. We also thank Dr. Barry Logan, Director, Forensic Laboratory Services Bureau, and Washington State Toxicologist for comments on a draft of this paper. The opinions or assertions contained herein are the private views of the authors and do not necessarily reflect the views of the organizations by which they are employed or of those acknowledged.

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