ALCOHOL AND DRUGS AMONG FATALLY INJURED DRIVERS OF HEAVY TRUCKS

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Summary

The National Transportation Safety Board (NTSB) conducted a comprehensive investigation of every fatally injured driver of a heavy truck in eight States for a one year period. Toxicological tests were conducted on each driver. One hundred and eighty two accidents, about 25 percent of such accidents nationwide, were included in the study. One Third (33 percent) of the drivers tested positive for drugs or abuse. The most prevalent drugs found were alcohol and marijuana, followed by cocaine, amphetamine, methamphetamine, ephedrine, pseudoephedrine, phenylpropanolamine, codeine and phencyclidine (PCP). Drugs interaction with fatigue and the effects of drug impairment on the cause of the accidents is discussed.

Introduction

In order to develop an estimate of drug and alcohol use among fatally injured drivers of heavy trucks, the NTSB collected data on all fatally injured drivers of trucks weighing more than 10,000 pounds gross vehicle weight (GVWR) in eight selected States for a one year period. The States selected, to provide a geographic mix, included: California, Colorado, Georgia, Maryland, New Jersey, North Carolina, Tennessee and Wisconsin. The study period ran from October 1, 1987 to September 30, 1988. The full study is in press.

Study Methodology

So that as many of the truck accidents in the selected States in which the driver was fatally injured (defined as dead at the scene or within four hours of the accident) could be included in the study, notification procedures were coordinated with the State Police, and the Chief Medical Examiner. Upon notification of an accident that met the criteria, an NTSB highway accident investigator was dispatched to the scene to conduct a comprehensive investigation to document the facts and circumstances and to gather information that allowed the NTSB to determine the probable cause of the accident. The investigator contacted the coroner/medical examiner and arranged to receive biological specimens for toxicological testing. The NTSB provided "tox kits" for the collection of blood, or in the absence of a sufficient quantity, vitreous fluid. Using standard chain of custody methods, the samples were forwarded on ice, by express mail, to the Center for Human Toxicology (CHT) at the University of Utah for screening, confirmation, and quantification. The CHT tests searched for the presence of 44 different drugs in the following classes: volatiles/gases, sedatives/tranquilizers, stimulants, opiates, antihistamines, hallucinogens, marijuana, analgesics, and anticonvulsants. A grant from the National Institute on Drug Abuse (NIDS) paid for the testing at CHt.

For each accident, the investigators developed information to completely describe the driver(s), vehicle(s), the roadway at the time of the accident. The investigator also interviewed representatives of the trucking company, available witnesses, and family members of the driver to obtain more detailed

data on hours of service, fatigue, carrier operations, and maintenance, training and testing, pre-employment screening, and other factors.

By developing this type of data the NTSB was able to determine the role that any drug found in the system of a driver had in causing the accident. To assist in this task, the NTSB in conjunction with NIDA and CHT convened three scientific review panels made up of eminent forensic toxicologists and experts on the effects of human performance. The panels provided guidance on whether impairment occurred as a result of drug use and what role alcohol or other drug impairment may have had in the accident.

Findings

The NTSB investigated, during the study period, 182 accidents involving 186 trucks. Since in one accident it could not be determined which of the two trucks occupants was driving, it was decided to not include the case. Therefore, the analyses that follow include data on 185 drivers. As far as could be determined, the 182 accidents include all the accidents that took place in the eight selected States during the study period that met the established criteria. This represents about 25 percent of the total number of heavy truck accidents that occurred nationwide in the time period.

While the NTSB considers the number of accidents in the study to be a significant portion of the total accidents that occurred, it does not suggest that the sample is statistically representative of such accidents nationwide. In addition, the NTSB does not suggest that fatal-to-the-driver heavy truck accidents are representative of all truck accidents. However, the NTSB believes that the findings, because of the large sample, are representative of heavy truck accidents nationwide in which the driver is fatally injured. Toxicological Test Results

NTSB was able to obtain biological specimens for toxicological testing by CHT for 168 of the 185 (or 91 percent) fatally injured drivers. Late notification was the main reason for the lack of specimens in most of the 17 cases. In an additional 16 cases, samples were of insufficient quantity to test for certain drugs on the analytic plan. Rather than lose valuable data, the Board has chosen to include in the analysis, cases in which CHT testing was carried out for most, but not all drugs, in the analytic plan. thus, the sample sizes vary somewhat from drug to drug.

Of the fatally injured drivers for which CHT tests were performed, 112 tested positive for one or more of the drugs on the analytic plan. Of these, 56 drivers tested positive for drugs of abuse. This is 33.3 percent of the 168 cases for which at least particle toxicological results were obtained. The most frequently identified drugs of abuse are listed in table 1. Drugs of Abuse

No barbiturates and no benzodiazepine (diazepam, flurazepam and chlordiazepoxide) were identified in the fatally injured truck drivers. This is not unexpected since they function as sedatives, hypnotics or anxiolytics which relax muscles and/or depress the central nervous system and would limit a truck driver's ability to drive for extended periods.

Almost 13 percent of the tested drivers and 37.5 percent of those who

tested positive for drugs of abuse had measurable amounts of alcohol in their systems. This finding is not unexpected based on data from the National Highway Traffic Safety Administration's Fatal Accident Reporting System (FARS) data from 1982-1985. FARS reported that 15 percent of fatally injured drivers of trucks weighing more than 10,000 lbs. GVWR had some alcohol in their system.

Stimulants are perceived by at least some drivers as beneficial in reducing fatigue and enhancing performance (Beilock 1989). Of the 56 drug of abuse positive drivers, 19 or 28.8 percent involved stimulants.

Marijuana were identified in 21 of the fatally injured drivers. Polydrug Use Of the 56 cases which were positive for drug of abuse, 23 or 41 percent were polyerug users. In six of the 23 polydrug cases, the driver tested positive for three or more drugs of abuse. Of the polydrug users, eight contained alcohol as one of the drugs of abuse. The average blood alcohol concentration of the alcohol-polydrug user group was 0.13 percent. Drug Use by Region Concerning type of drug used and the location of the accident, alcohol and marijuana was found in drivers fairly well distributed across the States. The cocaine cases were found primarily in California and Maryland. As a percentage of total tests or total drug of abuse positive cases, Maryland is significantly higher for cocaine. For amphetamines, virtually all such fatal accidents in the study occurred in California. See table 2 for a breakdown of drug test results by state.

Drug Use by Age

Older drivers are less likely to have tested positive for drugs of abuse. The average age of all the fatally injured drivers was 42.4 years. The average age of the drug free truck drivers was 44.6 years. The average age for drivers positive for drugs of abuse was 36.5 years. The single drug user whose drug of choice was alcohol was significantly older (42.5 years) than any of the single drug users whose drug of choice was other than alcohol (34.7 years).

Drug Use and Prior History of Drug Problems

A prior record of alcohol and drug abuse problems was strongly related to a positive test for drugs of abuse among the fatally injured drivers in the study. Of the drivers who had q prior history of problems, 82 percent tested positive for drugs of abuse.

Multiple Licenses

Drivers with at least one suspended or revoked license were more likely to have tested positive for drugs of abuse. Drivers with no known suspended or revoked licenses tested positive for drugs of abuse in 30.2 percent, while 57.9 percent of those with a suspended or revoked license tested positive.

Medical Condition

Nineteen of the 185 drivers(10 percent) had such severe health problems that health was a major factor or the probable cause of the accident. Seventeen of the 19 accidents involved a form of cardiac incident at the time of the accident.

Drug Use and Accident Causation

Concerning the role that drugs of abuse had in causing or contributing to each accident, it was found that of the 56 cases in which the drivers were found positive for drugs of abuse, in 49 cases (87.5 percent) impairment from using the drug or combination of drugs was a factor in causing the accident. Fatigue and Drug Use

Professional drivers represented nearly 81 percent of the fatally injured drivers in the study. Based on an analysis of the probable causes of the accidents, they were involved in 87.2 percent of the fatigue related accidents and 95.4 percent of the fatigue and drug related accidents.

Fatigue and drug usage are closely linked. More than one half of the drivers who violated Federal guidelines for hours of service tested positive for some type of drug of abuse. This was significantly higher than drug use found for drivers who did not drive more hours than prescribed by the guidelines. The most prevalent drug of abuse among the drivers in violation was marijuana. Differences were also suggested for the stimulants amphetamine/methamphetamine and cocaine. There appeared to be no difference between these groups of drivers in their use of alcohol or in multiple drug usage. In addition to the stimulants amphetamine/methamphetamine being disproportaionately high among drivers who were in violation of the hours of service guidelines, they were also disproportionately high among drivers involved in accidents between midnight and 6:00 a.m., and disproportionately very high among drivers who veered off the road or collided with other vehicles in ways that suggested dozing at the wheel. It is not surprising to find these drugs associated with fatigue-related accidents. Some drivers perceive that some drugs are helpful in extending the among of time they can drive without extended rest. These truck drivers do not realize that fatigue is aggravated after the initial effects to stimulants wear off. Sleep deprivation becomes deficit which drugs cannot overcome. Depressants, such as alcohol, aggravate and reduce the initial effects of stimulants.

Conclusion

The findings of the NTSB study will be very useful in identifying the magnitude, scope, and characteristics of drug and alcohol use among drivers of heavy trucks. In addition, the problems of fatigue and medical conditions were also identified. This data will help government and industry in their efforts to develop and implement programs to reduce these problem.

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Table 1 - Drugs of Abuse

Drug Drivers Positive	Percent	Positive
Alcohol	21	12.5%
Marijuana	21	12.8%
Cocaine/Metabolites	14	8.5%
Amphetamine/		
Methamphetamine	12	7.3%
Ephedrive	7	4.98
Pseudoephedrine	6	3.7%
Phenylpropanolamine	2	1.2%
Codeine	1	.6%
Phencyclidine (PC)	1	.6%