Fred

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THE INCIDENCE OF DRUGS IN FATALLY INJURED DRIVERS

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16. Abstract

Methods for the collection of blood, urine, bile and alcohol washes of face and fingers from fatally injured drivers have been developed. Specimens were supplied by coroners and medical examiners from fatally injured drivers. Seven hundred and ten were returned. Methods for analysis of blood, urine and bile for 44 commonly abused drugs were developed. These methods consist of extraction of the fluids, followed by qualitative thin-layer chromatographic screen. If the screen indicated positives, quantitative gas chromatographic confirmation was conducted. Mass spectrometry was used if additional qualitative information was necessary. Alcohol washes of face and fingers were examined for evidence of marijuana using thin-layer chromatographic and colorimetric methods. Blood samples were assayed for alcohol content using a gas chromatographic method.

The analytical results indicated that 58% of the drivers had ingested alcohol, and 47% of the drivers were legally drunk (BAC $\geq$ 0.100%). Thirteen percent of the drivers evidenced the presence of a prescription drug. Over 5% of the drivers evidenced the presence of a prescription drug in the absence of alcohol. The predominant type of prescription drug found was of the sedative/hypnotic drug--over 8% of the fatally injured drivers evidenced this type of drug.

The test for contact with marijuana yielded 38% positive responses.

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PREFACE

This report contains the accomplishments and results of a 28-month program designed to determine the incidence of drugs in fatally injured drivers. The report was prepared for the National Highway Traffic Safety Administration of the Department of Transportation by the staff of Midwest Research Institute and covers work conducted during the period 18 June 1971 to 19 October 1973. The project leader is Dr. E. J. Woodhouse, Principal Chemist, assisted by Mr. R. A. Adams, Associate Chemist, Miss J. Huerner, Assistant Chemist, Mrs. S. Reich, Assistant Chemist, and Mr. S. Graves, Assistant Chemist.

We gratefully acknowledge the advice and assistance of Dr. Fred B. Benjamin, Program Manager, Office of Driver Performance Research, National Highway Traffic Safety Administration. Dr. Benjamin has monitored the program since its inception.

Approved for:

MIDWEST RESEARCH INSTITUTE

H. M. Hubbard, Director
Physical Sciences Division

19 October 1973

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COMMENTS
by
Program Manager

This study analyzed the incidence of drugs in the body fluids of a sample of fatally injured drivers. The project also developed and applied screening techniques for the detection of contact with marijuana.

These data indicate that certain drugs may be a highway safety problem. Marijuana and barbituates were the most frequently detected drugs.

The data collected cannot legitimately be generalized beyond the 700 cases studied, to apply to any larger group such as all fatally injured drivers in the United States.

The following cautions and constraints should be noted in interpreting the data:

Sampling of Cases

The cases studied were submitted by 36 coroners in different areas of the country who agreed to cooperate in this study. Attempts to use the same criteria for selection of cases in all areas were not successful. The extent to which the cases selected are representative of a larger population cannot be determined with available data. In addition, all body fluids could not be tested in all cases because of incomplete or contaminated fluid samples.

Interpretation of Drug Data

Drugs may be found in low concentrations in bile and urine for days and sometimes even weeks after they lose their clinical effect. Therefore, in the attached report, bile and urine concentrations below 1 microgram per mililiter were considered as negative. Any concentration of drugs in blood was considered as positive.

The test results report the amount of the drug present at the time of autopsy. Present knowledge does not permit one to work backwards to estimate the amount present at the time of the crash. Furthermore, the effects of different dose levels of drugs on performance are not well established. Thus, if drug presence was reported in a particular case, it may or may not mean that the driver was impaired at the time of the crash.

Marijuana Test Results

This contract included the collection of alcohol washings of the face and fingers of fatally injured drivers which were analyzed for marijuana.

The original method of eluting the drug from the swab for analysis by Thin Layer Chromatography (TLC) was unsuccessful. Therefore, about half way through the study, this method was replaced by a colorimetric analysis of the swab itself.

The new technique was investigated by MRI under this contract and by MRI under a contract with the U. S. Army's Land Warfare Laboratory. None of the subjects gave a positive response prior to smoking and about 78% gave positive results during the first two hours after smoking. The number of positive responses decreased rapidly as the interval between exposure and test increased. This work was limited to living subjects.

The degree of response to the test was not recorded since it is not an indication of the amount inhaled. It shows that marijuana was in contact with the skin area, but not necessarily that it had been smoked.

In the present study when the modified test was applied to samples from 323 drivers, 124 drivers had at least one positive out of three washings (face, and both hands). Since the test can detect 78% of the marijuana smokers, this would indicate that a total of 169 (49%) of the fatally injured drivers tested may have been in contact with marijuana within the last few hours before death.

The test is new and there are some unexpected results that point to the need for further evidence of its accuracy:

- Percent marijuana involvement according to this study is far above expert estimates.
- Marijuana involvement does not show the age-relationship which would be anticipated.
- The tests on each hand show a higher incidence than the test on the face.

The following conclusions can be drawn at this time:

- The marijuana-skin-test does need further improvement, standardization, and validation.
- The results of the test are considered an indication that marijuana may constitute a major traffic hazard, though it is not considered possible to determine the extent of the marijuana hazard on the basis of the current findings.

Major Results

Results indicate that 47% of the drivers were legally drunk. 15.2% had evidence of drugs other than alcohol or marijuana and 38% gave a positive response on at least one of three tests for contact with marijuana.

Conclusion

This study of the incidence of drugs in fatally injured drivers indicates that certain drugs may be a highway safety problem. Marijuana, and the barbituates are the most frequently detected drugs. The results of this limited and preliminary study must be interpreted with caution but they indicate the need and direction of further research.

Fred Benjamin

Fred B. Benjamin (D.M.D., Ph.D.)
Program Manager, ODPR

SUMMARY

Methods for the collection of blood, urine, bile, and alcohol washes of face and fingers from fatally injured drivers have been developed. Specimens have been collected from Alcohol Safety Action Project areas and other cooperating areas. The samples were supplied by coroners and medical examiners from fatally injured drivers who were dead on arrival at the hospitals. One thousand seven hundred and thirty-one specimen collection kits were distributed to 57 different areas. Seven hundred and ten were returned with specimens from 36 areas. Methods for analysis of blood, urine, and bile for 44 commonly abused drugs were developed. These methods consisted of extraction of the fluids, followed by a qualitative thin-layer chromatographic screen. If the screen indicated positives, quantitative gas chromatographic confirmation was conducted. Mass spectrometry was also conducted if additional qualitative information was necessary. Alcohol washes of face and fingers were examined for evidence of marihuana using thin-layer chromatographic and colorimetric methods. Blood samples were assayed for alcohol content using a gas chromatographic method.

The analytical results indicated that 58% of the drivers had ingested alcohol, and 47% of the drivers were legally drunk (BAC $\geq$ 0.100%). Thirteen percent of the drivers evidenced the presence of a prescription drug. Over 5% of the drivers evidenced the presence of a prescription drug in the absence of alcohol. The predominant type of prescription drug found was of the sedative/hypnotic drug--over 7% of the fatally injured drivers evidenced this type of drug. The incidence of marihuana indicated by the swab test was as high as 49%. The present test methods for marihuana have not been proven reliable. Differing techniques employed in the marihuana test yielded incidences ranging from 1.68% to 49%.

I. INTRODUCTION

This report, the final report in a series of 20 reports, details the accomplishments, results and conclusions of a 28-month project designed to determine the incidence of drugs in fatally injured drivers. Specific objectives of the project were to develop methods for acquisition and drug analysis of specimens from fatally injured drivers, and to collect and analyze such specimens from up to 1,000 fatally injured drivers. The project involved development of kits for acquisition of specimens, development of analytical methods for screening specimens for drugs, acquisition of specimens and analysis of specimens.

Described below are the research approach and methodology, experimental procedures, experimental results, analysis and interpretation of experimental results, conclusions and recommendations and finally, project participants.

II. RESEARCH APPROACH AND METHODOLOGY

The National Highway Traffic Safety Administration is seeking a determination of the significance of drugs in highway fatalities. In order to accomplish this, a comparison must be made between the incidence of drugs in highway fatalities and the incidence of drugs in living drivers. The project described in this report was designed to investigate the incidence of drugs in highway fatalities--specifically the incidence of drugs in fatally injured drivers.

The research approach and methodology of this project are described below. (Specific details of operation are to be found in Section III - "Experimental Procedures.")

In order to gain useful information from which a determination of the incidence of drugs in fatally injured drivers could be made, the following research plan was adopted:

Midwest Research Institute (MRI) would assemble and distribute specimen-collecting kits containing equipment, instructions and identification (ID) cards to ASAP areas and other areas for the collection of specimens.

The coroners and medical examiners would return the specimens to MRI complete with an ID card. An identical ID card would also be sent by the coroners or medical examiners to the ASAP or area director.

MRI would, in the meantime, develop analytical methods for screening the specimens for drugs. The methods would be qualitative and quantitative. Forty-four commonly used drugs, cannabinoids, and blood alcohol would be screened for.

Upon receiving specimens, MRI would analyze them for the drugs in the screen. The analytical results would be forwarded to both DoT and the ASAP directors, coroners, or medical examiners from whom the specimens originated.

Finally, DoT would issue "Request for Crash Data" forms which MRI would distribute to all areas from which specimens have been received. These forms would then be returned to MRI complete with all pertinent information about the crash involved.

The information resulting from this program would then be subjected to a statistical analysis to yield a determination of the incidence of drugs in fatally injured drivers.

Figure 1 illustrates the major activities, information and materials flow for the total program. Since this was the first program of its type, a major effort was expended in development of methods both for acquiring specimens and analysis of specimens. Certain decisions had to be made concerning the specimens, drugs and analyses, and after due consultation with NHTSA and experts in the field, the following important decisions were made:

To acquire specimens from fatally injured drivers who were dead on arrival at the hospital.

To acquire blood, bile and urine specimens, if possible.

To acquire face and finger washings.

To analyze blood, bile and urine for 44 more commonly abused drugs. These analyses were to be both qualitative and quantitative.

To analyze blood samples quantitatively for alcohol.

To analyze face and finger washings qualitatively for cannabinoids (marihuana).

This research plan involved the coordination of many persons and agencies. The success of the plan depended on the cooperation of all concerned, including DoT, MRI, ASAP area directors, coroners, medical examiners and other potential sources of samples. The accomplishments of the program are detailed in the next section of this report, "Experimental Procedures."

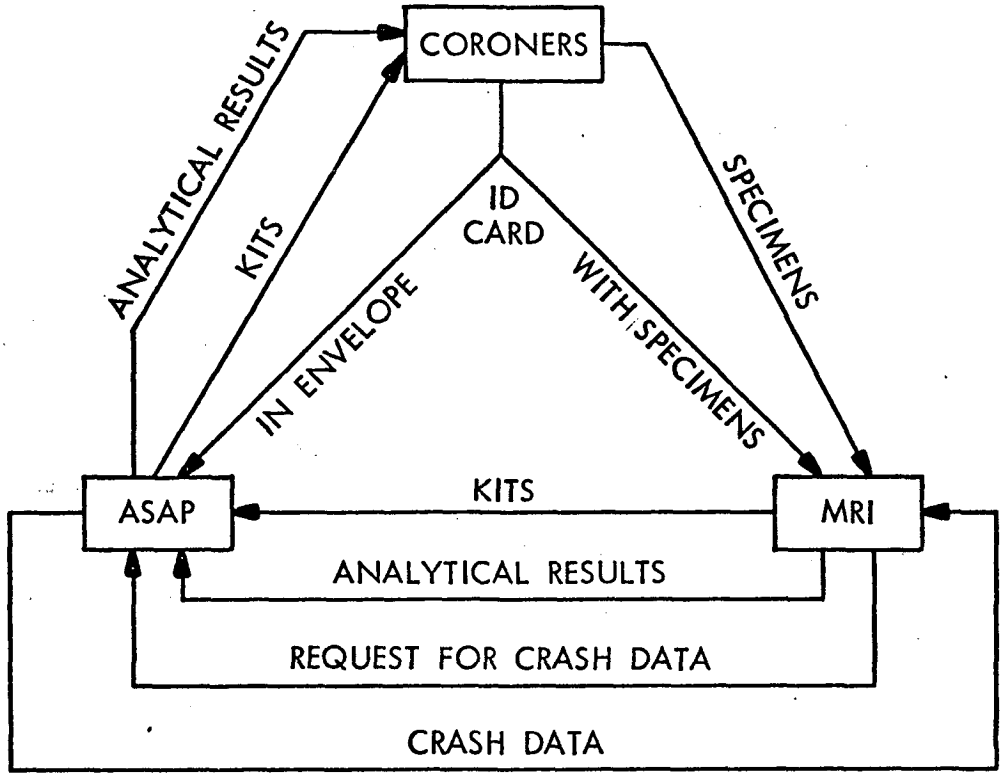

Figure 1 - Diagrammatic Representation of Information and Materials Flow for the Acquisition of Data on Fatally Injured Drivers

III. EXPERIMENTAL PROCEDURES

This section details accomplishments in the various phases of the program. The following operations are described in order:

A. Preparation of Specimen Collection Kits

B. Acquisition of Specimens

C. Development of Analytical Procedures

D. Analysis of Specimens

E. Dissemination of Analytical Information

A. Preparation of Specimen Collection Kits

The specimen collection kits for this program were designed for the collection of urine, blood, bile, and face and finger washings. All the equipment for collection of specimens was included in the kit, which also contained full instructions and two identification cards, one for return to MRI and one for mailing to the local ASAP director for his files and future reference.

A specimen kit specifically consists of the following items:

1. A fully telescopic card box, 6-1/2 in. x 3 in. x 3 in., with MRI return address and air mail postage paid.

2. A urine collection bottle, 50-ml size, with superior quality screw cap seal, totally constructed of shatter-proof polypropylene, labeled "URINE".

3. A bile collection bottle, 30-ml size, similar to the urine bottle, labeled "BILE," and containing preservative (fluoride).

4. A blood collection kit consisting of a plastic bag containing a vacutainer holder, a vacutainer blood collection needle, and three 15-ml vacutainers treated with anticoagulant (oxalate) and preservative (fluoride).

5. A marihuana face and finger wash kit consisting of a plastic bag containing three enclosed, protected swabs labeled "right hand," "left hand," and "mouth;" and a small vial containing ethanol.

6. An instruction sheet detailing (a) requirements, and (b) how to use the kit.

7. An identification card in duplicate, enclosed in a protective plastic bag.

8. An envelope addressed to the local ASAP director for use in returning one of the identification cards.

These kits were assembled and dispatched to ASAP directors and others upon request. As the program proceeded, records were kept of the kit disposition for each area in order that each area could be constantly supplied with enough kits. At least 100 kits, fully assembled, were kept on hand at MRI at all times.

Figures A-1 and A-2 indicate the instruction sheet and the identification (ID) card, respectively. These figures are located in Appendix A "Acquisition of Specimens."

B. Acquisition of Specimens

Alcohol Safety Action Program (ASAP) directors, coroners, and medical examiners in 57 areas have been contacted by both DoT and MRI in an effort to acquire specimens from fatally injured drivers. Letters of program explanation, program requirements, requests for samples and memoranda were sent to all areas. Trial kits with full instructions were also dispatched to these areas. The response from 43 areas was sufficiently encouraging that these areas were supplied with sufficient collection and mailing kits to initiate specimen collection and mailing to MRI for analysis. Of these 43 areas, 36 have responded as of September 7, 1973, with a total of 710 specimen sets. Table A-I indicates the total areas contacted, specimen kits dispatched and specimen kits received. As of September 7, 1973, MRI has dispatched a total of 1,731 specimen collection kits and received 710 back. Table I indicates the number of specimen kits received per month during the project.

Our rapport with the supply areas is good; much of this is due to the efforts of Dr. J. L. Nichols of the Office of Alcohol Countermeasures, who has been in contact with all the potential areas we have requested cooperation from.

The condition of most specimen kits was good when they were returned to the Institute. Although we had requested samples of urine, blood, bile and alcohol washings in each case, it was not always possible for the coroners or medical examiners to furnish all of these items. Table C-I

TABLE I

RECEIPT OF SPECIMEN KITS BY MONTH

Month	Specimen Kits Received
June to November 1971	0
December 1971	8
January 1972	12
February 1972	6
March 1972	13
April 1972	23
May 1972	25
June 1972	33
July 1972	32
August 1972	39
September 1972	35
October 1972	46
November 1972	42
December 1972	63
January 1973	55
February 1973	39
March 1973	36
April 1973	53
May 1973	46
June 1973	29
July 1973	29
August 1973	42
September 1 to 4, 1973	4
Total	710

(Appendix C) includes information on the specimen kits received up until September 7, 1973, their origin, and the status of the contents. Out of the total 710 specimen kits, only 699 actually were collected from fatally injured drivers. The remaining 11 were pedestrians, passenger or airplane pilots. Of the 699 specimen kits from fatally injured drivers, 97.3% furnished the alcohol washes, 56.5% furnished urine, blood, and bile, 74.0% furnished urine, 97.6% furnished blood, and 75.3% furnished bile.

At the initiation of this project, we also requested that liver samples be included in the program. The response from coroners and medical examiners persuaded us that we were likely to get much better cooperation from them if we requested only urine, blood, bile and alcohol washings. Liver samples were, therefore, dropped from the request before any kits were dispatched. Liver is a good source for analysis of drugs, but since we were already requesting urine, blood, and bile, we felt that if drugs had been taken, we would find them in at least one of the fluids requested. Table A-II (Appendix A) lists the coroners, medical examiners and/or ASAP personnel with whom collection arrangements were negotiated (successfully or unsuccessfully).

C. Development of Analytical Procedures

The analytical procedures developed for this program consisted of a qualitative thin-layer chromatography (TLC) screen followed by a quantitative gas chromatographic (GC) confirmation of positives from the TLC screen. If any doubt existed as to the nature of the drug, mass spectrometric analysis was also conducted (qualitative). TLC and GC methods were initially chosen for their already proven reliability to detect and quantitate many drugs in body fluids.

The above tests were carried out on extracts from the body fluids or alcohol washes. Various extraction systems were investigated for their suitability with the above analytical methods.

In order to quantitate drug levels in body fluids, the extraction efficiency of the system was also determined for the drugs which were confirmed present in body fluids during the course of this program.

Blood alcohol levels were also determined in this project using a gas chromatographic technique. Described in detail below are the various stages of the methods development program. They are:

1. Investigation of the characteristics of pure samples of the drugs to be screened for.

2. Investigation of extraction systems on body fluid solutions of the drugs to be screened for.

3. Determination of extraction efficiencies.

4. Investigation of hydrolysis of specimens.

5. Development of analytical methods for marihuana.

6. Development of a total analytical system for the drugs to be screened for.

7. Determination of blood alcohol levels.

8. Detailed description of some actual analytical system trials using hospital autopsy samples.

1. Investigation of the characteristics for pure samples of the drugs to be screened for: Pure samples of the drugs of interest were acquired from commercial chemical companies, the Bureau of Narcotics and Dangerous Drugs, and the National Institute of Mental Health. The drugs represented the major classes of drugs used and abused in the United States, including sedatives tranquilizers, analgesics, stimulants, antihistamines and decongestants, narcotics and miscellaneous, including hallucinogens. These are listed in Table II (p. 15) under their medical classifications. The chemical name of the drug is given and this is followed in parentheses by the name of the most popular prescription item containing this drug if appropriate.

The drugs were all dissolved in pure methanol at a concentration of 1 mg/ml and stored under deep freeze while not in use. These solutions were used for investigating (a) the thin-layer chromatographic (TLC) and (b) gas chromatographic (GC) characteristics of the drugs.

a. Investigation of the TLC characteristics: To a thin-layer chromatographic plate (20 cm x 20 cm, Silica Gel G on glass, 250 μ thick) drug solutions were spotted on a horizontal line 2 cm from the bottom of the plate. Ten microliters of solution was spotted in each case. Each drug was spotted on at least two different plates. These plates were then developed in glass TLC tanks containing various test solvents. After development of the plates for 10 cm from the spotting line, the plates were removed and dried by an air current. When dry the plates were sprayed with a variety of test visualization reagents and the colors and positions (R_f values) of the drugs noted. The most sensitive and useful solvents and visualization reagents were then used again in duplicate tests to establish reproducibility.

The solvents found superior in these tests were:

Solvent No. 1 Acetone:Chloroform 1:9
Solvent No. 2 Ethyl Acetate:Methanol:Ammonia 85:10:5
Solvent No. 3 Ethyl Acetate:Methanol:Ammonia:Benzene, 75:10:2:13
Solvent No. 6 Benzene:Chloroform, 3:7
Solvent No. 11 Benzene

These numbers are not consecutive, but are in accord with the legend to the total developed analytical system referred to later in the script, Figure 3, p. 22.

The visualization reagents found superior in these tests were:

UV - ultraviolet light

$HgSO_4$ - mercuric sulfate solution--suspend 5 g of mercuric oxide in 100 ml water, add 20 ml concentrated sulfuric acid, cool and dilute to 250 ml with water

DPC - diphenyl carbazone solution--dissolve 5 mg in 50 ml chloroform

$KMnO_4$ - potassium permanganate solution, 0.1% in water

FBB - Fast Blue B solution--250 mg in 100 ml of 0.1 N hydrochloric acid, followed by a spray with 0.5 N sodium hydroxide

Nin - Ninhydrin--commercially available in aerosol bombs

IOP - iodoplatinate solution--dissolve 1 g platinum tetrachloride in 100 ml water, mix with 300 ml water containing 10 g potassium iodide. Dilute to 400 ml with water. Dilute 1:1 with hydrochloric acid before use.

Table B-I, located in Appendix B "Analytical Development" attached to this report, indicates the two solvents found most suitable for the drugs of interest. The most suitable visualization reagents are also shown. Tables B-II and B-III (Appendix B) list the mobilities and color reactions for all the drugs using these solvents and visualization reagents.

b. Investigation of the GC characteristics: Aliquots of standard drug solutions were treated with acid or base to release the free drug and then subjected to GC analysis.

Two columns were developed for these drugs--a 6-ft and a 4-ft column, 2 mm and 4 mm ID, respectively, packed with 3% OV-1 on 100/120 mesh Gas Chrom Q. The carrier gas was nitrogen at a flow rate of 50 ml/min, detector temperature was 260°C, injection port was 240°C. The column temperature was varied. The instrument used in these investigations was a Bendix 2500 Gas Chromatograph. Table B-IV (Appendix B) lists the drug, column used, column temperature and retention time for all the drugs of interest. The cannabinoids (marihuana) were excluded from this test since they were analyzed for by TLC or a color test (qualitative). Reproducibility was ascertained for the retention times by duplicate runs. The barbiturates were run either as free barbiturates or as methylated derivatives depending on the retention time desired. Morphine and hydromorphone had to be methylated to produce reasonable retention times. Methylation was produced on-column using standard commercial methylation reagents. Acetyl salicyclic acid and salicylic acid were silylated before injection to produce useful retention times.

2. Investigation of extraction systems on body fluid solutions of drugs to be screened for: Two types of extraction systems were considered for this program--liquid extraction with diethyl ether and ion-exchange resin column extraction with XAD-2 resin.* The two methods and their comparison are described below.

a. Liquid extraction: A volume of body fluid was treated as follows:

Urine - Take 20 ml,
Blood - Take 15 ml, dilute 1:1 with water
Bile - Take 10 ml, dilute 1:1 with water

The fluid was then taken to pH 2.2 with hydrochloric acid and shaken with an equal volume of diethyl ether. The phases were allowed to separate and the ether phase removed and allowed to evaporate to a residue. The aqueous phase was taken to pH 9.3 and extracted again with an equal volume of ether. Another extraction at pH 11.0 provided a third residue. These residues were taken up in 100 µl of methanol and subjected to thin-layer chromatography and gas chromatography.

b. Ion exchange resin extraction: The body fluids, diluted as for liquid extraction, were placed over a column of XAD-2 resin as shown in Figure 2. The pH of the fluid was adjusted to 9.2 with a buffer solution and the fluid allowed to run through the column. The fluid was then discarded and the column washed with 20 ml water. The drugs were then eluted from the column using 20 ml of 1,2-dichloroethane/ethyl acetate, 4:6. This eluate was evaporated to dryness on a water bath at 60°C after the addition of 1 drop of concentrated hydrochloric acid. The residue was reconstituted in 100 µl methanol and subjected to thin-layer chromatography and gas chromatography.

* Available from Brinkmann Instruments, Inc., or Rhom and Haas, Inc.

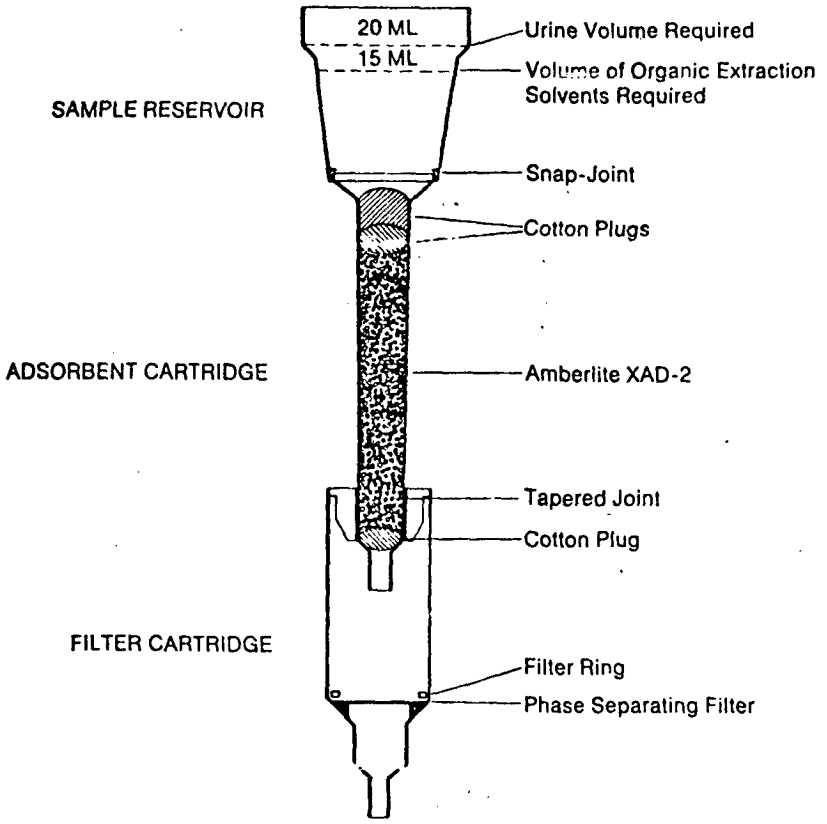

Figure 2 - Extraction Assembly

c. Comparison of extraction methods: In order to compare these extraction systems for usefulness with the TLC and GC analysis methods and to determine sensitivity limits for the total analysis method; body fluids were spiked with standard drug solutions, carried through the extraction process and subjected to TLC and GC.

(1) Urine: Four hundred milliliters of urine collected from Midwest Research Institute personnel was divided into four portions. One portion was used as a blank and the other three were spiked as follows:

Blank - No drugs added

Barbiturates - 200 µg phenobarbital, 200 µg secobarbital

Amphetamines - 400 µg d-amphetamine, 400 µg methamphetamine

Narcotics - 400 µg methadone, 400 µg cocaine, 400 µg hydromorphone
200 µg morphine, 200 µg codeine, 200 µg meperidine
200 µg quinine, 50 µg nicotine

The above solutions were extracted by both methods, and the extracts subjected to TLC and GC.

The experiments were repeated until reproducible results were obtained using any one batch of body fluid. The results for the ether and resin extraction methods are shown below. In all cases, the resin method gave cleaner extracts than the ether method. The resin method also yielded better extraction of many kinds of drugs, especially morphine. At the level tested, amphetamines and nicotine were detectable only by the resin extract method.

Drugs Spiked Into Urine	Drugs Found in the Extraction Method	
	Ether	Resin
Blank	Negative for all drugs	Negative for all drugs
Barbiturates	Secobarbital Phenobarbital	Secobarbital Phenobarbital
Narcotics	Methadone Cocaine Hydromorphone Morphine (weak) Codeine Meperidine Quinine	Methadone Cocaine Hydromorphone Morphine (very strong) Codeine Meperidine Quinine Nicotine
Amphetamines	Negative for both	d-Amphetamine Methamphetamine

(2) Blood: Two hundred milliliters of blood (from a local blood bank) was diluted with 200 ml of water and divided into 100-ml portions. The portions were spiked with the same drugs and in the same concentrations as in the case of urine. The blood used in these experiments was treated with heparin or sodium oxalate to prevent coagulation and with sodium fluoride to preserve the blood. Extraction procedures employed were the same as those for urine and were followed by the same TLC and GC procedures as used for urine extracts. In addition, deproteinization of the

blood was attempted to research the effect of such a treatment on the extraction processes. Deproteinization detracted much from the efficiencies of both ether and resin extraction schemes. On whole blood and serum the resin extraction method gave remarkably clear extracts which contained more drug than the ether extracts. Amphetamines and nicotine were detectable only when using the resin method. The results are shown below.

Drugs Spiked Into Blood	Drugs Found in the Extraction Method	
	Ether	Resin
Blank	Negative for all drugs	Negative for all drugs
Barbiturates	Secobarbital Phenobarbital	Secobarbital Phenobarbital
Narcotics	Methadone Cocaine Hydromorphone Morphine Codeine Meperidine Quinine	Methadone Cocaine Hydromorphone Morphine Codeine Meperidine Quinine Nicotine
Amphetamines	Negative for both	d-Amphetamine Methamphetamine

These results were also confirmed by GC, yielding extraction efficiencies which were unreproducible and varied from 30-60% with the ion exchange resin.

(3) Bile: A similar experiment using spiked bile (diluted 1:1 with water) yielded results similar to those obtained for blood. Again, extraction efficiencies were on the order of 30-60% using the ion exchange resin.

The ion exchange extraction experiments were then all repeated using all the drugs quoted in Table II (except cannabinoids). All the drugs were detectable with TLC and GC (qualitatively) down to a spiking level of 1 µg/ml for all drugs except salicylic acid and acetylsalicylic acid which could not be detected below 5 µg/ml.

On the basis of these experiments it was concluded that acceptable sensitivity limits were attainable by using ion-exchange resin extraction combined with TLC and GC. Variations in recovery (extraction efficiency) were believed due to reaction and/or destruction of the spiked

TABLE II

DRUGS TO BE INCLUDED IN THE ANALYTICAL SCREEN

Sedatives and Hypnotics

Phenobarbital (Luminal)
Pentobarbital (Nembutal)
Amobarbital (Amytal)
Secobarbital (Seconal)
Butabarbital (Butisol)
Butobarbital (Butethal)
Diphenylhydantoin (Dilantin)
Glutethimide (Doriden)
Methaqualone (Quaalude)

Tranquilizers

Meprobamate (Miltown)
Chlordiazepoxide (Librium)
Diazepam (Valium)
Chlorpromazine (Thorazine)
Promazine (Sparine)
Thioridazine (Mellaril)
Trifluoperazine (Stelazine)

Analgesics

Acetylsalicylic acid (Aspirin)
Salicylic acid
Propoxyphene (Darvon)

Stimulants and Antidepressants

Methylphenidate (Ritalin)
Imipramine (Tofranil)
Amitriptyline (Elavil)
Amphetamine (Dexedrine)
Methamphetamine (Desoxyn)

Antihistamines and Decongestants

Chlorpheniramine
Diphenhydramine
Tripelennamine
Methapyrilene
Phenylpropanolamine

Narcotics

Nalorphine (Nalline)
Morphine
Codeine
Meperidine (Demerol)
Cocaine
Methadone (Dolophine)
Hydromorphone (Dilaudid)

Miscellaneous

Dimethyltryptamine (DMT)
Diethyltryptamine (DET)
Lobeline
Mescaline
Methylene dioxyamphetamine (MDA)
Quinine
2,5-dimethoxy-4-methylamphetamine (STP)
Nicotine
Tetrahydrocannabinol (THC)a/
Cannabinol (CBN)a/

a/ Ingredients of marihuana.

drugs in the body fluids before extraction, since duplicate extractions from the same spiked body fluid yielded reproducible results.

3. Determination of extraction efficiencies: It was found in previous work that spiking actual body fluids with low levels of drugs (1-2 µg/ml) resulted in unreproducible extraction efficiencies between different samples of the same body fluid (e.g., urine). We came to the conclusion that this was due to reaction of the small amount of drug with the varying ingredients in body fluids. The extraction efficiency was sufficiently large to give the method a useful sensitivity but not reproducible enough for quantitation of drugs in the body fluids.

It was therefore decided to calculate the extraction efficiencies from water and make the assumption that the same extraction efficiency would hold for body fluids. This is a valid assumption since body fluids are mainly water, the ion-exchange resin is capable of extracting 1,000 times the amount of body fluid we actually use, and we are detecting only the free drugs.

Another assumption made was that the extraction efficiency at 10 or 20 µg/ml would be the same as at 1 or 2 µg/ml. To test this, the extraction efficiency of phenobarbital was investigated at levels of 20 µg/ml, 10 µg/ml and 5 µg/ml in water. Ultraviolet spectroscopy of the initial solutions, the water solution after passage through the ion exchange column, and the eluates from the columns, indicated that the extraction efficiency was 75% at all spiking levels. This was also confirmed by gas chromatography. It was found necessary to reconstitute all column eluates in at least 1/2 ml of methanol to avoid loss of drug from the residue vessels. This 1/2 ml of solution was then reduced to 100 µl for submission to TLC and GC.

The extraction efficiencies for other drugs were conducted at levels of 10 µg/ml from water. Experiments were conducted in duplicate to ensure reliability. These extraction efficiencies as shown in Table III are used to quantitate levels of drugs found by GC in the body fluids. Extraction efficiencies have only been calculated for those drugs we have encountered in body fluids of fatally injured drivers in this program.

4. Investigation of hydrolysis of specimens: Many drugs, when administered, are not only metabolized to some extent but are also conjugated to glucuronic acid as part of the body's effort to aid excretion. These conjugates or glucuronides will not appear on drug analysis screens since only free drug is assayed by most analytical methods. It is desirable, therefore, to break up the glucuronides to the free drug and glucuronic acid. Hydrolysis will accomplish this, and can be conducted by using acid or enzymes.

TABLE III

EXTRACTION EFFICIENCIES FOR DRUGS USING XAD-2 RESIN

Drug	Extraction Efficiency (%)
Meprobamate	49
Glutethimide	73
Phenobarbital	75
Pentobarbital	66
Amobarbital	73
Trifluoperazine	18
Quinine	81
Chlorpromazine	21
Butobarbital	51
Mescaline	34
Amphetamine	55
Methamphetamine	61
Lobeline	100
Methylphenidate	53
Meperidine	52
Methaqualone	66
Tripelennamine	61
Chlorpheniramine	75
Morphine	62
Hydromorphone	75
Imipramine	67
Methapyrilene	53
Diphenhydramine	63
Dimethyltryptamine	50
Diphenylhydantoin	58
Butabarbital	31
Secobarbital	98
Promazine	74
Diazepam	94
Chlordiazepoxide	85
Phenylpropanolamine	18

Acid hydrolysis is fast and efficient, but it also destroys free drug. The extent of destruction depends on the nature of the drug. Enzyme hydrolysis is slow but gentle. The enzyme usually used, β-glucuronidase, breaks down only the glucuronide conjugates.

Spiked body fluid experiments were conducted as in the extraction investigation, using ion exchange resin columns followed by TLC of the reconstituted residues. However, hydrolysis was conducted before extraction to determine if any detrimental effects were produced by the hydrolysis conditions. The hydrolysis conditions were:

a. Acid hydrolysis: The spiked fluid was taken to pH 2.0 with hydrochloric acid and then autoclaved at 15 psi for 20 min. After cooling, the fluids were extracted.

b. Enzyme hydrolysis: The spiked fluid was taken to pH 5.2 and incubated at 37°C for 18 hr in the presence of β-glucuronidase. The resultant fluids were filtered and then extracted.

The results indicated that acid hydrolysis destroyed quinine and cocaine and that some barbiturates were lost due to volatility. The enzyme method destroyed no drugs and no volatilization of drugs was evident.

It was concluded that enzyme hydrolysis of urine, blood, and bile samples was the most suitable method for the analytical scheme for this program.

5. Development of analytical methods for marihuana: Six human volunteers underwent the following experimental procedure in order to examine the feasibility of detecting marihuana components by washing the oronasal areas and fingers.

Each volunteer was swabbed around the mouth, nose, inside the mouth and on the teeth and gums with a cotton ball dipped in ethanol. Fifty milliliters of ethanol were placed in a beaker for this purpose and the examiner wore rubber gloves, holding the cotton ball with metal tweezers. The cotton balls were dipped in the ethanol, squeezed dry and discarded. The thumb and first two fingers of each hand were dipped into the beaker and shaken for 15 sec. The ethanol was then allowed to evaporate in a hood in preparation for analysis.

Each volunteer was then required to smoke a reefer of marihuana. The marihuana used was a good quality government-furnished variety. The volunteers were left to smoke at their own pace although they were kept under strict observation at all times.

The volunteers were then washed with ethanol in a similar manner as prior to smoking. The ethanol was evaporated in a hood in preparation for analysis.

Blank specimens consisted of 50 ml of ethanol which was evaporated to dryness in preparation for analysis.

Spiked specimens consisted of 10 µg each of THC and cannabinol in 50 ml of ethanol. The solution was evaporated in preparation for analysis.

Analysis of the residues from the ethanol solutions was carried out as follows:

a. Volunteers 1, 2, 3, blank and spiked specimens: The residues were dissolved in 1 ml of a 1:1 mixture of benzene and petroleum ether. The solution was placed on an alumina column and washed with 10 ml of the same benzene:petroleum ether solution. The cannabinoids were then eluted with 5 ml of a 1:1 mixture of benzene:chloroform. The eluate was evaporated to 1/2 ml and spotted on a TLC plate. The plate was developed in benzene and sprayed with Fast Blue B, followed by sodium hydroxide solution (0.5N). A standard solution of THC was applied to each plate before developing the check on the validity of the results.

It was found that in all cases the washings showed either no cannabinoids present or extremely faint indications of their presence. The standard THC spot showed up very well in all cases. The conclusion is that the cannabinoids were trapped on the column. Further elution did alleviate the problem.

b. Volunteers 4, 5, 6, blank and spiked specimens: The residues were dissolved as much as possible in 1 ml of methanol. Surplus fat was physically removed from the solution. Methanol solution (1/2 ml) was spotted onto TLC plates along with a standard spot of THC. The plates were developed in benzene and sprayed with Fast Blue B followed by 0.5N sodium hydroxide.

In the case of the blank specimen, no detectable traces of cannabinoids were found. Likewise with all three "before smoking" washes--no cannabinoids were found. The standard THC spot gave a red spot at R_f 4.0; the spiked wash gave two spots, red at R_f 4.0 (THC), blue at R_f 4.75 (cannabinol). All three "after smoking" washes gave strong bright spots, red at R_f 4.5 (THC) and blue at R_f 4.75 (cannabinol).

The total results are summarized in Table IV. The conclusion is that the column technique, while removing fat from the samples, also removes much or most of the very fat soluble cannabinoids. Elimination of the column purification step results in a spotting solution from

which fat may be physically removed. The slight amount of fat remaining has a small effect on the R_f values of the THC and cannabinol found in user samples, but this does not detract from the method or results. These results indicated that the method was feasible.

TABLE IV

TLC CHARACTERISTICS OF MARIHUANA ANALYSIS

Specimen	Rf Benzene	Color	Strength
Blank (using column)	-	-	-
Spiked (using column)	-	-	-
User 1 before smoking (using column)	-	-	-
User 1 after smoking (using column)	-	-	-
User 2 before smoking (using column)	-	-	-
User 2 after smoking (using column)	-	-	-
User 3 before smoking (using column)	-	-	-
User 3 after smoking (using column)	-	-	-
Blank (no column)	-	-	-
Spiked (no column)	4.0	Red	Medium
	4.5	Blue	Medium
User 4 before smoking (no column)	-	-	-
User 4 after smoking (no column)	4.5	Red	Strong
	4.75	Blue	Strong
User 5 before smoking (no column)	-	-	-
User 5 after smoking (no column)	4.5	Red	Strong
	4.75	Blue	Strong
User 6 before smoking (no column)	-	-	-
User 6 after smoking (no column)	4.5	Red	Strong
	4.75	Blue	Strong

To investigate fatally injured drivers, cotton swabs on plastic sticks were used in the kits dispatched to coroners and medical examiners. Swabs were supplied for the left hand, right hand and oronasal area of each driver. The analytical results showed very few positives.

and upon investigation it was found that the swabs were retaining the cannabinoids, i.e., elution of the cannabinoids from the swabs was not occurring. Experiments in which the swabs were spiked with cannabinoids indicated that the cannabinoids were stable on the swabs for periods of over 3 weeks at room temperature and it was therefore concluded that a color test for cannabinoids on the swab would yield better results than the TLC method which required elution. The on-the-swab test method has been proven effective for lip swabs from marihuana pipe smokers and is documented in the U.S. Army Land Warfare Laboratory Technical Report No. LWL-CR-08C72. Seventy-eight percent of a population of 100 smokers yielded positive results in this study after smoking 600 mg of marihuana containing 1.7% THC. No false positives were recorded. Table B-5 (page 70) summarizes the results of the LWL study. Interfering substances in this test were evaluated using spiked swabs and the only substances found constituting an interference were Areca, Catechu, Mormon Tea and Yohimbe. Table B-VI (page 71) lists the substances examined for interference in this test and the color reactions obtained. The on-the-swab test consists of moistening the swabs with two drops of 0.25% Fast Blue B in 0.1N hydrochloric acid and allowing them to dry for 2 min. Following this period, the swabs are moistened with two drops of 0.2N sodium hydroxide solution. Any red or pink color appearing within 2 sec of the addition of the sodium hydroxide is considered a positive.

The on-the-swab color test was employed on fatally injured driver swabs in the latter part of this program. Of the 710 sample sets analyzed, Nos. 1-365 were analyzed using the TLC method in which the three swabs were combined in an eluate, and Nos. 366-710 were analyzed using the on-the-swab method on the three separate swabs (left-hand, right-hand, mouth).

6. Development of a total analytical system for the drugs to be screened for: Using the data generated in the previous part of this section, a total analytical system for all the drugs of interest was developed. This system, as depicted in Figure 3, is capable of detecting the 46 drugs shown in Table II. Sensitivity levels of better than 1 µg/ml drug in body fluid were obtained for all drugs except salicylic acid and aspirin which have a sensitivity level of 5 µg/ml. Nicotin, aspirin, and salicylic were analyzed qualitatively in the employment of this analytical system on the fatally injured driver samples. Figure 3 is also presented in Appendix B followed by a key and a set of notes. The instructions designed to follow Figure 3 for the TLC screening of drugs in blood, urine and bile are also presented in Appendix B as are the instructions for TLC and color test screening for marihuana from alcohol washings.

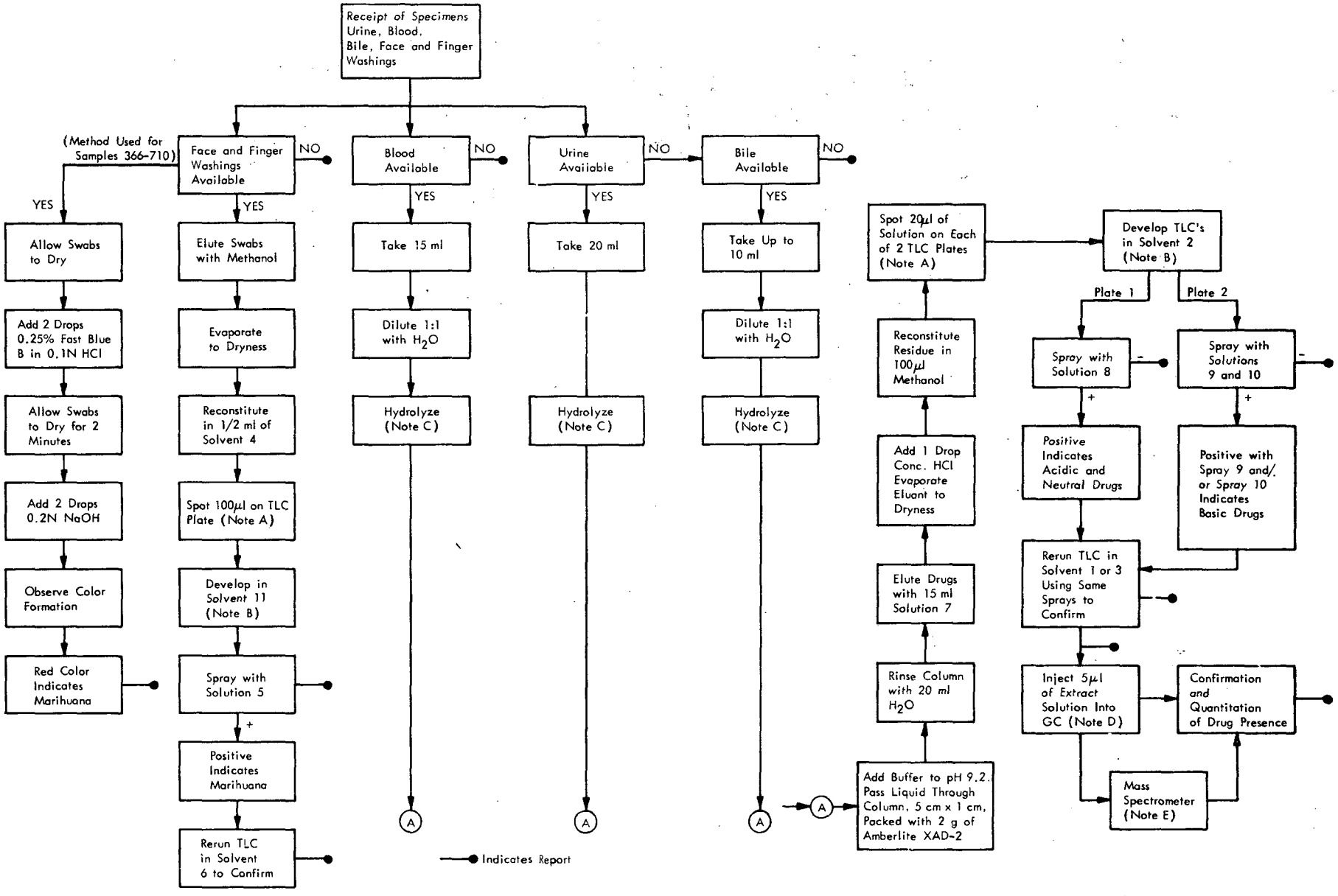

Figure 3 - Analysis of Body Specimens for Drugs

Should a positive be qualitatively confirmed by the TLC screen, the residue containing that positive is subjected to GC analysis by injection of 5 µl of the methanolic residue solution into a Bendix 2500 Gas Chromatograph, using the conditions cited.

7. Determination of blood alcohol levels: All blood specimens obtained from fatally injured drivers were assayed for blood alcohol. The method employed for this assay was a gas-chromatographic technique using the "head space" method. A small quantity of blood was placed in a serum bottle with a tight-fitting septum and maintained at a constant temperature of 40°C for at least 1/2 hr. Analyses were performed by injecting several microliters of the head space gas above the blood specimen into a GC with a flame ionization detector. The column was 2 ft by 1/8 in. OD stainless steel packed with 100/120 mesh Porapak Q. The column temperature was held at 110°C and the carrier gas flow was held at 50 cc/min.

These conditions gave good peak shape and separation for ethyl alcohol and acetonitrile, which was employed as an internal standard. A standard curve was prepared over the concentration range 0.050 to 0.400% by spiking water at these levels and adding a known amount of acetonitrile. These solutions were run on the gas chromatograph and the ratio of the ethyl alcohol to the acetonitrile peak was plotted against percent alcohol. This curve was employed to determine the alcohol concentration in the blood samples by extrapolating the peak height ratios to alcohol concentration.

8. Detailed description of some actual analytical system trials using hospital autopsy samples: Before analysis of fatally injured driver specimens, several autopsy specimens were examined from the local area (Kansas City). In most cases, the drugs administered before death were known. The samples were put through the fully developed screen and confirmation systems. Detailed below are the results of analysis of fluids from four autopsy cases.

Drugs Known Administered	ID No. and Specimen	Analytical Results
Barbiturates	N-71-244 Blood	Phenobarbital 2.75 µg/ml
Demerol and Morphine	N-71-252 Urine	Demerol 72.4 µg/ml Morphine 42.2 µg/ml
	Blood	-
	Bile	-

Drugs Known Administered	ID No. and Specimen	Analytical Results
Demerol	N-71-257	
	Urine	Demerol 32.1 µg/ml
	Blood	Demerol 6.5 µg/ml
	Bile	Demerol 2.5 µg/ml
Tuinal and MDA*	No ID	
	Urine	Phenobarbital 0.317 µg/ml Amphetamine 0.13 µg/ml
	Blood	Phenobarbital 0.47 µg/ml Amphetamine trace
	Bile	Phenobarbital 3.65 µg/ml Amobarbital 0.217 µg/ml Secobarbital 0.155 µg/ml Amphetamine trace

Specimen acquisition was not easy, but we believe that these four examples indicate the analytical system developed for this project is most adequate for detecting drugs in fatally injured drivers.

D. Analysis of Specimens from Fatally Injured Drivers

Specimens from 699 fatally injured drivers have been analyzed using the methods developed and described earlier. The procedure adopted for analysis operations was as follows:

1. Specimens are logged in as soon as they arrive. The contents are checked, repackaged if necessary, and frozen until needed for analysis. The ID card is placed in a file and the data from it also entered into a log book and a lab record book.

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* It was indicated that the woman had ingested "Tuinal" tablets known to contain amobarbital and secobarbital. It was also reported that she had taken a street drug which was analyzed by our laboratory and found to contain MDA (methylene dioxy amphetamine) which would be metabolized to amphetamine. Our analytical results agree with these reports. The official laboratory, to which autopsy specimens were also sent, was unable to find amphetamine and could not find any barbiturates at a level consistent with overdose symptoms.

2. The face and finger washes are analyzed for cannabinoids (marihuana).

3. Five milliliters of blood is removed for alcohol assay.

4. The fluids are hydrolyzed, diluted, extracted and the extracts frozen until needed.

5. The extracts are subjected to a thin-layer chromatographic (TLC) screen.

6. Positives from the TLC are run again in a second solvent for qualitative confirmation.

7. Confirmed positives are reconfirmed and quantitated using gas chromatography on the same extract.

8. The extracts are subjected to mass spectrometry if any doubt exists as to the nature of the drug.

9. The results are compiled in a notebook and reports. Quantitation is effected using the GC data in conjunction with the extraction efficiency data.

The analytical method developed is dependent on the use of the XAD-2 extraction resin for body fluid analysis. Quality control checks on the extraction method were continuously carried out by the laboratory using spiked samples of body fluids.

The results of the analysis of the 699 specimen sets are presented in Section IV of this report.

E. Dissemination of Analytical Information

The analytical data derived from the fatally injured drivers have been compiled in letter form and distributed to the ASAP Regional Directors and others from whom the specimens originated. This service to the coroner and medical examiner has aided in maintaining cooperation between the parties concerned in this project.

IV. EXPERIMENTAL RESULTS

The experimental results for the 699 fatally injured drivers are listed in Table C-I (Appendix C, attached to this report). This listing also contains 11 sets of specimens which were later found to be collected from victims other than drivers. The total listing therefore numbers 710 specimen sets. Table C-I indicates the location of the crash, date of crash, whether or not detailed information of the crash was available, time of crash, age and sex of the victim, type of crash and whether the driver (victim) was at fault. This is followed by the blood alcohol, marihuana and drug analyses. Drug levels are recorded in µg/ml. The drug level may be converted to mg % by dividing the µg/ml level by 10.

The analysis and interpretation of these results are presented in the next section.

V. ANALYSIS AND INTERPRETATION OF EXPERIMENTAL RESULTS

In order to fully interpret the analytical results from Table C-I, additional pertinent data on the details of the crashes are necessary. To fulfill this need, Crash Data Information Forms as shown in Appendix A were dispatched to each area submitting specimens. The forms were dispatched in duplicate for each specimen submitted.

As of September 7, 1973, 249 Crash Data Forms had been received for the 699 fatally injured drivers analyzed. Table C-I (Appendix C) indicates for which drivers Crash Data Forms have been completed. Information on age and sex of the victim, date, time and type of crash and whether the driver (victim) was at fault or not has been recorded in Table CI as indicated from the Crash Data Forms. Copies of the Crash Data Forms have been submitted to DoT.

To aid in the assessment of the data in Table C-I, and in particular to assess the amount of bias in the sampling of fatally injured drivers, each area submitting samples was asked to complete a questionnaire such as that shown on p. 38, Appendix A. This questionnaire was designed to elicit information on whether the samples submitted from a given area represented 100% of the fatally injured drivers within the time period samples were submitted, and if not, the reasons why not. Table A-III lists the replies from responding areas. Twenty-five areas responded out of the 36 areas receiving the questionnaire. Essentially, nine areas submitted specimens with no bias. Twenty areas submitted specimens with no deliberate bias. One area submitted only male drivers and four areas submitted specimens biased on suspicion of drugs. These latter four areas submitted a total of 60 driver specimen sets.

For the purpose of statistical analysis of the results, specimen sets 34, 82, 361, 408, 410, 468, 475, 500, 501, 502, and 562 are omitted since it was found that there victims were not fatally injured drivers. The remaining 699 specimen sets have been analyzed statistically as below:

A. Specimens Collected

In the 699 specimen sets, from fatally injured drivers, collection of the following fluids was achieved as follows:

Urine - 517 specimens, i.e., 74.0% of possible total
Blood - 682 specimens, i.e., 97.6% of possible total
Bile - 526 specimens, i.e., 75.3% of possible total

Specimen sets complete with urine, blood, and bile numbered 395, i.e., 56.5% of possible total. Four specimen kits were received with no body fluids--only marihuana swabs.

Marihuana swabs were returned in 357 cases out of the 362 tested by the TLC method, i.e., 98.6%.

Marihuana swabs were returned in 323 cases out of the 337 tested by the on-the-swab method, i.e., 95.8%.

Enough blood was received for alcohol analysis in 684 cases out of the 699 possible, i.e., 97.9% of the cases.

At the time of analysis, seven of the 699 specimen set origins were unknown, i.e., 692 specimen sets were of known origin. The specimen sets of unknown origin at the time of statistical analysis were 504, 539, 540, 542, 590, 661, and 665.

B. The Incidence of Drugs

The incidence of drugs has been calculated in the body fluids, alcohol washings (swabs) and drivers with the following criteria applying:

- Drugs in urine and bile are assigned as being positive only if a level of 1 µg/ml or greater is found.

- Drugs in blood are assigned as positive at any level, including blood alcohol.

- Aspirin, nicotine and salicylic acid are qualitative only and are assigned positive if found at any level.

- Marihuana results are treated in two separate batches, those tested by TLC and those tested on-the-swab.

Table V lists the incidences of drugs (other than alcohol, marihuana, nicotine, aspirin, and salicylic acid) found in urine, blood and bile.

The drugs are classified into groups, i.e., sedatives/hypnotics, stimulants, antihistamines/decongestants, tranquilizers, narcotic analgesics, and miscellaneous. Incidences are quoted for each individual drug, each drug group and finally the incidence of all drugs (other than alcohol, marihuana, nicotine, aspirin and salicylic acid). The number of cases of the appearance of a drug in a fluid is given in the table, this is followed by the percentage of fluid samples the drug was found in.

Table VI indicates the incidences of nicotine, aspirin, and salicylic acid in urine, blood, and bile samples. In each case, the number of incidences is followed by the percentages of fluid samples the drug was found in.

Table VII indicates the incidence of blood alcohol in the 684 blood samples collected. The alcohol level is stratified in quanta of 0.05% alcohol. Figures are quoted for drivers who had been drinking alcohol as well as drivers who were drunk (i.e., blood alcohol level $\geq$ 0.100%).

Table VIII indicates the incidence of marihuana in drivers as determined by the swab tests. The incidences are calculated separately for the TLC test and the on-the-swab test. The differences between swabs tested and swabs available are due to the fact that some swabs were too dirty for testing.

Table IX indicates the incidence of quantitated drugs (except alcohol) in drivers. All the 695 drivers from whom at least one body fluid was collected are included in this table (four collection kits were received containing only swabs). Incidences are quoted for drug groups as well as for any drugs. Incidences are also quoted for instances when the drugs were found with or without alcohol.

Table X indicates the incidence of quantitated drugs (except alcohol) in the 395 drivers from whom all three physiological fluids (urine, bile, and blood) were collected. Again, incidences are quoted for drug groups, any drugs and when drugs were found with or without alcohol.

TABLE V

INCIDENCE OF QUANTITATED DRUGS IN BODY FLUIDS

Drugs	Incidence					
	Urine (517 Specimens)		Blood (682 Specimens)		Bile (526 Specimens)	
	Number	Percentage	Number	Percentage	Number	Percentage
Amobarbital	3	0.58	3	0.44	4	0.76
Butabarbital	2	0.39	1	0.15	6	1.14
Butobarbital	1	0.19			2	0.38
DPH					1	0.19
Glutethimide	1	0.19	3	0.44		
Pentobarbital	4	0.77	1	0.15	1	0.19
Phenobarbital	13	2.51	12	1.76	8	1.52
Secobarbital	3	0.58			2	0.38
Sedatives and Hypnotics	27	5.22	20	2.93	24	4.56
Amphetamine	2	0.39	2	0.29		
Imipramine			2	0.29	1	0.19
Methamphetamine			3	0.44	2	0.38
Methylphenidate	1	0.19	1	0.15		
Cocaine			1	0.15		
Stimulants	3	0.58	9	1.32	3	0.57
Methapyrilene			1	0.15		
Phenylpropanolamine	7	1.35			6	1.14
Antihistamines and Decongestants	7	1.35	1	0.15	6	1.14
Meprobamate	2	0.39	1	0.15	7	1.33
Chlordiazepoxide	2	0.39				
Chlorpormazine	1	0.19	1	0.15	2	0.38
Trifluoperazine	2	0.39			2	0.38
Tranquilizers	7	1.35	2	0.29	11	2.09
Morphine	1	0.19			1	0.19
Hydromorphone					2	0.38
Meperidine	1	0.19				
Methadone	1	0.19				
Narcotic analgesics	3	0.58			3	0.57
Quinine	1	0.19				
Lobeline	1	0.19	2	0.29		
Dimethyltryptamine			1	0.15		
Any drug	49	9.48	35	5.13	47	8.94

TABLE VI

INCIDENCE OF NICOTINE, ASPIRIN AND SALICYLIC ACID IN BODY FLUIDS

Drug	Incidence					
	Urine 517 Specimens		Blood 682 Specimens		Bile 526 Specimens	
	Number	Percentage	Number	Percentage	Number	Percentage
Nicotine	284	54.9	57	8.4	91	17.3
Aspirin	114	22.1	87	12.8	104	19.8
Salicylic acid	29	5.6	7	1.0	20	3.8

TABLE VII

INCIDENCE OF BLOOD ALCOHOL IN DRIVERS

Percent Alcohol Found	Number of Incidences	Percentage of Total	Cummulative Percentage
0.000	287	42.0	42.0
0.010 - 0.049	39	5.7	47.7
0.050 - 0.099	37	5.4	53.1
0.100 - 0.149	67	9.8	62.9
0.150 - 0.199	77	11.3	74.2
0.200 - 0.249	62	9.1	83.3
0.250 - 0.299	52	7.6	90.9
0.300 - 0.349	28	4.1	95.0
0.350 - 0.399	19	2.8	97.8
$\geq$ 0.400	16	2.2	100.0
> 0.000	397	58.0 $\pm$ 3.8	
$\geq$ 0.100	321	46.9 $\pm$ 3.8	

TABLE VIII

INCIDENCE OF MARIHUANA IN DRIVERS

Test	Swabs Tested	Number of Positives	Percent Positives	Total[a] Incidence
TLC (357 drivers)	357 sets	6 sets	1.68	N.A.
On-the-swab (323 drivers)				
Right hand	303	80	26.4	33.8
Left hand	305	77	25.2	32.3
Mouth	201	44	21.9	28.1
Complete set	323 sets	124 sets[b]	38.4	49.2
Complete set of three swabs clean enough for testing	195 sets	23 sets[c]	11.8	15.1
		67 sets[b]	34.4	44.1

a/ Adjusted incidence takes into account that the on-the-swab test yielded 78% positives on tests with smokers in laboratory controlled experiments (U.S. Army LWL Report LWL-CR-08C72).

b/ Incidences in which at least one swab was positive per set.

c/ Incidences in which all three swabs were positive.

TABLE IX

INCIDENCES OF QUANTITATED DRUGS IN DRIVERS

Type of Drug	Total Incidences Drivers Number	Total Incidences Drivers Percent	Incidences Combined with No Alcohol Drivers Number	Incidences Combined with No Alcohol Drivers Percent	Incidences Combined with Alcohol Drivers Number	Incidences Combined with Alcohol Drivers Percent	Incidences Combined with Alcohol ≥ 0.100 Drivers Number	Incidences Combined with Alcohol ≥ 0.100 Drivers Percent
Sedatives and hypnotics	50	7.19	23	3.31	27	3.88	22	3.17
Stimulants	14	2.01	7	1.01	7	1.01	5	0.72
Antihistamines and decongestants	14	2.01	6	0.86	8	1.15	2	0.29
Tranquilizers	18	2.59	5	0.72	13	1.87	7	1.01
Narcotic analgesics	5	0.72	1	0.14	4	0.58	4	0.58
Miscellaneous	5	0.72	2	0.29	3	0.43	2	0.29
Any Drugs	91	13.09	38	5.42	53	7.63	40	5.76

TABLE X

INCIDENCES OF QUANTITATED DRUGS IN DRIVERS FOR WHOM ALL BODY FLUIDS WERE AVAILABLE

	Total Incidences		Incidences Combined with No Alcohol		Incidences Combined with Alcohol		Incidences Combined with Alcohol ≥ 0.100	
	Drivers		Drivers		Drivers		Drivers	
Tyoe of Drug	Number	Percent	Number	Percent	Number	Pereent	Number	Percent
Sedatives and hypnotics	35	8.86	14	3.54	21	5.32	16	4.05
Stimulants	8	2.03	3	0.76	5	1.27	4	1.01
Antihistamines and decongestants	9	2.28	3	0.76	6	1.52	4	1.01
Tranquilizers	11	2.78	2	0.51	9	2.28	5	1.27
Narcotic analgesics	3	0.76	1	0.25	2	0.51	2	0.51
Miscellaneous	1	0.25	0	0.00	1	0.25	0	0.00
Any drugs	60	15.19	19	4.81	41	10.38	30	7.59

Table XI indicates the incidences of nicotine, aspirin and salicylic acid in drivers. All 695 drivers from whom at least one body fluid was collected are included in this table.

TABLE XI

INCIDENCE OF NICOTINE, ASPIRIN AND SALICYLIC ACID IN DRIVERS

Type of Drug	Incidences Drivers Number	Percent
Nicotine	325	46.8
Aspirin	198	28.5
Salicylic acid	40	6.6

Tables D-I to D-II (Appendix D) are stratification compilations of driver and accident data (when known) and drug incidence in those drivers. Tables are shown for alcohol, all other quantitated drugs combined, sedatives/hypnotics, stimulants, antihistamines/decongestants, tranquilizers, nicotine, aspirin, and salicylic acid and marihuana. Data on whether the driver was at fault in the accident, whether the accident was single or multiple vehicle, the quarter of the year, the time of day (divided into quarters), the location of the crash (divided into five continental regions), the age (divided into five periods between the ages of 20 and 60) and sex of the victim. Chi-square values are indicated as positive when significances can be attached to a relationship between drug incidence and victim/crash data.

As noted earlier, 60 of the specimen sets were received from areas which lent bias to their specimens by submitting those which were suspected to be from drug users. If those 60 specimens are removed from the analysis, the following figures are revealed:

	Total Specimens	Total Specimens Minus the 60 Biased Specimens
Blood alcohol	58.0	58.24
Blood alcohol $\geq$ 0.100%	46.9	46.24
Marihuana (on-the-swab, all 3+)	11.8	11.96
Nicotine (in urine)	54.9	56.44
Aspirin (in urine)	22.1	23.18
Quantitated drugs (drivers)	13.1	12.60

A Chi-square test reveals no significance to any of these changes.

Finally, a comparison of alcohol and sedative use by drivers, as shown below reveals no significant influence on sedative use by alcohol or vice versa.

	Drivers Using Sedatives	Drivers Not Using Sedatives	Total
Drivers consuming alcohol	27	370	397
Drivers not consuming alcohol	23	275	298
Total	50	645	695

7.19% of drivers were consuming sedatives with or without alcohol

6.80% of drivers consuming alcohol were taking sedatives,, and 7.72% of drivers not consuming alcohol were taking sedatives.

VI. CONCLUSIONS AND RECOMMENDATIONS

A. Conclusions

1. Incidences: The incidences of all drugs[1/] detected by quantitative analysis (urine, blood, bile) are shown in Table V. It is apparent that a given drug may be much more detectable in one test than another. A consequence of this is that drug usage will be underestimated if any one of the tests is omitted. This is evident from a comparison of Tables IX and X whose incidences from the total sets of fluids are compared with incidences from only complete sets. Of course, for a specific drug it may be true that one or two tests is sufficient.

About one of 11 urine or bile tests is positive, whereas about one of 20 blood tests is positive. This may be due to the fact that urine and bile are drug concentration centers whereas blood is not.

In terms of people, 13% (91/695) had a positive response to one or more of the quantitated drugs excluding alcohol. This figure would be somewhat higher, presumably, if all samples were subjected to all three tests. (Although almost every sample furnished a blood test, this is not true with respect to urine and bile). Thus, the 13% is an "under-estimate" of the fraction of people using these drugs. If only those sets in which urine, blood and bile are all available are analyzed, an incidence figure of 15% is realized (60/395). Sedatives and hypnotics account for over half the drug incidence.

1/ Excluding alcohol, marihuana, nicotine, aspirin, and salicylic acid.

Table VI displays the incidences of the qualitative responses of nicotine, aspirin, and salicylic acid in body fluids. It is apparent that blood and bile tests greatly under-estimate nicotine incidence. The urine test also detects more aspirin and salicylic acid, but the discrepancy is much less marked. Table XI displays the incidences (driver-wise) of nicotine (47%) aspirin (28%) and salicylic acid (6%).

Tables VII and VIII summarize the results of the BAC test and the marihuana tests. Almost 3 of 5 (58%) drivers had been drinking, and nearly half (47%) were "drunk" (BAC $\geq$ 0.10%).

The original (TLC) marihuana detected only six users (1.7%), and is obviously not compatible with the second test (on-the-swab technique). The right-hand/left-hand/mouth results are homogeneous and detect 28-34% marihuana usage. Forty-nine percent of the drivers showed a positive on at least one swab. The percentage of three-positive marihuana results (based on the number of samples that permitted all three swab tests) is only 15%. These figures take into account that 78% of marihuana smokers were detected in laboratory tests using the swab technique combined with an on-the-swab color test. It is apparent that the reliability of swab test methods for marihuana smoker detection needs evaluation. Of significance in this respect is the fact that lip, forehead, and stomach swabs of six tobacco smokers and six perspiring athletes at MRI yielded no positives when tested by the on-the-swab technique. Thus, the basic concept of the swab test seems to have merit.

The 50 positive sedative results were examined in an attempt to differentiate their alcohol incidence from the alcohol usage in nonsedative users. However, in both the had-been-drinking, and drunk categories there is no difference, i.e., the sedative user is neither more nor less likely to use alcohol than the nonsedative user.

2. Stratifications: To some extent, it is possible to examine the influence (if any) of age,[2/] sex, season,[3/] region,[4/] time of crash,[5/] at fault or not, and single vehicle - multiple vehicle on the drug responses.

The responses stratified were: had been drinking, drunk, marihuana[6/] salicylic acid, aspirin, nicotine, stimulants, tranquilizers, antihistamines and decongestants, sedatives and hypnotics, and "any drug".[7/] However, the

---

2/ Age categories were: $\leq$ 19, 20-24, 25-29, 30-39, 40-49, 50-59, and $\geq$ 60.

3/ "Seasons" are: J-F-M (Quarter 1), A-M-J (Quarter 2), J-A-S (Quarter 3), and O-N-D (Quarter 4).

4/ "Regions" are: "Northwest" - Oregon, Washington; "West" - California, New Mexico, Nevada; "East" - Maine, New York, Vermont; "South" - Arkansas, Florida, Georgia, Kentucky, Maryland, Virginia; "Midwest" - Michigan, Minnesota, Nebraska, Ohio, Oklahoma, and Wisconsin.

5/ Time categories were: 0000-0059, 0600-1119, 1200-1799, and 1800-2399.

6/ Using only the results after the method was changed to the on-the-swab method.

7/ Any drug detected by a quantitative analysis (except alcohol).

three groups stimulants, tranquilizers, and antihistamines and decongestants did not produce sufficient sample size to yield formal statistical differences. These three groups will be discussed later. A summary of influences is:

1. The only drug significantly over-involved in the at-fault category is alcohol.

2. Alcohol is also the only drug over-involved in single-vehicle crashes.

3. Alcohol is the only drug upon which time-of-day is a significant influence (with, of course, increasing usage as time increases).

4. Region is not a significant stratification for any response.

5. Age is a significant factor only with respect to alcohol--unfortunately, age is often not known, however, and many of the comparisons are based on small sample sizes.

6. Sex is a factor with respect to alcohol and nicotine usage, but not otherwise. In both cases males are over-involved.

7. The factor season (quarter) is associated with <u>all</u> responses <u>except</u> alcohol and nicotine.

Thus, marihuana is spring-summer activity, aspirin is a winter "activity", etc.

It is plain that alcohol is by far the most dangerous drug examined. Alcohol is used by many more people than any other drug (except nicotine) and thus it's incidence is much easier to analyze statistically. Unfortunately, we cannot draw a statistically significant sample of amobarbital users, etc. With the exception of the combination alcohol-barbiturates, no synergistic possibilities were examined.

Finally, the drug groups tranquilizers, antihistamines, and stimulants did not furnish enough sample size to stratify meaningfully. It is, however, at least suggested by the data that males are over-involved in using tranquilizers and antihistamines, and that young people are over-involved in using stimulants.

B. Recommendations

On the basis of the present results, it is recommended:

1. That a study similar to the present study be initiated to secure a larger volume of data in order to gain more statistical significance in the incidence of drugs found in fatally injured drivers.

2. That such a study be controlled in such a way as to ensure collection of all specimens and victim/crash data.

3. That such a study be reduced in the scope of drugs analyzed so as to include only those which are indicated by this report to be contributing significantly to the total incidence of drugs; i.e., sedatives/hypnotics, stimulants, and alcohol.

4. That a more reliable test for marihuana smokers and marihuana intoxication be developed and utilized in a future program.

APPENDIX A

ACQUISITION OF SPECIMENS

NHTSA Project DoT-HS-119-3-627, MRI Project No. 3747-C

SPECIMEN COLLECTION FROM FATALLY INJURED DRIVERS

Requirements

The following specimens from fatally injured drivers who are dead on or before arrival at the hospital: (1) blood; (2) urine and/or bile; and (3) alcohol washings of the fingers and face. Please fill out the ID Cards in duplicate. Return one to MRI with the specimens, the other to the addresses in the enclosed envelope.

Instructions for Use of Kit

1. Blood collection: The kit contains a plastic bag with three vacutainer tubes (gray top). A "monoject" double needle (in pink plastic case) and a plastic vacutainer tube and needle holder are also provided.

To collect blood, screw needle into end of tube-and-needle-holder and remove plastic sheath to expose needle. Place a vacutainer tube (gray end first) into the tube holder and contact the gray end with the end of the inner needle. Do not puncture the gray seal at this point. Holding the tube-and-needle-holder with tube inserted, insert the outer needle into blood vessel--be careful not to push on the tube or else the seal will be broken prematurely. When blood vessel is punctured, slowly push the gray ended tube over the inner needle and puncture the gray seal. The vacuum in the tube will draw in approximately 15 ml blood. Remove the gray ended tube of blood and, keeping the needle in the blood vessel, push another empty gray ended tube over the inner needle. Repeat this to produce three vacutainer tubes of blood. Discard the needle, place the three tubes of blood in the plastic bag and secure as when received.

2. Urine collection: The kit contains a plastic screw cap bottle with yellow label "urine." Place as much urine in the bottle as possible, screw the cap back on firmly. No preservative is necessary.

3. Bile collection: The kit contains a plastic screw cap bottle with a green label "bile." This bottle contains preservative which should be kept in the bottle. Place as much bile as possible in the bottle, screw the cap back on firmly and shake to dissolve the preservative.

4. Alcohol washings of the fingers and face: The kit contains a plastic bag with three swabs and a vial of ethyl alcohol. The swabs are marked left hand, right hand, and mouth. Remove the appropriate swab from the swab tube, dip in ethyl alcohol and swab the appropriate area. For the two hands, swab the thumb and first two fingers. For the mouth, swab the area around the lips and the end of the nose. Place the moist swabs back in their respective tubes and place in the plastic bag along with the alcohol bottle.

5. Complete the Identification Card in duplicate. Place one copy in stamped-addressed envelope and mail. Place the other copy in the plastic bag and place back in the kit box.

6. Place all the specimens and ID Card in the kit box, seal with tape along the bottom edge and mail to Midwest Research Institute as soon as possible.

Figure A-1 - Instruction Sheet Included in the Specimen Collection Kit

NHTSA Project No. DoT-HS-119-3-627, MRI Project No. 3747-C

ACCIDENT IDENTIFICATION CARD - FATALLY INJURED DRIVER

Name of Driver _____

Location of Crash-State _____ County _____

Address _____

Date of Crash _____ Time of Crash _____

Time of Death _____ Time of Sample _____

Name of Coroner _____ Accident I.D. No. _____

Figure A-2 - Identification Card Enclosed in Duplicate in Each Specimen Collection Kit

TABLE A-I

FATALLY INJURED DRIVER SAMPLE KITS DISPATCHED AND RECEIVED AS OF SEPTEMBER 7, 1973

Area	Kits Dispatched	Kits Received
Arizona, ASAP	2	-
Arkansas, ASAP	22	8
Colorado, ASAP	50	-
Florida, ASAP	2	-
Georgia, ASAP	2	-
Indiana, ASAP	8	-
Kansas, ASAP	2	-
Louisiana, ASAP	2	-
Maine, ASAP	62	1
Maryland, ASAP	34	22
Massachusetts, ASAP	2	-
Michigan, ASAP	21	10
Minnesota, ASAP	52	17
Missouri, ASAP	2	-
Nebraska, ASAP	44	12
New Hampshire, ASAP	2	-
New Mexico, ASAP	70	11
New York, ASAP	82	46
North Carolina, ASAP	2	-
Ohio, ASAP	2	-
Oklahoma, ASAP	37	8
Oregon, ASAP	92	74
South Carolina, ASAP	2	-
South Dakota, ASAP	1	-
Texas, ASAP	2	-
Vermont, ASAP	84	51
Virginia, ASAP	52	7
Washington, ASAP	76	76
Wisconsin, ASAP	50	1
Sacramento, California	62	48
St. Louis, Missouri	-	-
San Francisco, California	20	-
San Diego, California	68	48
Santa Ana, California	20	2
Oakland, California	61	39
San Jose, California	20	2
Los Angeles, California	20	-

TABLE A-I (Concluded)

Area	Kits Dispatched	Kits Received
San Mateo, California	20	2
Fort Thomas, Kentucky	12	1
Everett, Washington	34	17
Akron, Ohio	37	11
Martinez, California	18	5
Atlanta, Georgia	62	32
San Bernadino, California	6	1
Dot, Washington, D.C.	50	-
Vero Beach, Florida	25	2
Orlando, Florida	62	36
Miami, Florida	10	-
Las Vegas, Nevada	40	15
St. Petersburg, Florida	55	33
Sanford, Florida	10	-
Cincinnati, Ohio	42	27
Tampa, Florida	28	15
Daytona Beach, Florida	28	10
Appleton, Wisconsin	30	11
Beloit, Wisconsin	18	5
Eau Claire, Wisconsin	12	2
Unknown	NA	2
Total	1,731	710

TABLE A-II

PERSONS CONTACTED FOR COLLECTION OF SPECIMENS

Area	Persons Contacted
Arizona, ASAP	Mrs. Moya Easterling, ASAP Project Director 448 West Washington Street Phoenix, Arizona 85003
Arkansas, ASAP	Mr. R. E. Brians, ASAP Project Director 211 National Old Line Building Little Rock, Arkansas 72201
	Dr. Rodney Carlton State Medical Examiner University of Arkansas Medical Center 4815 West Markham Little Rock, Arkansas 72205
Colorado, ASAP	Lois Whitley, ASAP Project Director State of Colorado Department of Health 4210 East 11th Avenue Denver, Colorado 80220
Florida, ASAP	Mr. Raymond Bradley, ASAP Project Director 1420 North Tampa Street Tampa, Florida 33602
Georgia, ASAP	Mr. Jerry B. Mullinax, ASAP Project Director 121 - 17th Street Columbus, Georgia 31901
Indiana, ASAP	Mr. Omer Loyd, Criminal Justice Coordinator and Mr. Joseph J. Shary, Administrator Indiana Alcohol Safety Action Project Room 1160, City-County Building Indianapolis, Indiana 46204
	Dr. D. J. Nicholas Marion County Coroner's Office Room 541 City-County Building Indianapolis, Indiana 46204

TABLE A-II (Continued)

Area	Persons Contacted
Kansas ASAP	Mr. Don E. Ferguson, ASAP Director Department of Community Health 1900 East 9th Street Wichita, Kansas 67214
Louisiana ASAP	Mr. Allen Rosenzweig, ASAP Project Director Room 304, Gallier Hall 545 St. Charles New Orleans, Louisiana 70130
Maine ASAP	Mr. D. Dwight Dogherty, Jr. ASAP Project Director Suite 617 142 High Street Portland, Maine 04101
Maryland ASAP	Mr. John W. Terwilliger ASAP Project Director 2201 Argonne Drive Baltimore, Maryland 21218
Massachusetts ASAP	Mr. Richard X. Connors Division of Alcoholism Department of Public Health Commonwealth of Massachusetts Boston, Massachusetts 02006
Michigan ASAP	Mr. James W. Henderson, Jr. ASAP Project Director County Health Department 4133 Washtenaw Avenue Ann Arbor, Michigan 48108
Minnesota ASAP	Mr. Forst Lowery, ASAP Director and Mr. Floyd Romslo, Director of Evaluation Hennepin County ASAP 625 Second Avenue S. Minneapolis, Minnesota 55402

TABLE A-II (Continued)

Area	Persons Contacted
Missouri ASAP	Mr. Robert F. Boos, ASAP Director City Hall 414 East 12th Street Kansas City, Missouri 64106
Nebraska ASAP	Mr. Donald Nugent, ASAP Director and Mr. James Shelly, Associate Director Lincoln Building, Office 817 10th and "O" Streets Lincoln, Nebraska 68508 Deputy Sheriff Michael Sweet Lancaster County Sheriff 555 South 10th Street Lincoln, Nebraska 68508
New Hampshire ASAP	Mr. John Muir, ASAP Director Department of Health & Welfare 61 South Spring Street Concord, New Hampshire 03301
New Mexico ASAP	Mr. Tony Luna, Jr., ASAP Director City Hall 400 Marquette, N.W. Albuquerque, New Mexico 87103 James T. Weston, M.D. Chief State Medical Investigator Basic Sciences Building University of New Mexico 915 Stanford Drive, N.E. Albuquerque, New Mexico 87131
New York ASAP	Mr. Anthony Cirenza, ASAP Director Nassau County Administration Building 400 County Seat Drive Mineola, New York 11530 Dr. Jesse Bidanset, Chief Toxicologist Nassau County Medical Center 2201 Hempstead Turnpike East Meadow, New York 11554

TABLE A-II (Continued)

Area	Persons Contacted
North Carolina ASAP	Mr. J. Harry Weatherly, ASAP Project Director 517 Insurance Lane, Room 204 Charlotte, North Carolina 28204
Ohio ASAP	Reverend Seth P. Staples, ASAP Director Room 18, City Hall 8th and Plum Streets Cincinnati, Ohio 45214
Oklahoma ASAP	Mr. Karl Richter, ASAP Coordinator 710 Hightower Building 105 No. Hudson Oklahoma City, Oklahoma 73102
Oregon ASAP	Mr. William B. Farr, ASAP Director 309 S.W. Fourth Avenue Portland, Oregon 97204 Larry V. Lewman, M.D. 301 N. E. Knott Portland, Oregon 97212
South Carolina ASAP	Mr. Michael Edens, ASAP Director South Carolina Commission on Alcoholism 2414 Bull Street Columbus, South Carolina 29201
South Dakota ASAP	Dr. Roger E. Hagen, ASAP Project Director 108 East Missouri Street Pierre, South Dakota 57501
Texas ASAP	Mr. Kenneth F. Langland 303 Alamo Street San Antonio, Texas 78206
Vermont ASAP	Mr. Darwin G. Merrill, ASAP Director P. O. Box 535 Waterbury, Vermont 05676 Lawrence S. Harris, M.D. Chief Medical Examiner Medical Alumni Building University of Vermont Burlington, Vermont 05401

TABLE A-II (Continued)

Area	Persons Contacted
Virginia ASAP	Mr. Barent Landstreet Project Director Fairfax County ASAP Fairfax Circle Building, Suite 505 3251 Old Lee Highway Fairfax, Virginia 22030
Washington ASAP	Mr. Don Morehead, ASAP Project Director Highway License Building Department of Motor Vehicles Olympia, Washington 98501
Wisconsin ASAP	Mr. Fred Wileman, ASAP Project Director 610 Langdon Street, Room 730 Madison, Wisconsin 53706
	Mr. John Q. Radcliffe, Highway Safety Coordinator State Office Building, Room 1121 1 West Wilson Street Madison, Wisconsin 53702
Sacramento, California	Mr. George Nielsen Sacramento County Coroner's Office 4400 "V" Street Sacramento, California 95817
St. Louis, Missouri	Mr. Raymond L. Harris 601 South Brentwood Boulevard Clayton, Missouri 63105
San Francisco, California	Mr. John C. Hall, General Manager California Traffic Safety Foundation 564 Market Street San Francisco, California 94104
San Diego, California	Dr. David Stark 55 Overland Avenue Building 14 San Diego, California 92123

TABLE A-II (Continued)

Area	Persons Contacted
Santa Ana, California	Mr. Eugene Miller Orange County Sheriff's Office Coroner Division 400 Civic Center Drive West Santa Ana, California 92701
Oakland, California	Mr. R. W. Prahl, Chief Investigator Coroner's Office 480 Fourth Street Oakland, California 94607
San Jose, California	Dr. John Hauser Office of the Medical Examiner/Coroner 751 South Bascom Avenue San Jose, California 95128
Los Angeles, California	Mr. Ralph M. Bailer Chief, Investigation Division Dept. of Chief Medical Examiner/Coroner Service Floor Entrance 1645 Marengo Street Los Angeles, California 90033
San Mateo, California	Mr. Paul Jensen, Coroner 225 West 37th Avenue San Mateo, California 94403 Attn: Mr. Robert Cole
Fort Thomas, Kentucky	Dr. Fred A. Stuie Campbell County Coroner 11 South Fort Thomas Avenue Fort Thomas, Kentucky 41075
Everett, Washington	Mr. Robert H. Phillips Snohomish County Coroner Room B 20 Court House Everett, Washington 98201
Akron, Ohio	Summit County Coroner 31 North Summit Street Akron, Ohio 44308

TABLE A-II (Continued)

Area	Persons Contacted
Martinez, California	Lt. Willis Cullison Coroner's Bureau Commander Contra Costa County Administration Building Martinez, California 94553
Atlanta, Georgia	Dr. Robert R. Stivers Chief Medical Examiner 62 Butler Street, S.E. Atlanta, Georgia 30303
San Bernardino, California	Mr. Bill Hill, Coroner San Bernardino Coroner's Office 147 West 14th Street San Bernardino, California 92401
Vero Beach, Florida	Dr. Hampton Lee Schofield, Jr. Diplomat of the American Board of Pathologists P. O. Box 1196 Vero Beach, Florida 32960
Orlando, Florida	Thomas F. Hegert, M.D. District 9 Medical Examiner Orange County Orlando, Florida 32800
Miami, Florida	Dr. Joseph H. David Dade County Medical Examiner 1700 N.W. 10th Avenue Miami, Florida 33136
Las Vegas, Nevada	Mr. Richard Mayne, Chief Deputy Coroner District Health Office P. O. Box 4426 Las Vegas, Nevada 89106
St. Petersburg, Florida	Dr. John J. Shinner, Coroner 666 Sixth Street South Room 111 St. Petersburg, Florida 33701

TABLE A-II (Concluded)

Area	Persons Contacted
Sanford, Florida	G. V. Garay, M.D. 1101 East First Street Sanford, Florida 32771
Cincinnati, Ohio	Dr. Frank Cleveland Hamilton County Coroner 3223 Eden Avenue Cincinnati, Ohio 45219
Tampa, Florida	Mr. James B. Hutcheson Chief Medical Examiner Hillsborough County 5415 Laurel Boulevard Tampa, Florida 33607
Daytona Beach, Florida	Dr. Arthur Schwartz P. O. Box 2243 Volusia County Courthouse Annex Daytona Beach, Florida 32015
Appleton, Wisconsin	Mr. Bernard Kemps Coroner, Outagamie County 1412 West Franklin Street Appleton, Wisconsin 54911
Beloit, Wisconsin	Mr. Richard McCaul Coroner, Rock County 87 Morgan Terrace Drive Beloit, Wisconsin 53511
Eau Claire, Wisconsin	James K. Martins, M.D. 206 Fifth Avenue Eau Claire, Wisconsin 54701

CRASH DATA INFORMATION FORM

Note: All information on this form is for research purposes only and is strictly confidential.

Supplier's Name: _____

Supplier's Title: _____

(and address) _____

_____

Sample I.D. No. _____

Date of Crash: _____

Time of Crash: _____

Time of Death: _____

Time and Date Sample Taken: _____

Location of Crash:

State: _____

County: _____

City or Town: _____

Address: _____

Accident Type - Location (Check one):

a. Single vehicle - Rural /__/

b. Single vehicle - Urban /__/

c. Multiple vehicle - Rural /__/

d. Multiple vehicle - Urban /__/

How many persons killed in crash? _____

In this driver's vehicle? _____

In other vehicle(s)? _____

How many persons injured seriously? _____

In this driver's vehicle? _____

In other vehicle? _____

Collision Type: (Check where applicable)

a. Pedestrian /__/

b. Non-motor vehicle /__/

c. Fixed objects /__/

d. Run off road /__/

e. Overturn /__/

f. Head-on /__/

g. Angle /__/

h. Rear-end /__/

i. Other (specify) /__/ _____

Light Conditions: (Check one)

a. Dawn /__/

b. Daylight /__/

c. Dusk /__/

d. Darkness /__/

Road Surface (Check one)

a. Dry /__/

b. Wet /__/

c. Snowy or icy /__/

d. Other (specify) /__/ _____

Contributing Circumstances (Select condition(s) that most likely contributed to crash.

a. This driver's condition or behavior /__/

b. Other driver's condition or behavior /__/

c. Environment /__/

d. Vehicle condition /__/

e. Other (specify) /__/

Day of Week (Circle one)

Mon Tues Wed Thus Fri Sat Sun

Vehicle Type(s) (i.e., passenger car, truck, bus, etc.)

This driver's vehicle _____

Other vehicle(s) _____

Sex of Victim

Male /__/

Female /__/

Age of Victim _____

**Please submit brief paragraph describing the crash with emphasis on the role of this victim and his vehicle.

Code .....

QUESTIONNAIRE

1. The ..... samples sent to MRI during the period ..... to ..... represent the total of fatally injured drivers in my district.

   Yes _____ No _____

2. If the number of samples is less than the number of fatally injured drivers, please indicate the basis for selection of samples:

   a. Limited availability of biological fluids: .....

   b. Preference for cases where there was a suspicion of drug use: .....

   c. Lack of time: .....

   d. Other: ..... (please specify)

Signature:

Date:

BIAS QUESTIONNAIRE

TABLE A-III

RESPONSES TO BIAS QUESTIONNAIRE

Area	Reply to Question 1	Reply to Question 2
Arkansas ASAP	No	a.b.
Maine ASAP	No	d. Lack of cooperation on the part of the Medical Examiners.
Maryland ASAP	No	d. Only DOA or died prior to any medication being administered.
Michigan ASAP	No Reply	-
Minnesota ASAP	No Reply	-
Nebraska ASAP	Yes	
New Mexico ASAP	No	d. Body too mutilated in a few cases, not DOA or shortly thereafter.
New York ASAP	No	d. Toxicological analyses were not performed when driver expired in hospitals. Shortage of kits. Selection was random, not influenced by suspicion of drugs.
Oklahoma ASAP	No Reply	-
Oregon ASAP	Yes	
Vermont ASAP	No.	d. Toxicological analyses were not performed on drivers who died after more than 12 hours after admission to hospital.
Virginia ASAP	No	d. Lack of cooperation with M.E.
Washington ASAP	No	d. Lack of time.
Wisconsin ASAP	No Reply	-
Sacramento, California	No Reply	-
San Diego, California	No	a. b.
Santa Ana, California	No Reply	-
Oakland, California	Yes	
San Jose, California	No	a. b.
San Mateo, California	No	d. Information on victims not available at autopsy time.
Fort Thomas, Kentucky	No Reply	-
Everett, Washington	Yes	
Akron, Ohio	No Reply	-
Martinez, California	No	d. Autopsy surgeon forgot.
Atlanta, Georgia	No	d. Only DOA included, few cases missed when new M.E. started.
San Bernardino, California	Yes	
Vero Beach, Florida	No	b.

TABLE A-III (Concluded)

Area	Reply to Question 1	Reply to Question 2
Orlando, Florida	Yes	
Las Vegas, Nevada	No	d. Only DOA included.
St. Petersburg, Florida	No Reply	-
Cincinnati, Ohio	No	d. Kits not available at start of program.
Tampa, Florida	No	d. Morgue did not comply with requests.
Daytona Beach, Florida	No	d. Only male drivers sampled.
Appleton, Wisconsin	No	d. Kits not available at start of program.
Beloit, Wisconsin	No Reply	-
Eau Claire, Wisconsin	No Reply	-

APPENDIX B

ANALYTICAL DEVELOPMENT

TABLE B-I

SOLVENTS AND LOCATION REAGENTS FOR TLC OF DRUGS

Drug	Solvents	Location Reagents
Phenobarbital sodium	1 and 2	uv, $HgSO_4$, DPC, $KMnO_4$
Pentobarbital sodium (Nembutal)	1 and 2	uv, $HgSO_4$, DPC, $KMnO_4$
Amobarbital sodium (Amytal)	1 and 2	uv, $HgSO_4$, DPC, $KMnO_4$
Secobarbital sodium (Seconal)	1 and 2	uv, $HgSO_4$, DPC, $KMnO_4$
Butabarbital sodium (Butisol)	1 and 2	uv, $HgSO_4$, DPC, $KMnO_4$
Butobarbital sodium (Butethal)	1 and 2	uv, $HgSO_4$, DPC, $KMnO_4$
Diphenylhydantoin sodium (Dilantin)	1 and 2	uv, $HgSO_4$, DPC, $KMnO_4$
Meprobamate (Miltown)	1 and 2	uv, $HgSO_4$, DPC, $KMnO_4$
Glutethimide (Doriden)	1 and 2	uv, $HgSO_4$, DPC, $KMnO_4$
Acetylsalicylic acid (Aspirin)	1 and 2	uv, $HgSO_4$, DPC, $KMnO_4$
Salycylic acid	1 and 2	uv, $HgSO_4$, DPC, $KMnO_4$
Methaqualone HCl (Quaalode)	2 and 3	uv, Nin, IOP
Chlordiazepoxide HCl (Librium)	2 and 3	uv, Nin, IOP
Diazepam HCl (Valium)	2 and 3	uv, Nin, IOP
Chlorpromazine HCl (Thorazine)	2 and 3	uv, Nin, IOP
Promazine HCl (Sparine)	2 and 3	uv, Nin, IOP
Thioridazine HCl (Mellaril)	2 and 3	uv, Nin, IOP
Trifluoperazine HCl (Stelazine)	2 and 3	uv, Nin, IOP
Propoxyphene HCl (Darvon)	2 and 3	uv, Nin, IOP
Methylphenidate HCl (Ritalin)	2 and 3	uv, Nin, IOP
Imipramine HCl (Tofranil)	2 and 3	uv, Nin, IOP
Amitriptyline HCl (Elavil)	2 and 3	uv, Nin, IOP
Chlorpheniramine	2 and 3	uv, Nin, IOP
Diphenhydramine HCl	2 and 3	uv, Nin, IOP
Tripelennamine HCl	2 and 3	uv, Nin, IOP
Methapyriline HCl	2 and 3	uv, Nin, IOP
Phenylpropanolamine HCl	2 and 3	uv, Nin, IOP
Nalorphine HCl (Nalline)	2 and 3	uv, Nin, IOP
Dimethyltryptamine (DMT)	2 and 3	uv, Nin, IOP
Diethyltryptamine (DET)	2 and 3	uv, Nin, IOP
Lobeline HCl	2 and 3	uv, Nin, IOP
Mescaline	2 and 3	uv, Nin, IOP
Methylenedioxyamphetamine HCl (MDA)	2 and 3	uv, Nin, IOP
Amphetamine (Dexadrine)	2 and 3	uv, Nin, IOP
Methamphetamine HCl (Desoxyn)	2 and 3	uv, Nin, IOP
Morphine sulfate	2 and 3	uv, Nin, IOP
Codeine phosphate	2 and 3	uv, Nin, IOP
Meperidine HCl (Demerol)	2 and 3	uv, Nin, IOP
Cocaine HCl	2 and 3	uv, Nin, IOP
Methadone HCl (Dolophine)	2 and 3	uv, Nin, IOP

TABLE B-I (Concluded)

Drug	Solvents	Location Reagents
Hydromorphone HCl (Dilaudid)	2 and 3	uv, Nin, IOP
Quinine sulfate	2 and 3	uv, Nin, IOP
2,5-Dimethoxy-4-methylamphetamine (STP)	2 and 3	uv, Nin, IOP
Nicotine	2 and 3	uv, Nin, IOP
Tetrahydrocannabinol (THC)	6 and 11	FBB
Cannabinol (CBN)	6 and 11	FBB

TABLE B-II

TLC R_f (X 10) VALUES AND LOCATION COLORS FOR ACIDIC AND NEUTRAL DRUGS

Drug	R_{f1}	R_{f2}	$HgSO_4$	DPC	$KMnO_4$
Phenobarbital	2.3	2.8	white	violet	white
Pentobarbital	3.3	6.5	white	violet	-
Amobarbital	3.4	5.9	white	violet	-
Secobarbital	3.7	6.3	white	violet	-
Butabarbital	2.8	5.8	clear	purple	-
Butobarbital	2.5	5.5	clear	violet	-
Diphenylhydantoin	1.3	5.4	white	blue	white
Meprobamate	0.3	7.4	clear	white	white
Glutethimide	6.3	9.5	clear	purple	-
Acetylsalicylic acid	0.0	1.8	clear	-	yellow
Salicylic acid	0.0	1.8	clear	-	yellow

Drug	R_{f6}	R_{f11}	FBB
Tetrahydrocannabinol	7.3	6.2	red
Cannabinol	7.3	6.5	purple

TABLE B-III

R_f (X 10) VALUES AND LOCATION COLORS FOR BASIC DRUGS

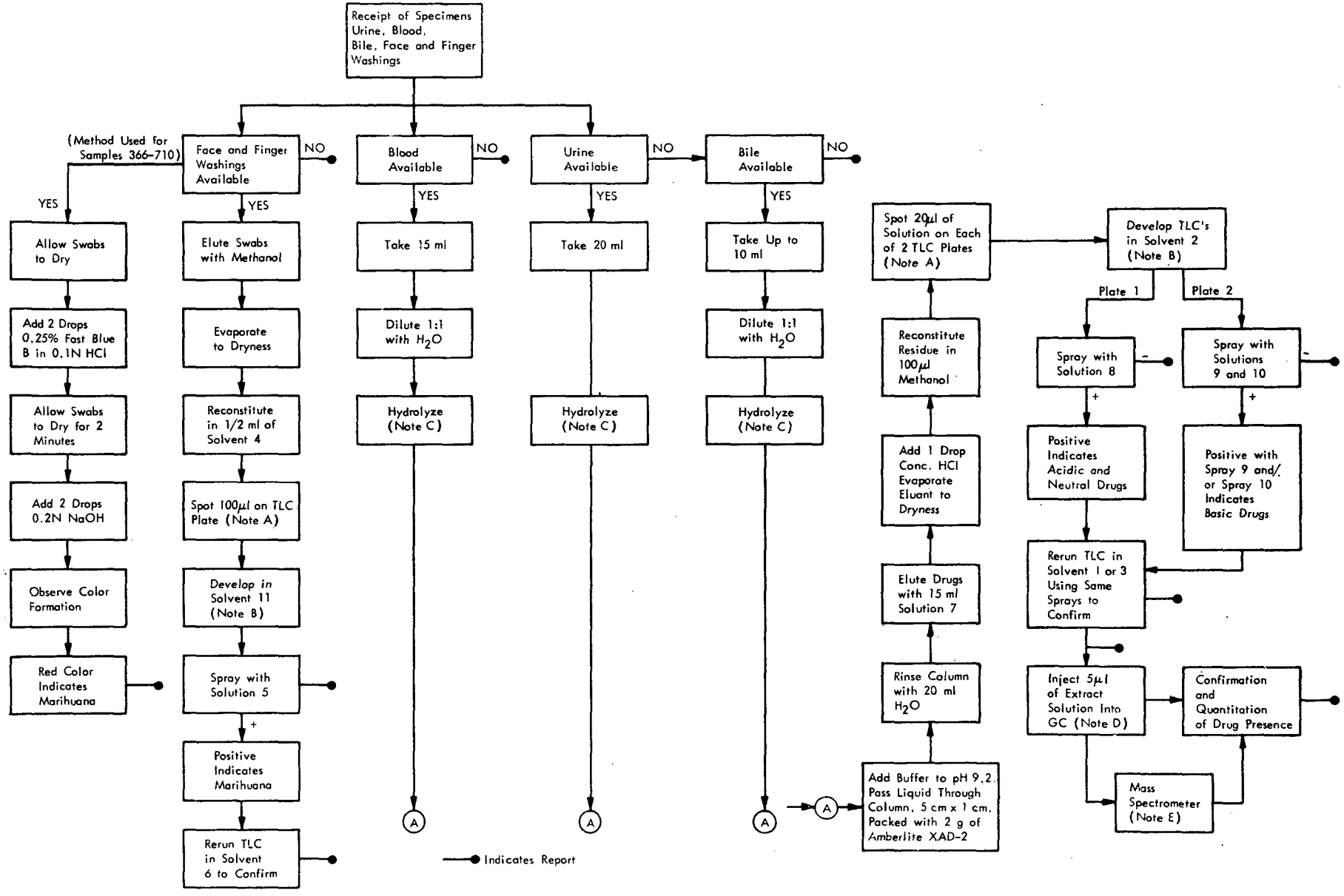
Drug	R_{f2}	R_{f3}	Ninhydrin	Iodoplatinate
Methaqualone	9.5	9.0	-	red/brown
Chlordiazepoxide	7.0	5.5	-	brown
Diazepam	9.5	4.5	-	brown/red
Chlorpromazine	9.5	6.8	-	red/violet
Promazine	8.8	5.8	-	brown/blue
Thioridazine	9.3	6.8	-	brown/red
Trifluoperazine	8.3	7.5	-	blue/violet
Propoxyphene	9.8	9.0	-	brown
Methylphenidate	9.0	2.0	-	gray
Imipramine	9.0	7.0	-	purple/violet
Amitriptyline	9.4	7.3	-	red/brown
Chlorpheniramine	8.0	4.0	-	brown/blue
Diphenhydramine	9.2	7.0	-	brown
Tripelennamine	10.0	7.5	red/purple	red/brown
Methapyrilene	10.0	7.3	purple	blue/brown
Phenylpropanolamine	6.0	2.0	purple	red
Nalorphine	5.3	3.0	-	blue/purple
Dimethyltryptamine	8.4	4.3	-	purple/violet
Diethyltryptamine	9.4	6.0	-	red/brown
Lobeline	10.0	7.2	orange	red/brown
Mescaline	6.0	1.9	purple	red
Methylenedioxyamphetamine	8.0	3.8	purple/red	red/orange
Amphetamine	8.3	4.1	violet	red
Methamphetamine	7.7	3.1	purple	-
Morphine	4.0	1.4	-	blue
Codeine	6.9	2.6	-	blue/purple
Meperidine	9.5	6.7	-	violet/purple
Cocaine	9.8	9.3	-	purple/red
Methadone	10.0	9.0	purple	red/brown
Hydromorphone	4.0	1.1	red	purple
Quinine	7.9	3.1	-	gray/purple
2,5-Dimethoxy-4-methyl-amphetamine	8.0	3.4	purple	red/orange
Nicotine	9.4	6.6	-	blue/gray

TABLE B-IV

GC RETENTION TIMES AND COLUMN CONDITIONS FOR DRUGS

Drug	Column Length (ft)	Column Temp. (°C)	Retention Time (min)
Codeine	4	250	0.55
Diazepam	4	250	0.79
Chlorpromazine	4	250	0.67
Chlordiazepoxide	4	250	0.95
Nalorphine	4	250	0.20
Promazine	4	250	0.43
Thioridazine	4	250	1.18
Quinine	4	250	4.10
Morphine[a/]	6	265	2.44
Hydromorphone[a/]	6	265	2.64
Cocaine	6	240	2.25
Methadone	6	240	1.93
Meperidine	6	240	0.67
Methaqualone	6	240	0.71
Chlorpheniramine	6	240	1.34
Propoxyphene	6	240	0.59
Imipramine	6	240	2.29
Lobeline	6	240	0.87
Amitriptyline	6	240	2.17
Phenobarbital	6	240	1.54
Pentobarbital	6	210	1.93
Amobarbital	6	210	1.85
Secobarbital	6	210	2.24
Butabarbital	6	210	1.42
Butobarbital	6	210	1.50
Diphenylhydantoin	6	210	2.56
Methylenedioxyamphetamine	6	210	2.16
Mescaline	6	210	2.16
Tripelennamine	6	200	3.74
Diphenhydramine	6	200	2.56
Methylphenidate	6	200	0.39
Meprobamate	6	200	1.14
Glutethimide	6	200	2.72
Dimethyltryptamine	6	200	2.05
Diethyltryptamine	6	200	3.07
2,5-Dimethoxy-4-methyl-amphetamine	6	200	1.18
Methapyrilene	6	200	3.86
Trifluoperazine	6	200	0.98
Acetylsalicylic acid[b/]	6	170	2.64
Salicylic acid[b/]	6	170	2.56
Secobarbital[a/]	6	170	5.71
Phenobarbital[a/]	6	170	9.57
Amobarbital[a/]	6	170	4.72
Pentobarbital[a/]	6	170	5.12
Nicotine	6	160	1.61
Phenylpropanolamine	6	145	1.06
Methamphetamine	6	145	1.02
Amphetamine	6	145	0.71

a/ Drugs were methylated on-column.
b/ Drugs were silylated.


Receipt of Specimens Urine, Blood, Bile, Face and Finger Washings
(Method Used for Samples 366-710)
Face and Finger Washings Available
NO
YES
Blood Available
NO
YES
Urine Available
NO
YES
Bile Available
NO
YES
Allow Swabs to Dry
Add 2 Drops 0.25% Fast Blue B in 0.1N HCl
Allow Swabs to Dry for 2 Minutes
Add 2 Drops 0.2N NaOH
Observe Color Formation
Red Color Indicates Marihuana
Elute Swabs with Methanol
Evaporate to Dryness
Reconstitute in 1/2 ml of Solvent 4
Spot 100µl on TLC Plate (Note A)
Develop in Solvent 11 (Note B)
Spray with Solution 5
+
Positive Indicates Marihuana
Rerun TLC in Solvent 6 to Confirm
Take 15 ml
Dilute 1:1 with H_2O
Hydrolyze (Note C)
Take 20 ml
Hydrolyze (Note C)
Take Up to 10 ml
Dilute 1:1 with H_2O
Hydrolyze (Note C)
A
A
A
Spot 20µl of Solution on Each of 2 TLC Plates (Note A)
Reconstitute Residue in 100µl Methanol
Add 1 Drop Conc. HCl Evaporate Eluant to Dryness
Elute Drugs with 15 ml Solution 7
Rinse Column with 20 ml H_2O
Add Buffer to pH 9.2. Pass Liquid Through Column, 5 cm x 1 cm, Packed with 2 g of Amberlite XAD-2
Develop TLC's in Solvent 2 (Note B)
Plate 1
Plate 2
Spray with Solution 8
-
+
Positive Indicates Acidic and Neutral Drugs
Spray with Solutions 9 and 10
-
+
Positive with Spray 9 and/or Spray 10 Indicates Basic Drugs
Rerun TLC in Solvent 1 or 3 Using Same Sprays to Confirm
Inject 5µl of Extract Solution Into GC (Note D)
Confirmation and Quantitation of Drug Presence
Mass Spectrometer (Note E)
Indicates Report

KEY TO ANALYTICAL SCHEME

Solvent 1: For acidic and neutral drugs--acetone/chloroform, 1:9.

Solvent 2: Ethyl acetate/methanol/ammonia, 85:10:5.

Solvent 3: For basic drugs--ethyl acetate/methanol/ammonia/benzene, 75:10:2:13.

Solvent 4: Benzene/petroleum ether, 1:1.

Solution 5: Fast Blue B solution - 250 mg in 100 ml of 0.1 N hydrochloric acid. Follow with a spray of 0.5 N sodium hydroxide.

Solvent 6: Benzene/chloroform, 3:7.

Solution 7: 1,2-Dichloroethane/ethyl acetate, 4:6.

Solution 8: Mercuric sulfate solution--suspend 5 g of mercuric oxide in 100 ml water, add 20 ml concentrated sulfuric acid. Cool and dilute to 250 ml with water. Follow with diphenyl carbazone (DPC) solution--dissolve 5 mg DPC in 50 ml chloroform. Follow this with a 0.1 N solution of $KMnO_4$ (potassium permanganate).

Solution 9: Ninhydrin--commercially available in aerosol bombs from Brinkmann.

Solution 10: Iodoplatinate solution--dissolve 1 g platinum tetrachloride in 100 ml water, mix with 300 ml water containing 10 g potassium iodide. Dilute to 400 ml with water.

Solvent 11: Benzene

NOTES ON ANALYTICAL SCHEME

Note A: Use 20 x 20 cm silica gel G, 250 μ on glass. Spot extracts, along with standards, 1.0 cm from lower edge of plate. Warm the plate slightly when spotting.

Note B: Develop in glass tank with lid. Use solvent to about 0.5 cm depth. Develop the plate 10 cm above spotting line. Remove and dry at room temperature.

Note C: Hydrolyze by adding 3900 Fishman Units of β-Glucuronidase, take to pH 5.2, incubate at 37°C for 18 hr, centrifuge and filter.

Note D: A Bendix 2500 Gas Chromatograph has been employed. Glass columns, 5 ft x 4 mm (ID) with 3% OV-1 on 100/120 mesh Gas Chrom Q. 5 μl of extract solution were injected. Carrier gas is N_2, at a flow of 50 ml/min. Detector temperature 250°C, injection port temperature 240°C. Column temperature between 160° and 265°C depending on drugs being analyzed.

Note E: The mass spectrometer employed in this analytical scheme is a Varian MAT CH-4. This is connected to the gas chromatograph via a Watson-Biemann helium separator. A Varian 8K core laboratory computer and teletype are employed with the GC/MS setup.

TOXICOLOGICAL SCREEN (RESIN)

BLOOD

a. Take 15 ml blood, or one-half of specimen, whichever is smaller.

b. Spin down, dilute 1:1 with distilled water, add 3900 Fishman Units of β-glucuronidase reagent.

c. Take to pH 5.2.

d. Incubate at 37°C (99°F) for 18 hr, centrifuge, filter.

e. Run through Amberlite XAD-2 column, adding appropriate buffer (pH 9.2).

f. Wash Amberlite column with 20 ml distilled water.

g. Pull dry using aspirator.

h. Elute column with 20 ml of ethyl acetate/dichlorethane (5:4), add 1 drop of HCl.

i. Evaporate eluate to dryness in water bath at 60°C.

j. Reconstitute residue in 0.5 ml methanol and transfer to 1/2 dram vial, evaporate to 100 µl, and label.

k. Spot 20 µl of residue solution onto each of two 20 x 20 cm TLC plates. Spot standards on the plate, along with any other concurrent analyses.

l. Run the plates for 10 cm in Solvent No. 2, from 2 cm to 12 cm.

m. Dry and spray the plates, one with mercuric sulfate, DPC and $KMnO_4$ for acidic drugs; the other with ninhydrin for amphetamines--followed by iodoplatinate for other basic drugs.

n. Record observations--R_f values and colors--include those of standards.

o. Confirm results by spotting a further 20 µl of residue solution and developing (with standards) in a second solvent (Solvent No. 3 for amphetamines and basic drugs; Solvent 1 for barbiturates).

TOXICOLOGICAL SCREEN (RESIN)

URINE

a. Take 20 ml of urine, or one-half of specimen, whichever is the smaller.

b. Add 3900 Fishman Units of β-glucuronidase reagent.

c. Take to pH 5.2.

d. Incubate at 37°C (99°F) for 18 hr, filter.

e. Run through Amberlite XAD-2 column, adding appropriate buffer (pH 9.2).

f. Wash Amberlite column with 20 ml distilled water.

g. Pull dry using aspirator.

h. Elute column with 20 ml of ethyl acetate/dichloroethane (6:4), add 1 drop of conc. HCl.

i. Evaporate eluate to dryness in water bath at 60°C.

j. Reconstitute residue in 0.5 ml methanol and transfer to 1/2 dram vial, evaporate to 100 µl, and label.

k. Spot 20 µl of residue solution onto each of two 20 x 20 cm TLC plates. Spot standards on the plate, along with any other concurrent analyses.

l. Run the plates for 10 cm in Solvent No. 2, from 2 cm to 12 cm.

m. Dry and spray the plates, one with mercuric sulfate, DPC and $KMnO_4$ for acidic drugs; the other with ninhydrin for amphetamines--followed by iodoplatinate for other basic drugs.

n. Record observations--R_f values and colors--including those of standards.

o. Confirm results by spotting a further 20 µl of residue solution and developing (with standards) in a second solvent (Solvent No. 3 for amphetamines and basic drugs; Solvent No. 1 for barbiturates).

TOXICOLOGICAL SCREEN (RESIN)

BILE

a. Take 10 ml bile, or one-half of specimen, whichever is the smaller.

b. Spin down, dilute 1:1 with distilled water, add 3900 Fishman Units of β-glucuronidase reagent.

c. Take to pH 5.2.

d. Incubate at 37°C (99°F) for 18 hr, centrifuge, filter.

e. Run through Amberlite XAD-2 column, adding appropriate buffer (pH 9.2).

f. Wash Amberlite column with 20 ml distilled water.

g. Pull dry using aspirator.

h. Elute column with 20 ml of ethyl acetate/dichloroethane (6:4), add 1 drop of conc. HCl.

i. Evaporate eluate to dryness in water bath at 60°C.

j. Reconstitute residue in 0.5 ml methanol and transfer to 1/2 dram vial, evaporate to 100 µl, and label.

k. Spot 20 µl of residue solution onto each of two 20 x 20 cm TLC plates. Spot standards on the plate, along with any other concurrent analyses.

l. Run the plates for 10 cm in Solvent No. 2, from 2 cm to 12 cm.

m. Dry and spray the plates, one with mercuric sulfate, DPC and $KMnO_4$ for acid drugs; the other with ninhydrin for amphetamines--followed by iodoplatinate for other basic drugs.

n. Record observations--R_f values and colors--including those of standards.

o. Confirm results by spotting a further 20 µl of residue solution and developing (with standards) in a second solvent (Solvent No. 3 for amphetamines and basic drugs; Solvent No. 1 for barbiturates).

TOXICOLOGICAL SCREEN FOR CANNABINOIDS

TLC Method

1. Wash the swabs by agitating all three in about 10 ml methanol in the bottom of a 250-ml beaker.

2. Allow the methanol to evaporate in a hood.

3. Reconstitute in minimum amount (1/2 ml or less) of methanol and spot half the residue on a 20 x 20 cm silica gel TLC plate (2 cm from bottom of Plate).

4. Spot standards of THC and CBN on the plate along with any other marihuana test specimens. Plate should hold up to 12 tests plus standards.

5. Develop the plate from 2 cm to 12 cm in benzene (Solvent 11).

6. Spray with Fast Blue B, followed by dilute (0.5 N) sodium hydroxide.

7. Note all R_f's and colors.

8. If positives occur, confirm by spotting remaining half of residue and running in benzene/chloroform 3:7 (Solvent No. 6).

On-the-Swab Method

1. Allow swabs to dry for a few minutes after removing from protective tubes.

2. Add 2 drops of 0.25% Fast Blue B in 0.1 N hydrochloric acid to each swab; allow to dry for 2 min.

3. Add 2 drops of 0.2 N sodium hydroxide to each swab and note color formed in 2 sec.

4. A red or pink color indicates positive. All other colors formed in ~~two seconds~~ and any color formed <u>after 2 sec</u> is considered negative.

TABLE B-V

SUMMARY OF RESULTS ON SMOKING TESTS USING THE ON-THE-SWAB TEST*

Substance** Smoked	Test Results Before				Test Results After				Percent
	Controls		Smokers		Controls		Smokers		
	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(+)
0.6 g marihuana	9	0	50	0	9	0	13	37	74 (37/50)
0.4 g marihuana	5	0	50	1	5	0	15	35	70 (35/50)
0.25 g marihuana	7	0	50	4	7	0	19	31	62 (31/50)
0.6 g marihuana	5	0	50	2	5	0	9	41	82 (41/50)
0.4 g marihuana	8	0	50	1	8	0	13	37	74 (37/50)
0.25 g marihuana	7	0	50	2	7	0	20	30	60 (30/50)
0.6 hashish	3	0	50	1	3	0	9	41	82 (41/50)

* As reported in LWL Report No. LWL-CR-08C72, LWL Contract No. DAAD05-72-C-0187. The swabs in this study were lip swabs.

** Marihuana (1.7% THC) and hashish (0.1% THC) were smoked in pipes.

TABLE B-VI

EVALUATION OF POSSIBLE INTERFERENCES IN THE* LIP SWAB TEST FOR MARIHUANA SMOKERS

Material Tested	Color Observed	Material Tested	Color Observed
THC (Active Cannabis Ingredient)	Bright Red	Mescaline	Pale Brown/Orange
		Lobeline	Pale Brown/Orange
		Nalorphine	Pale Brown/Orange
Phenobarbital	Pale Brown/Orange	Phenmetrazine	Pale Brown/Orange
Pentobarbital	Pale Brown/Orange	Tripelennamine	Pale Brown/Orange
Amobarbital	Pale Brown/Orange	Methapyrilene	Pale Brown/Orange
Secobarbital	Pale Brown/Orange	Phenylpropanolamine	Pale Brown/Orange
Butabarbital	Pale Brown/Orange	Oxymorphone	Pale Brown/Orange
Butobarbital	Pale Brown/Orange	Areca	Dark Brown/Pink
Diphenylhydantoin	Pale Brown/Orange	Catechu	Dark Brown/Pink
Merperidine	Pale Brown/Orange	Chamomile	Pale Pink/Orange
Acetyl Salicylic Acid	Pale Brown/Orange	Damiana	Brown
Salicylic Acid	Pale Brown/Orange	Hops	Brown
Chlorpheniramine	Pale Brown/Orange	Horsetail	Brown/Green
Diphenhydramine	Pale Brown/Orange	Kava Kava	Brown
Amitriptyline	Pale Brown/Orange	Kola	Brown
Thioridazine	Pale Brown/Orange	Lobelia	Brown
Propoxyphene	Pale Brown/Orange	Mistletoe	Brown
Quinine	Pale Brown/Orange	Mormon Tea	Orange/Pink
Methylphenidate	Pale Brown/Orange	Tobacco	Brown
Oxazepam	Pale Brown/Orange	Mustard	Brown
Promazine	Pale Brown/Orange	Onion	Brown
Trifluoperazine	Pale Brown/Orange	Paprika	Brown
Chlorpromazine	Pale Brown/Orange	Passion Flower	Brown
Imipramine	Dark Brown/Pink	Skull Cap	Brown
Diazepam	Pale Brown/Pink	Valerian	Brown
Morphine	Pale Brown/Pink	Wormwood	Brown
Codeine	Pale Brown/Pink	Yohimbe	Orange/Pink
Glutethimide	Pale Brown/Pink	Nutmeg	Brown/Pink
Cocaine	Pale Brown/Pink	Cinnamon	Brown
Methadone	Pale Brown/Pink	Cloves	Brown/Pink
Hydromorphone	Dark Brown/Pink	Ginger	Brown/Pink
Quinine Extract	Dark Brown/Pink	Mace	Pink/Orange
Nicotine	Dark Orange/Yellow	Pepper	Brown
MDA	Pale Brown/Pink	Rosemary	Brown
STP	Pale Brown/Orange	Sage	Brown
Amphetamine	Pale Brown/Orange	Thyme	Brown
Methamphetamine	Pale Brown/Orange		
DMT	Pale Brown/Orange		
DET	Pale Brown/Orange		

* *As reported in LWL Report No. LWL-CR-08C72, LWL Contract No. DAA005-72-C-0187.*

APPENDIX C

RESULTS

LEGEND FOR TABLE C-I

*	Not available
-	Negative result
+	Positive result
Trace	Concentration of less than 0.1 µg/ml (unless determinable)

†	Marihuana test results for right-hand, left-hand, and oronasal area
+	Positive swab result
-	Negative swab result
*	No swab available
o	Swab too dirty for test

(N)	Nicotine (qualitative)
(A)	Aspirin (qualitative)
(S)	Salicylic acid (qualitative)

Amitryp	amitryptilene
Amo	amobarbital
Amphet	amphetamine
Barb(s)	barbiturate(s)
Buta	butabarbital
Buto	butobarbital
Chlordiaz	chlordiazepoxide
Chlorphen	chlorpheniramine
Chlorprom	chlorpromazine
Code	codeine
DET	diethyltryptamine
Diaz	diazepam
Diphen	diphenhydramine
DMMA	2,5-dimethoxy-4-methylamphetamine
DMT	dimethyltryptamine
DPH	diphenylhydantoin
Gluteth	glutethimide
HDM	hydromorphone
Imip	imipramine
Lobe	lobeline
Mep	meperidine
Mepro	meprobamate
Mesc	mescaline
Meth	methamphetamine
Methaq	methaqualone
Morph	morphine
MPD	methylphenidate
MPYL	methapyriline
Nalor	nalorphine
Pento	pentobarbital
Pheno	phenobarbital
Phenylprop	phenylpropanolamine
Prom	promazine
Propox	propoxyphene
Quin	quinine
Seco	secobarbital
Thior	thioridazine
Trifluo	trifluoperazine
Tripel	tripelennamine

TABLE C-I

ANALYTICAL RESULTS AND CRASH DATA FROM FATALLY INJURED DRIVERS

MRI Sample Code	Location of Crash	Date of Crash	Crash Data Available	Time of Crash	Age of Victim	Sex of Victim	Single or Multiple Vehicle Accident	Driver Victim at Fault	Blood Alcohol	Marihuana Analysis	Drugs Indicated by TLC			Drugs Confirmed by GC		
											Urine	Blood	Bile	Urine	Blood	Bile
1	Washington, ASAP	12-1-71	No	1543	*	M	*	*	*	-	-	*	-	-	*	-
2	Oregon, ASAP	12-5-71	Yes	2010	22	M	M	Yes	0.400	-	(N)	-	-	-	-	-
3	Oregon, ASAP	12-15-71	No	0605	*	M	*	*	-	-	Barb (N)	-	-	-	-	-
4	Oregon, ASAP	12-11-71	No	2306	*	M	*	*	0.038	-	Barb	-	-	Pheno (1.2)	-	-
5	Oregon, ASAP	12-11-71	Yes	2150	42	M	M	Yes	0.250	-	(N)	-	-	-	-	-
6	Washington, ASAP	12-22-71	No	0937	78	M	*	*	-	-	Amphet (A)	-	-	Amphet (0.2)	-	-
7	Oregon, ASAP	12-27-71	Yes	0030	22	M	S	Yes	0.200	-	(N,S)	-	-	-	-	-
8	Washington, ASAP	12-27-71	No	1720	27	M	*	*	-	-	-	-	-	-	-	-
9	Washington, ASAP	12-31-71	No	2007	23	M	*	*	0.185	-	(N)	-	-	-	-	-
10	Washington, ASAP	1-1-72	Yes	0340	33	M	S	Yes	0.150	-	-	-	-	-	-	-
11	Washington, ASAP	1-4-72	Yes	1825	62	M	M	Yes	0.250	-	(A)	-	-	-	-	-
12	Oregon, ASAP	1-6-72	Yes	1500	47	M	M	No	-	-	Barb	-	-	-	-	-
13	Washington, ASAP	1-11-72	Yes	0655	56	F	M	Yes	-	-	*	-	-	*	-	-
14	Vermont, ASAP	1-14-72	No	1832	*	M	*	*	0.425	-	(N)	-	-	-	-	-
15	Oregon, ASAP	1-13-72	Yes	1144	51	M	S	No	-	-	(N,S)	-	-	-	-	-
16	Washington, ASAP	1-16-72	Yes	0115	18	M	S	Yes	0.038	-	*	-	-	*	-	-
17	Minnesota, ASAP	1-19-72	No	0644	*	*	*	*	0.038	-	(N)	-	-	-	-	-
18	Washington, ASAP	1-22-72	Yes	0225	26	M	M	Yes	0.212	-	(N)	-	-	-	-	-
19	Vermont, ASAP	1-22-72	No	1730	*	M	*	*	-	-	*	Gluteth	-	*	-	-
20	Vermont, ASAP	1-26-72	No	0930	*	F	*	*	-	-	*	-	-	*	-	-
21	Vermont, ASAP	1-28-72	No	*	*	M	*	*	-	-	*	-	-	*	-	-

TABLE C-I (Continued)

MRI Sample Code	Location of Crash	Date of Crash	Crash Data Available	Time of Crash	Age of Victim	Sex of Victim	Single or Multiple Vehicle Accident	Driver Victim at Fault	Blood Alcohol	Marihuana Analysis	Drugs Indicated by TLC			Drugs Confirmed by GC		
											Urine	Blood	Bile	Urine	Blood	Bile
22	Washington, ASAP	2-3-72	Yes	0057	42	F	S	Yes	-	-	Barb Propox	-	Barbs Propox	Pheno (tr)	-	Pheno (1.1)
23	Maryland, ASAP	2-15-72	Yes	0450	22	M	S	Yes	-	-	(N)	-	-	-	-	-
24	Washington, ASAP	2-11-72	Yes	1800	38	M	S	Yes	*	-	(N)	*	Meth	-	*	Meth (tr)
25	Minnesota, ASAP	2-17-72	No	0102	*	*	*	*	0.125	-	(N)	Propox	*	-	-	*
26	Maryland, ASAP	2-27-72	Yes	2116	30	M	M	Yes	*	-	(N)	*	-	-	*	-
27	Maryland, ASAP	3-1-72	Yes	0615	27	M	S	Yes	0.236	-	(N)	-	-	-	-	-
28	Washington, ASAP	3-4-72	Yes	2150	38	M	M	Yes	0.186	-	(N)	Propox	-	-	-	-
29	Oregon, ASAP	3-3-72	Yes	0225	31	M	M	No	-	-	(N,A)	(N)	*	-	-	*
30	Washington, ASAP	3-7-72	Yes	1210	58	F	S	Yes	-	-	(N)	-	*	-	-	*
31	Sacramento, Calif.	3-8-72	No	1845	*	M	*	*	-	-	Barb (N)	Barb	*	Pheno (tr)	Pheno (3.5)	*
32	Oregon, ASAP	3-12-72	Yes	0707	45	M	M	Yes	0.225	-	Barbs Trifluo (N,A)	-	Chlordiaz (A)	-	-	-
33	Sacramento, Calif.	3-11-72	No	0240	*	M	*	*	0.062	-	-	-	(S)	-	-	-
34	Wisconsin, ASAP	3-11-72	No	1000	*	*	*	*	0.075	-	-	Gluteth (A)	-	-	Gluteth (0.5)	-
35	Oregon, ASAP	3-22-72	Yes	0430	30	M	M	Yes	0.100	-	Mesc. (N)	-	(N,S)	-	-	-
36	Arkansas, ASAP	3-21-72	Yes	1645	52	M	M	No	-	-	(N)	-	*	-	-	*
37	Maryland, ASAP	3-26-72	Yes	0445	23	M	M	Yes	-	-	Amphet (N,A)	-	-	Amphet (1.9)	-	-
38	Arkansas, ASAP	3-25-72	Yes	0112	29	M	S	Yes	0.132	-	-	-	*	-	-	*
39	Sacramento, Calif.	3-25-72	No	1509	*	M	*	*	0.058	-	-	-	*	-	-	*
40	Oregon, ASAP	3-31-72	No	1900	*	M	*	*	-	-	(A)	-	(A)	-	-	-
41	Sacramento, Calif.	3-31-72	No	1515	*	F	*	*	0.088	-	(N)	-	-	-	-	-
42	Oklahoma, ASAP	4-3-72	Yes	2047	44	M	S	Yes	-	-	Trifluo (N)		*	-	-	-

TABLE C-I (Continued)

MRI Sample Code	Location of Crash	Date of Crash	Crash Data Available	Time of Crash	Age of Victim	Sex of Victim	Single or Multiple Vehicle Accident	Driver Victim at Fault	Blood Alcohol	Marihuana Analysis	Drugs Indicated by TLC			Drugs Confirmed by GC		
											Urine	Blood	Bile	Urine	Blood	Bile
43	Michigan, ASAP	4-5-72	No	0210	*	M	*	*	0.088	-	(N)	-	-	-	-	-
44	Washington, ASAP	4-5-72	Yes	1540	79	F	M	Yes	-	-	(A)	-	(A)	-	-	-
45	Washington, ASAP	4-5-72	Yes	0925	29	M	M	Yes	-	-	-	-	-	-	-	-
46	Vermont, ASAP	4-9-72	No	0030	*	M	*	*	0.220	-	(N)	-	(N)	-	-	-
47	Sacramento, Calif.	4-8-72	No	0115	*	M	*	*	0.375	-	-	-	-	-	-	-
48	Washington, ASAP	4-8-72	Yes	2115	31	F	M	Yes	-	-	(A,S)	(A,S)	(A,S)	-	-	-
49	Washington, ASAP	4-8-72	No	1715	*	M	*	*	0.105	-	Amphet (N)	-	Amphet	-	-	-
50	Washington, ASAP	4-7-72	Yes	0735	23	M	M	Yes	0.115	-	(N)	-	-	-	-	-
51	Oklahoma, ASAP	4-12-72	Yes	1250	16	F	M	Yes	-	-	(A)	-	*	-	-	*
52	Oregon, ASAP	4-12-72	Yes	1330	67	M	M	Yes	-	-	*	(A,N)	(A,N)	*	-	-
53	Oregon, ASAP	4-16-72	Yes	0254	28	M	S	Yes	0.212	-	(A,N)	-	(N)	-	-	-
54	Oregon, ASAP	4-15-72	Yes	0903	50	M	M	Yes	0.500	-	Barb	Barb	Barbs (S)	Pheno (2.0)	Pheno (3.6)	Pheno (tr)
55	Sacramento, Calif.	4-17-72	No	1800	*	M	*	*	-	-	(N)	-	-	-	-	-
56	Maryland, ASAP	4-19-72	Yes	0055	23	M	S	Yes	0.275	-	(N)	-	(N,A)	-	-	-
57	Michigan, ASAP	4-18-72	No	1710	*	M	*	*	-	-	(A)	(A)	Gluteth (A)	-	-	-
58	Sacramento, Calif.	4-19-72	No	1130	*	M	*	*	-	-	(N)	Morph (N)	*	-	-	*
59	Michigan, ASAP	4-22-72	No	1900	*	F	*	*	-	-	*	-	(S)	*	-	-
60	Oregon, ASAP	4-22-72	Yes	2002	22	M	M	No	-	-	(N)	-	(N,S)	-	-	-
61	Washington, ASAP	4-22-72	Yes	2117	24	M	S	Yes	0.050	-	(N,A)	(A)	(N,A)	-	-	-
62	Sacramento, Calif.	4-22-72	No	1425	*	M	*	*	-	-	Barb (N,A)	-	Barb (N)	-	-	-
63	Maryland, ASAP	4-28-72	Yes	1530	75	M	M	Yes	-	-	*	(A)	-	*	-	-
64	Oregon, ASAP	4-25-72	Yes	1800	24	F	M	Yes	-	-	*	(A)	-	*	-	-

TABLE C-I (Continued)

MRI Sample Code	Location of Crash	Date of Crash	Crash Data Available	Time of Crash	Age of Victim	Sex of Victim	Single or Multiple Vehicle Accident	Driver Victim at Fault	Blood Alcohol	Marihuana Analysis	Drugs Indicated by TLC			Drugs Confirmed by GC		
											Urine	Blood	Bile	Urine	Blood	Bile
65	Minnesota, ASAP	4-29-72	No	2002	*	*	*	*	0.125	-	(N)	-	-	-	-	-
66	Vermont, ASAP	4-29-72	No	2345	*	M	*	*	0.238	-	(N,A)	-	(N,S)	-	-	-
67	Washington, ASAP	4-30-72	Yes	1510	37	M	S	Yes	0.212		Barb (N,A)	Barb (A)	Barb (N,A)	Pheno (4.9)	Pheno (tr)	Pheno (tr)
68	Washington, ASAP	4-27-72	Yes	1729	19	M	M	Yes	0.050	-	*	-	-	*	-	-
69	Sacramento, Calif.	4-30-72	No	1956	*	*	*	*	-	-	-	(A)	-	-	-	-
70	Minnesota, ASAP	5-4-72	No	1500	*	*	*	*	-	-	*	-	(A)	*	-	-
71	Oregon, ASAP	5-5-72	Yes	2338	37	M	M	No	-	-	(A)	(N)	-	-	-	-
72	Minnesota, ASAP	5-6-72	No	0129	*	*	*	*	0.175	-	Amphet (N)	-	*	Amphet (0.1)	-	*
73	Arkansas, ASAP	5-7-72	Yes	0300	33	M	S	Yes	-	-	(N)	(A)	*	-	-	*
74	Arkansas, ASAP	5-7-72	Yes	0300	29	F	S	Yes	-	-	(A)	-	MPD (N)	-	-	-
75	Washington, ASAP	5-14-72	Yes	0145	26	M	S	Yes	-	-	Amphet Meth	-	-	Amphet (tr) Meth (tr)	-	-
76	Oregon, ASAP	5-13-72	Yes	1940	23	F	M	Yes	0.050	-	-	-	-	-	-	-
77	Sacramento, Calif.	5-14-72	No	1705	*	M	*	*	0.375	-	(N)	-	MPD Tripel Imip (N)	-	-	-
78	Vermont, ASAP	5-16-72	No	1630	*	M	*	*	-	-	(N)	-	-	-	-	-
79	Arkansas, ASAP	5-17-72	Yes	1820	20	M	M	Yes	-	-	*	-	-	*	-	-
80	Maryland, ASAP	5-18-72	Yes	0140	28	M	S	Yes	0.212	-	(N)	-	*	-	-	*
81	Washington, ASAP	5-21-72	Yes	0400	26	M	S	Yes	0.250	-	(A)	(A)	(A)	-	-	-
82	Vermont, ASAP	5-19-72	No	1920	*	M	*	*	0.151	-	(N)	-	*	-	-	*
83	Vermont, ASAP	5-20-72	No	1715	*	M	*	*	0.380	-	-	-	-	-	-	-
84	Vermont, ASAP	5-20-72	No	1815	*	M	*	*	0.080	-	Meth (N)	(A)	-	Meth (tr)	-	-
85	Sacramento, Calif.	5-20-72	No	2040	*	M	*	*	0.025	-	Meth (N)	-	-	Meth (tr)	-	-
86	Vermont, ASAP	5-26-72	No	0200	*	M	*	*	0.320	-	-	-	-	-	-	-

TABLE C-I (Continued)

MRI Sample Code	Location of Crash	Date of Crash	Crash Data Available	Time of Crash	Age of Victim	Sex of Victim	Single or Multiple Vehicle Accident	Driver Victim at Fault	Blood Alcohol	Marihuana Analysis	Drugs Indicated by TLC			Drugs Confirmed by GC		
											Urine	Blood	Bile	Urine	Blood	Bile
87	Maryland, ASAP	5-27-72	Yes	1830	26	F	S	Yes	0.255	-	(N,A)	(A)	(A)	-	-	-
88	Sacramento, Calif.	5-25-72	No	1830	*	M	*	*	0.300	-	(N)	-	(N)	-	-	-
89	Sacramento, Calif.	5-30-72	No	0315	*	M	*	*	-	-	(N)	(S)	(S)	-	-	-
90	Maryland, ASAP	5-31-72	Yes	0110	23	M	S	Yes	-	-	(S)	(S)	(S)	-	-	-
91	Maryland, ASAP	5-31-72	Yes	2004	42	F	S	Yes	-	-	-	-	*	-	-	*
92	Vermont, ASAP	5-30-72	No	1100	*	F	*	*	-	-	-	-	-	-	-	-
93	Michigan, ASAP	5-31-72	No	2130	*	M	*	*	0.455	-	(N)	(N)	-	-	-	-
94	Vermont, ASAP	5-30-72	No	1545	*	M	*	*	0.500	-	(N)	-	Barb	-	-	Amo (0.3)
95	Oregon, ASAP	6-3-72	Yes	1726	62	M	M	No	-	-	*	-	*	*	-	*
96	Minnesota, ASAP	6-4-72	No	1345	*	*	*	*	-	-	Barbs (N,S)	-	(N,S)	Pheno (tr)	-	-
97	Oklahoma, ASAP	6-6-72	Yes	1715	41	F	M	No	-	-	*	-	*	*	-	*
98	Maryland, ASAP	6-9-72	Yes	0602	59	M	S	Yes	-	-	Amphet	-	-	Amphet (tr)	-	-
99	Minnesota, ASAP	6-8-72	No	1209	*	*	*	*	-	-	-	-	-	-	-	-
100	Oregon, ASAP	6-11-72	Yes	2355	30	M	S	Yes	0.130	-	(S)	-	-	-	-	-
101	Sacramento, Calif.	6-10-72	No	1600	*	M	*	*	0.030	-	*	(S)	(S)	*	-	-
102	Arkansas, ASAP	6-13-72	Yes	1550	54	M	M	No	-	-	Chlorprom Chlorphen (N)	-	Mepro Barb	Chlorprom (tr)	-	Amo (6.2)
103	New York, ASAP	6-11-72	Yes	0615	76	M	S	Yes	0.290	-	(A)	(A)	Barb (A)	-	-	Pento (tr)
104	Arkansas, ASAP	6-15-72	Yes	1730	14	M	M	No	-	-	-	-	-	-	-	-
105	Oregon, ASAP	6-18-72	Yes	0240	18	M	M	Yes	0.325	-	(N)	-	Barbs	-	-	Pheno (tr) Amo (4.3)
106	Oregon, ASAP	6-18-72	Yes	1900	27	M	S	Yes	0.280	-	Trifluo (N,A)	-	Trifluo (N,A)	-	-	Trifluo (2.2)
107	San Diego, Calif.	6-19-72	Yes	2215	20	M	S	Yes	0.220	-	(A)	-	Barb (A)	-	-	Buto (tr)
108	Sacramento, Calif.	6-20-72	No	1035	*	M	*	*	-	-	*	-	*	*	-	*

TABLE C-I (Continued)

MRI Sample Code	Location of Crash	Date of Crash	Crash Data Available	Time of Crash	Age of Victim	Sex of Victim	Single or Multiple Vehicle Accident	Driver Victim at Fault	Blood Alcohol	Marihuana Analysis	Drugs Indicated by TLC			Drugs Confirmed by GC		
											Urine	Blood	Bile	Urine	Blood	Bile
109	Maine, ASAP	6-23-72	No	2100	*	M	*	*	0.510	-	*	-	*	*	-	*
110	Vermont, ASAP	5-26-72	No	2350	*	*	*	*	0.188	-	(N,A)	-	Barb (A)	-	-	-
111	Arkansas, ASAP	6-23-72	Yes	1700	16	F	S	Yes	-	-	-	(A)	*	-	-	*
112	Michigan, ASAP	6-25-72	No	2230	*	M	*	*	0.220	-	*	-	Barbs	*	-	Pento (tr)
113	San Diego, Calif.	6-25-72	Yes	1215	27	M	S	Yes	-	-	(N,A)	-	(N,A)	-	-	-
114	Washington, ASAP	6-25-72	Yes	1200	17	M	M	Yes	-	-	*	-	Barb (S)	*	-	-
115	Santa Ana, Calif.	6-25-72	No	1730	*	M	*	*	0.170	-	-	-	-	-	-	-
116	Washington, ASAP	6-24-72	Yes	1125	17	M	M	Yes	-	-	*	(N)	(N)	*	-	-
117	Washington, ASAP	6-23-72	Yes	1550	33	M	M	Yes	-	-	Quin Meth Chlordiaz	-	*	Quin (13.4)	-	*
118	Santa Ana, Calif.	6-25-72	No	0450	*	F	*	*	-	-	-	-	*	-	-	*
119	Michigan, ASAP	6-25-72	No	1700	*	F	*	*	-	-	(N)	(N)	(N)	-	-	-
120	San Diego, Calif.	6-27-72	Yes	2215	36	M	S	Yes	0.240	-	*	-	Amphet Mepro Barbs (S,A)	*	-	Mepro (1.2)
121	San Mateo, Calif.	6-28-72	Yes	2351	42	M	S	Yes	0.310	-	*	-	*	*	-	*
122	Vermont, ASAP	6-29-72	No	0300	*	M	*	*	0.300	-	Mepro Barbs (N)	- (N)	Mepro Barbs Meth (N)	-	-	Meth (0.4)
123	Maryland, ASAP	7-2-72	No	0550	*	M	*	*	0.150	-	*	(N)	Meth (N)	*	-	-
124	Minnesota, ASAP	6-16-72	No	1540	*	*	*	*	-	-	Chlorprom	-	*	Chlorprom (11.4)	-	*
125	Oregon, ASAP	7-5-72	Yes	0030	22	M	S	Yes	0.150	-	(A)	-	-	-	-	-
126	Vermont, ASAP	7-1-72	No	1930	*	M	*	*	0.230	-	-	-	-	-	-	-
127	San Diego, Calif.	7-2-72	Yes	1915	22	M	S	Yes	0.130	-	Amphet	-	Barb	Amphet (tr)	-	Buto (tr)
128	Oakland, Calif.	7-7-72	Yes	0930	76	M	M	*	-	-	Barb	-	-	Pento (0.3)	-	-

TABLE C-I (Continued)

MRI Sample Code	Location of Crash	Date of Crash	Crash Data Available	Time of Crash	Age of Victim	Sex of Victim	Single or Multiple Vehicle Accident	Driver Victim at Fault	Blood Alcohol	Marihuana Analysis	Drugs Indicated by TLC			Drugs Confirmed by GC		
											Urine	Blood	Bile	Urine	Blood	Bile
129	Oregon, ASAP	7-6-72	Yes	1855	17	M	M	Yes	-	-	Phenylprop Meth	-	*	-	-	*
130	Oregon, ASAP	7-7-72	No	2130	*	M	*	*	0.010	-	Phenylprop (N)	-	Mepro Chlorprom	-	-	Mepro (12.2) Chlorprom (tr)
131	Oklahoma, ASAP	7-6-72	Yes	2330	16	F	S	Yes	-	-	(N)	(N)	*	-	-	*
132	Oklahoma, ASAP	7-9-72	Yes	1745	27	M	S	Yes	0.125	-	(N,A)	-	-	-	-	-
133	San Diego, Calif.	7-10-72	Yes	1505	20	M	M	Yes	0.110	-	(A)	-	-	-	-	-
134	Oakland, Calif.	7-10-72	Yes	2350	25	M	M	No	0.080	-	(N,A,S)	-	(N,A,S)	-	-	-
135	Oakland, Calif.	7-14-72	Yes	1630	52	M	M	Yes	-	-	*	-	*	*	-	*
136	Oakland, Calif.	7-15-72	Yes	1650	41	F	S	Yes	0.200	-	(N)	(N)	-	-	-	-
137	Washington, ASAP	7-15-72	Yes	0005	16	M	M	Yes	0.230	-	-	-	Barb	-	-	Pento (tr)
138	Oakland, Calif.	7-16-72	Yes	1345	53	M	M	Yes	-	-	Amphet (N,A)	-	*	-	-	*
139	Oregon, ASAP	7-15-72	Yes	0140	17	M	M	Yes	0.175	-	*	-	-	*	-	-
140	Michigan, ASAP	7-18-72	No	0951	*	M	*	*	*	-	*	*	-	*	*	-
141	San Diego, Calif.	7-18-72	Yes	1948	24	M	M	No	-	-	-	-	(A)	-	-	-
142	Vermont, ASAP	7-13-72	No	1645	*	M	*	*	-	-	*	-	*	*	-	*
143	Vermont, ASAP	7-15-72	No	1950	*	M	*	*	-	-	(A)	-	-	-	-	-
144	Maryland, ASAP	7-20-72	Yes	0310	22	M	S	Yes	-	-	*	-	(A)	*	-	-
145	Oregon, ASAP	7-21-72	Yes	0110	34	M	S	Yes	0.275	-	(A)	(A)	(A)	-	-	-
146	Oregon, ASAP	7-19-72	Yes	2315	30	M	M	Yes	0.300	-	(N,A)	-	(A)	-	-	-
147	Oregon, ASAP	7-22-72	No	0030	*	M	*	*	-	-	-	-	-	-	-	-
148	San Diego, Calif	7-23-72	Yes	1115	54	M	S	Yes	-	-	*	-	Meth	*	-	Meth (1.1)
149	Oregon, ASAP	7-22-72	Yes	0935	*	F	S	Yes	-	-	*	-	Barb	*	-	Buto (tr)
150	Oregon, ASAP	7-26-72	Yes	0255	25	M	M	Yes	0.008	-	Morph (N)	(A)	(N)	-	-	-
151	Everett, Washington	7-26-72	Yes	2340	25	M	S	Yes	0.350	-	(N)	-	*	-	-	*

TABLE C-I (Continued)

MRI Sample Code	Location of Crash	Date of Crash	Crash Data Available	Time of Crash	Age of Victim	Sex of Victim	Single or Multiple Vehicle Accident	Driver Victim at Fault	Blood Alcohol	Marihuana Analysis	Drugs Indicated by TLC			Drugs Confirmed by GC		
											Urine	Blood	Bile	Urine	Blood	Bile
152	Sacramento, Calif.	7-27-72	No	2000	*	M	*	*	0.360	-	-	(A)	-	-	-	-
153	Everett, Washington	7-30-72	Yes	0645	32	M	S	Yes	0.050	-	*	-	*	*	-	*
154	San Diego, Calif.	7-29-72	Yes	0800	25	M	S	Yes	*	-	(N)	*	Barb	-	*	-
155	Oakland, Calif.	7-31-72	Yes	0354	20	M	M	No	0.270	-	Barb (N)	-	Barbs	-	-	-
156	Sacramento, Calif.	7-28-72	No	2110	*	*	*	*	0.120	-	(N,A,S)	-	Barb	-	-	-
157	Sacramento, Calif.	7-29-72	No	0100	*	M	*	*	0.125	-	(N,A,S)	-	Barb (A)	-	-	-
158	Oregon, ASAP	8-4-72	Yes	0005	25	M	S	Yes	0.035	-	Morph (N)	-	*	-	-	*
159	Minnesota, ASAP	8-5-72	No	*	*	*	*	*	0.152	-	(N,A)	-	-	-	-	-
160	Vermont, ASAP	8-6-72	No	0830	*	M	*	*	-	-	-	Gluteth	-	-	Gluteth (0.2)	-
161	San Jose, Calif.	8-4-72	Yes	2315	17	M	S	Yes	0.194	-	(N)	(A)	*	-	-	*
162	Minnesota, ASAP	8-6-72	No	1733	*	*	*	*	-	-	(N)	-	-	-	-	-
163	Oakland, Calif.	8-7-72	Yes	1600	58	M	M	Yes	-	-	Diaz	(S)	Barbs	Diaz (0.5)	-	Buto (1.0)
164	Sacramento, Calif.	8-7-72	No	1330	*	M	*	*	-	-	(A)	(A)	Mepro Gluteth	-	-	-
165	Oakland, Calif.	8-6-72	Yes	1600	25	M	S	Yes	0.071	-	Amphet	(A)	Barb (A)	-	-	Seco (0.8)
166	Vermont, ASAP	8-7-72	No	1430	*	F	*	*	0.010	-	*	(A)	Barb	*	-	-
167	Oklahoma, ASAP	8-9-72	Yes	0400	42	M	S	Yes	0.173	-	(N)	-	*	-	-	*
168	Maryland, ASAP	8-9-72	Yes	2355	43	M	M	No	-	-	-	-	*	-	-	*
169	Michigan, ASAP	*	No	*	*	*	*	*	0.075	-	*	-	-	*	-	-
170	Maryland, ASAP	8-12-72	Yes	1325	74	F	M	Yes	-	-	Barb	-	*	Pento (1.4)	-	*
171	Everett, Washington	8-11-72	Yes	2350	16	M	S	Yes	-	-	Barb (N,S)	-	-	-	-	-
172	Oregon, ASAP	8-14-72	Yes	2150	27	M	M	Yes	0.049	-	Barb (N)	-	-	-	-	-
173	Oakland, Calif.	8-16-72	No	0150	*	M	*	*	0.122	-	(N)	-	Barb	-	-	Seco (0.5)

TABLE C-I (Continued)

MRI Sample Code	Location of Crash	Date of Crash	Crash Data Available	Time of Crash	Age of Victim	Sex of Victim	Single or Multiple Vehicle Accident	Driver Victim at Fault	Blood Alcohol	Marihuana Analysis	Drugs Indicated by TLC			Drugs Confirmed by GC		
											Urine	Blood	Bile	Urine	Blood	Bile
174	Oakland, Calif.	8-16-72	No	0735	*	M	*	*	-	-	-	-	-	-	-	-
175	San Diego, Calif.	8-17-72	No	1730	*	*	*	*	0.129	-	(N)	Meth	Mepro (N)	-	Meth (1.2)	Mepro (0.8)
176	Oakland, Calif.	8-18-72	No	0235	*	M	*	*	0.170	-	Phenylprop	-	-	Phenylprop (tr)	-	-
177	Vermont, ASAP	8-18-72	No	1000	*	M	*	*	-	-	Barb (N)	-	Barb	Amo (0.1)	-	Pheno (3.7)
178	Maryland, ASAP	8-19-72	Yes	1525	55	M	S	Yes	-	-	*	-	Barb Phenylprop	*	-	Phenylprop (3.0)
179	San Diego, Calif.	8-18-72	No	1945	*	*	*	*	-	-	Amphet (N)	-	Mepro Barb	Amphet (tr)	-	Mepro (0.4) Seco (0.5)
180	Martinez, Calif.	8-19-72	Yes	1855	18	M	S	Yes	0.172	-	(N)	-	-	-	-	-
181	San Diego, Calif.	8-21-72	No	0905	*	*	*	*	0.037	-	(N)	Barb	Barb	-	-	-
182	Washington, ASAP	8-19-72	No	2305	*	M	*	*	0.129	-	(N)	-	Barb (N)	-	-	-
183	Oakland, Calif.	8-22-72	No	0045	*	M	*	*	0.130	-	-	-	Diaz	-	-	-
184	Sacramento, Calif.	8-21-72	No	0200	*	M	*	*	0.155	-	*	-	*	*	-	*
185	Oklahoma, ASAP	8-26-72	Yes	0459	46	F	M	*	0.152	-	(S)	-	*	-	-	*
186	Oakland, Calif.	8-24-72	No	1530	*	M	*	*	-	-	Phenyl-prop	Phenyl-prop	-	-	-	-
187	San Diego, Calif.	8-24-72	No	0139	*	*	*	*	0.130	-	*	-	-	*	-	-
188	Oregon, ASAP	8-24-72	Yes	2235	22	M	S	No	0.048	+	*	-	Barbs Gluteth DPH (S)	*	-	-
189	San Diego, Calif.	8-27-72	No	1930	*	*	*	*	-	-	(N)	(A)	-	-	-	-
190	San Jose, Calif.	8-25-72	Yes	1830	26	M	S	Yes	0.160	-	(N)	Gluteth	Barb	-	-	Buto (0.4)
191	San Diego, Calif.	8-28-72	No	2340	*	*	*	*	-	-	-	-	-	-	-	-
192	Vermont, ASAP	8-5-72	No	0200	*	M	*	*	0.110	-	-	-	Barbs	-	-	-

TABLE C-I (Continued)

MRI Sample Code	Location of Crash	Date of Crash	Crash Data Available	Time of Crash	Age of Victim	Sex of Victim	Single or Multiple Vehicle Accident	Driver Victim at Fault	Blood Alcohol	Marihuana Analysis	Drugs Indicated by TLC			Drugs Confirmed by GC		
											Urine	Blood	Bile	Urine	Blood	Bile
193	San Mateo, Calif.	8-30-72	Yes	0050	59	M	S	Yes	0.221	-	Barbs DPH HDM Tripel Imip (A) Phenylpropyl	-	Barbs DPH HDM Tripel Imip Phenylprop	Phenylprop (7.8)	-	-
194	Oakland, Calif.	9-4-72	No	1945	*	M	*	*	*	-	-	*	Barb DPH Imip Tripel	-	*	-
195	Atlanta, Georgia	9-4-72	No	2230	*	M	*	*	-	+	*	(A)	-	*	-	-
196	Oregon, ASAP	9-2-72	Yes	0430	24	F	M	Yes	0.195	-	*	-	Gluteth	*	-	-
197	Vermont, ASAP	9-3-72	No	0130	*	M	*	*	0.123	-	-	-	*	-	-	*
198	Vermont, ASAP	9-5-72	No	0100	*	M	*	*	0.033	-	-	-	Barbs	-	-	-
199	Oakland, Calif.	9-2-72	No	0130	*	M	*	*	0.177	-	(N)	-	Barb DPH	-	-	DPH (0.7)
200	Vermont, ASAP	*	No	*	*	*	*	*	0.270	-	(N,A)	*	(A)	-	*	-
201	Oregon, ASAP	9-8-72	Yes	1710	70	M	M	Yes	-	+	*	-	*	*	-	*
202	Minnesota, ASAP	9-10-72	No	*	*	*	*	*	-	-	*	-	-	*	-	-
203	Minnesota, ASAP	8-9-72	No	0649	*	*	*	*	0.112	-	Phenylprop Barb HDM (N,A)	-	*	Phenylprop (12.9) Pheno (3.0)	-	*
204	Vermont, ASAP	9-10-72	No	2144	*	M	*	*	-	-	-	Gluteth	*	-	-	*
205	New York, ASAP	9-5-72	Yes	0800	22	M	M	*	-	-	*	-	-	*	-	-
206	Washington, ASAP	9-12-72	No	0120	*	M	*	*	0.160	-	(N)	-	HDM Amphet	-	-	-
207	San Diego, Calif.	9-6-72	No	1154	*	*	*	*	-	-	-	-	Phenylprop	-	-	-
208	Ft. Thomas, Kentucky	9-12-72	Yes	2315	32	M	S	Yes	0.195	-	(N)	-	*	-	-	*
209	Oklahoma, ASAP	9-12-72	Yes	1804	29	M	M	Yes	-	-	Barbs Phenyl-propyl Chlordiaz	Barbs Phenyl-propyl Chlordiaz	*	Buto (0.8)	-	*

TABLE C-I (Continued)

MRI Sample Code	Location of Crash	Date of Crash	Crash Data Available	Time of Crash	Age of Victim	Sex of Victim	Single or Multiple Vehicle Accident	Driver Victim at Fault	Blood Alcohol	Marihuana Analysis	Drugs Indicated by TLC			Drugs Confirmed by GC		
											Urine	Blood	Bile	Urine	Blood	Bile
210	Maryland, ASAP	9-14-72	Yes	1615	64	M	M	Yes	0.011	-	*	-	*	*	-	*
211	New York, ASAP	9-7-72	Yes	2230	37	M	S	Yes	0.153	-	*	-	Barbs (S)	*		Pheno (0.3) Amo (0.9)
212	Oregon, ASAP	9-12-72	Yes	2015	21	M	M	No	-	-	Barb	-	-	-	-	-
213	Sacramento, Calif.	9-15-72	No	0200	*	M	*	*	0.161	-	(A)	-	-	-	-	-
214	Oakland, Calif.	9-18-72	No	0110	*	M	*	*	0.015	-	Diaz Barb Phenylprop	-	Barbs Phenylprop	Diaz Trace	-	Phenylprop (34.0)
215	San Diego, Calif.	9-18-72	No	1615	*	*	*	*	0.170	-	(N)	-	Barbs	-	-	Buta (31.0)
216	St. Petersburg, Florida	9-11-72	Yes	1215	18	F	M	No	-	-	Barbs Phenylprop Amphet Meth (N)	-	*	Buto (1.8) Meth (0.1)	-	*
217	St. Petersburg, Florida	9-1-72	Yes	0351	34	M	M	Yes	-	-	*	-	Barb DPH Mepro (A)	*	-	Amo (1.3)
218	St. Petersburg, Florida	8-31-72	Yes	2330	47	M	S	Yes	0.225	-	Phenyl-prop (N)	Phenyl-prop	*	-	-	*
219	St. Petersburg, Florida	9-3-72	Yes	1500	74	M	M	Yes	-	-	Barbs Phenylprop Amphet	-	-	Phenylprop (0.1)	-	-
220	St. Petersburg, Florida	9-12-72	Yes	1845	32	F	M	Yes	0.070	-	*	-	-	*	-	-
221	Michigan, ASAP	9-22-72	No	1600	*	M	*	*	0.231	-	Barbs Mepro DPH Amphet Amitryp (N)	Amphet Amitryp	Barbs Mepro DPH Amphet Amitryp	Amo (tr) DPH (0.1)	-	Amo (0.8) Mepro (4.1)
222	Washington, ASAP	9-19-72	No	1740	*	M	*	*	0.220	-	Mepro (N, A)	-	Mepro	Mepro (1.0)	-	Mepro (3.3)

TABLE C-I (Continued)

MRI Sample Code	Location of Crash	Date of Crash	Crash Data Available	Time of Crash	Age of Victim	Sex of Victim	Single or Multiple Vehicle Accident	Driver Victim at Fault	Blood Alcohol	Marihuana Analysis	Drugs Indicated by TLC			Drugs Confirmed by GC		
											Urine	Blood	Bile	Urine	Blood	Bile
223	Washington, ASAP	9-19-72	No	1100	*	F	*	*	-	-	*	Trifluo	-	*	-	-
224	Martinez, Calif.	9-25-72	Yes	0050	52	M	M	Yes	0.200	-	*	-	Barbs Phenylprop	*	-	Amo (0.2)
225	Sacramento, Calif.	9-27-72	No	0147	*	F	*	*	0.218	-	(N)	-	-	-	-	-
226	Washington, ASAP	9-27-72	No	1945	*	F	*	*	-	-	*	Trifluo	*	*	-	*
227	Washington, ASAP	9-28-72	No	1530	*	M	*	*	-	-	Barbs Diaz Amphet Meth DMMA	Barbs Gluteth Thior	Barbs Thior Trifluo	Amo (3.4) Pento (4.1) Amphet (14.0) Phenylprop (4.0)	Pheno (0.2) Amo (4.8)	Amo (0.8) Seco (1.2) Buta (11.4)
228	Sacramento, Calif.	9-29-72	No	0303	*	M	*	*	0.240	-	(N)	-	-	-	-	-
229	Oregon, ASAP	9-29-72	Yes	1110	35	F	M	Yes	0.090	-	*	-	*	*	-	*
230	Oakland, Calif.	10-1-72	No	1750	*	M	*	*	-	-	Mepro DPH Barb Meth Phenylprop (N)	-	Mepro Phenyl-prop	Mepro (0.7) DPH (tr) Meth (tr) Phenylprop (tr)	-	-
231	Atlanta, Georgia	10-3-72	No	0255	*	M	*	*	0.114	-	Prom Lobe Amitryp Propox Chlorphen Phenylprop Morph (N, S)	-	Methaq Phenylprop	Chlorphen (0.5) Phenylprop (0.3) Morph (0.1)	-	-
232	Washington, ASAP	10-4-72	No	0326	*	M	*	*	-	-	*	(N)	Phenylprop Propox	*	-	-
233	New York, ASAP	9-30-72	Yes	0224	27	M	S	Yes	0.025	-	*	-	Barb (A)	*	-	-
234	San Diego, Calif.	9-29-72	No	1048	*	*	*	*	-	+	*	-	*	*	-	*
235	Vermont, ASAP	10-6-72	No	1415	*	M	*	*	-	-	(N)	-	-	-	-	-
236	New York, ASAP	10-5-72	Yes	0250	32	M	S	Yes	-	-	-	-	Barb (A)	-	-	-

TABLE C-I (Continued)

MRI Sample Code	Location of Crash	Date of Crash	Crash Data Available	Time of Crash	Age of Victim	Sex of Victim	Single or Multiple Vehicle Accident	Driver Victim at Fault	Blood Alcohol	Marihuana Analysis	Drugs indicated by TLC			Drugs Confirmed by GC		
											Urine	Blood	Bile	Urine	Blood	Bile
237	St. Petersburg, Florida	10-9-72	Yes	1600	74	M	M	Yes	-	-	*	-	-	*	-	-
238	New York, ASAP	10-3-72	Yes	2025	20	F	M	Yes	0.118	-	*	Barb DPH Phenyl-prop (A)	Barb DPH Phenylprop (A)	*	-	**Phenylprop (6.3)**
239	Oregon, ASAP	10-8-72	Yes	1500	20	M	M	Yes	0.006	+	Barbs Thior (N)	-	Barb DPH Imip	Pheno (18.0)	-	**Buto (0.2)**
240	St. Petersburg, Florida	10-10-72	Yes	2330	33	M	S	Yes	0.136	-	HDM (N,A)	(N)	Barbs DPH Chlordiaz Imip Phenylprop (N)	-	-	-
241	Oakland, Calif.	10-11-72	No	0540	*	M	*	*	0.006	-	*	Mepro Gluteth	-	*	Mepro (0.3)	-
242	Sacramento, Calif.	10-12-72	No	0340	*	M	*	*	0.088	-	Barb Diaz Tripel Chlorprom Morph Quin Code (N)	(N)	Barb DPH Meth Chlorprom (N)	Pheno (1.4) Tripel (0.4) Chlorprom (tr) Quin (tr) Code (tr)	-	**Pheno (170.0) Meth (3.3) Chlorprom (6.**
243	Vermont, ASAP	9-22-72	No	2230	*	M	*	*	0.187	-	(N)	-	Barb DPH (N)	-	-	**DPH (tr)**
244	Vermont, ASAP	10-7-72	No	1520	*	F	*	*	0.331	-	Thior Chlorprom Prom Meth Phenylprop (N,A)	-	Barbs Mepro (A)	Phenylprop (tr) Trace	-	**Buta (7.0)**
245	Tampa, Florida	10-13-72	No	0620	*	F	*	*	0.037	-	*	Phenyl-prop (A)	Barbs (A)	*	-	-

TABLE C-I (Continued)

MRI Sample Code	Location of Crash	Date of Crash	Crash Data Available	Time of Crash	Age of Victim	Sex of Victim	Single or Multiple Vehicle Accident	Driver Victim at Fault	Blood Alcohol	Marihuana Analysis	Drugs Indicated by TLC			Drugs Confirmed by GC		
											Urine	Blood	Bile	Urine	Blood	Bile
246	Nebraska, ASAP	10-13-72	Yes	0600	*	M	S	Yes	0.200	-	Phenylprop (N)	-	(N)	-	-	-
247	Washington, ASAP	10-12-72	No	1530	*	M	*	*	-	-	(N)	(N)	-	-	-	-
248	Washington, ASAP	10-12-72	No	1845	*	F	*	*	0.023	-	*	-	*	*	-	*
249	St. Petersburg, Florida	10-16-72	Yes	1254	60	M	M	Yes	-	-	Phenylprop Chlordiaz (N,A)	-	(N)	Chlordiaz (0.5)	-	-
250	Washington, ASAP	10-13-72	No	1952	*	M	*	*	0.193	-	Phenylprop (N)	-	Phenylprop Barbs (N,A)	-	-	Buta (2.9)
251	San Diego, Calif.	10-14-72	No	0330	*	*	*	*	0.271	-	Phenylprop	-	(N)	-	-	-
252	Oregon, ASAP	10-16-72	Yes	0410	27	F	S	Yes	0.150	-	Barbs (N)	Barbs	Barbs (A)	Pento (1.0)	Pento (0.7)	Pento (8.6)
253	Oakland, Calif.	10-16-72	No	1750	*	M	*	*	0.126	-	(A)	(A)	(N,A)	-	-	-
254	St. Petersburg, Florida	10-17-72	Yes	1330	18	M	M	Yes	-	-	*	-	(N)	*	-	-
255	Cincinnati, Ohio	10-18-72	No	0130	*	M	*	*	0.024	-	(N)	-	*	-	-	*
256	New York, ASAP	10-18-72	Yes	0545	22	M	M	Yes	0.194	-	-	-	-	-	-	-
257	San Diego, Calif.	10-15-72	No	0635	*	*	*	*	0.250	-	(N)	-	*	-	-	-
258	Oakland, Calif.	10-17-72	No	*	*	M	*	*	*	-	Phenylprop Amphet (N,A)	*	(A)	Amphet (tr)	*	-
259	Nebraska, ASAP	10-20-72	No	0030	*	M	*	*	0.125	-	(N)	-	-	-	-	-
260	Oregon, ASAP	10-20-72	Yes	2340	17	M	S	Yes	0.077	*	(N)	-	*	-	-	*
261	Oregon, ASAP	10-20-72	Yes	2230	17	M	M	No	-	-	Morph Phenylprop Prom Trifluo Amphet Nalor (N)	-	-	-	-	*

TABLE C-I (Continued)

MRI Sample Code	Location of Crash	Date of Crash	Crash Data Available	Time of Crash	Age of Victim	Sex of Victim	Single or Multiple Vehicle Accident	Driver Victim at Fault	Blood Alcohol	Marihuana Analysis	Drugs Indicated by TLC			Drugs Confirmed by GC		
											Urine	Blood	Bile	Urine	Blood	Bile
262	Washington, ASAP	10-19-72	No	1015	*	M	*	*	-	-	(N,A)	(N)	Barb DPH	-	-	-
263	Everett, Washington	10-21-72	Yes	1730	49	M	S	Yes	0.088	-	(N)	Phenyl-prop (N)	Barb (N)	-	-	-
264	Cincinnati, Ohio	10-19-72	No	0144	*	M	*	*	0.239	-	(N)	(N)	(N)	-	-	-
265	Las Vegas, Nevada	10-22-72	Yes	0810	21	M	S	Yes	0.141	-	Barb Morph Prom Trifluo HDM Phenylprop (N)	-	*	-	-	*
266	New York, ASAP	10-21-72	Yes	0535	20	M	M	Yes	0.242	-	(N)	-	*	-	-	*
267	Minnesota, ASAP	10-24-72	No	0229	*	*	*	*	> 0.500	-	(N)	-	(N)	-	-	-
268	Martinez, Calif.	10-21-72	Yes	1900	31	F	S	Yes	0.105	-	(N)	(N)	Barbs DPH Diaz Trifluo Thior Methaq Mep Chlordiaz (N)	-	-	Methaq (tr) Mep (0.2)
269	New York, ASAP	10-24-72	Yes	0840	25	M	M	No	-	-	*	Phenylprop	-	*	-	-
270	Maryland, ASAP	10-27-72	No	0615	*	F	*	*	-	-	(N)	-	-	-	-	-
271	Sacramento, Calif.	10-26-72	No	0115	*	F	*	*	-	-	-	-	*	-	-	*
272	Minnesota, ASAP	10-19-72	No	0300	*	F	*	*	0.077	-	DET Barb (N,A)	-	Barb (N,A)	-	-	Pheno (tr)

TABLE C-I (Continued)

MRI Sample Code	Location of Crash	Date of Crash	Crash Data Available	Time of Crash	Age of Victim	Sex of Victim	Single or Multiple Vehicle Accident	Driver Victim at Fault	Blood Alcohol	Marihuana Analysis	Drugs Indicated by TLC			Drugs Confirmed by GC		
											Urine	Blood	Bile	Urine	Blood	Bile
273	Martinez, Calif.	10-30-72	Yes	0125	45	M	S	Yes	0.296	-	Meth Barb Gluteth Thior Prom Quin Nalor (N)	-	Morph Barb DPH Amphet Phenylprop Prom Quin Nalor Thior	Meth (tr) Quin (0.3)	-	Quin (tr)
274	Atlanta, Georgia	10-27-72	No	0315	*	M	*	*	0.290	-	*	-	-	*	-	-
275	Vermont, ASAP	10-22-72	No	0045	*	M	*	*	0.168	-	-	-	-	-	-	-
276	Vermont, ASAP	10-28-72	No	0200	*	M	*	*	0.157	-	(N)	-	Barbs DPH Phenylprop	-	-	Buta (tr)
277	St. Petersburg, Florida	11-1-72	Yes	1637	16	M	M	Yes	-	-	Barbs (N,A)	-	-	Buta (7.3) Amo (7.5)	-	-
278	Minnesota, ASAP	11-3-72	No	0105	*	*	*	*	0.162	-	(N)	-	-	-	-	-
279	Las Vegas, Nevada	11-3-72	Yes	0715	19	M	M	Yes	*	-	*	*	*	*	*	*
280	Oakland, Calif.	11-3-72	No	0210	*	M	*	*	0.005	-	Barbs DPH Phenyl- prop Morph (N,A)	(A)	Barbs DPH (A)	Pheno (8.5)	-	Buta (8.3)
281	Minnesota, ASAP	11-5-72	No	1130	*	*	*	*	-	-	(N)	-	-	-	-	-
282	Sacramento, Calif.	11-4-72	No	1905	*	F	*	*	0.328	-	Nalor HDM (N)	-	-	-	-	-
283	Vermont, ASAP	11-4-72	No	0530	*	M	*	*	0.222	-	(A)	(A)	Barb Amphet Phenylprop (N,A)	-	-	Pheno (6.0) Amphet (0.4)
284	Appleton, Wisconsin	11-8-73	Yes	0130	24	M	S	Yes	0.254	-	Phenylprop (N)	-	(N)	Phenylprop (5.8)	-	-

TABLE C-I (Continued)

MRI Sample Code	Location of Crash	Date of Crash	Crash Data Available	Time of Crash	Age of Victim	Sex of Victim	Single or Multiple Vehicle Accident	Driver Victim at Fault	Blood Alcohol	Marihuana Analysis	Drugs Indicated by TLC			Drugs Confirmed by GC		
											Urine	Blood	Bile	Urine	Blood	Bile
285	Oregon, ASAP	11-7-72	Yes	2212	52	F	M	Yes	-	-	*	-	*	*	-	*
286	Oakland, Calif.	11-7-72	No	*	*	M	*	*	-	-	Amphet Mepro Barbs DPH (N,A)	-	Amphet Mepro Barbs DPH (N,A)	-	-	Pheno (9.3) Buta (0.7)
287	Washington, ASAP	11-8-72	No	0802	*	M	*	*	-	-	(N,S)	(S)	(N,S)	-	-	-
288	Tampa, Florida	11-9-72	No	1345	*	F	*	*	-	-	Barb DPH Phenylprop (N,A)	-	(N)	-	-	-
289	Oregon, ASAP	11-8-72	Yes	2130	50	M	M	No	-	-	Phenylprop (N)	-	Barb (N)	-	-	-
290	Nebraska, ASAP	11-11-72	Yes	2339	*	M	S	Yes	0.260	-	*	-	*	*	-	*
291	New York, ASAP	11-10-72	Yes	0215	24	M	S	Yes	0.082	-	*	MPD Amphet Trifluo Chlorprom Thior Diphen MPYL	*	*	MPD (0.6) Chlorprom (1.7)	*
292	Oakland, Calif.	11-12-72	No	1215	*	F	*	*	-	-	*	-	Phenylprop DPH	*	-	Phenylprop (tr)
293	Virginia, ASAP	11-13-72	No	1810	*	M	*	*	0.071	-	-	-	-	-	-	-
294	Oakland, Calif.	11-14-72	No	1405	*	M	*	*	-	-	Barb Phenylprop (N)	-	Phenylprop DPH Barb	-	-	Phenylprop (5.7) Buta (0.4)
295	Sacramento, Calif.	11-14-72	No	0010	*	M	*	*	0.230	-	Prom (N)	-	*	-	-	*

TABLE C-I (Continued)

MRI Sample Code	Location of Crash	Date of Crash	Crash Data Available	Time of Crash	Age of Victim	Sex of Victim	Single or Multiple Vehicle Accident	Driver Victim at Fault	Blood Alcohol	Marihuana Analysis	Drugs Indicated by TLC			Drugs Confirmed by GC		
											Urine	Blood	Bile	Urine	Blood	Bile
296	St. Petersburg, Florida	11-16-72	Yes	1900	40	M	M	No	0.242	-	Trifluo, HDM Nalor, (A) Morph, DPH Meth Phenylprop Chlorphen Gluteth Barbs Quin Chlordiaz	-	Trifluo Nalor Quin Morph Chlorphen Meth Phenylprop Chlordiaz Barbs HDM	Morph (0.9) Meth (0.3) Gluteth (0.7) DPH (0.3)	-	Nalor (tr) Morph (1.6) HDM (3.2) Phenylprop (tr)
297	St. Petersburg, Florida	11-16-72	Yes	1900	82	M	M	Yes	-	-	*	-	*	*	-	*
298	St. Petersburg, Florida	11-18-72	Yes	1820	24	M	M	Yes	0.068	-	(A)	(A)	(A)	-	-	-
299	Atlanta, Georgia	11-17-72	No	0300	*	M	*	*	0.249	-	Phenylprop Amphet	-	Barb Phenylprop	Phenylprop (0.7)	-	Phenylprop (0.4)
300	Sacramento, Calif.	11-18-72	No	0220	*	M	*	*	0.129	-	(N,A)	(A)	(A)	-	-	-
301	Oregon, ASAP	11-19-72	Yes	0230	21	M	M	Yes	0.208	-	Chlordiaz Phenylprop Prom Methaq (N)	-	Barbs Phenyl-prop	Chlordiaz (0.2) Methaq (tr)	-	Pheno (1.9)
302	Las Vegas, Nevada	11-18-72	Yes	0158	20	M	M	Yes	-	-	Chlordiaz Diaz Imip Thior Amitryp Propox	-	*	Diaz (tr) Imip (0.5)	-	*
303	Washington, ASAP	11-21-72	No	0045	*	M	*	*	-	-	Amphet Phenylprop Meth (N)	-	-	-	-	-
304	St. Petersburg, Florida	11-20-72	Yes	1125	74	M	M	No	-	-	-	-	Phenylprop (A)	-	-	-

TABLE C-I (Continued)

MRI Sample Code	Location of Crash	Date of Crash	Crash Data Available	Time of Crash	Age of Victim	Sex of Victim	Single or Multiple Vehicle Accident	Driver Victim at Fault	Blood Alcohol	Marihuana Analysis	Drugs Indicated by TLC			Drugs Confirmed by GC		
											Urine	Blood	Bile	Urine	Blood	Bile
305	Daytona Beach, Florida	11-24-72	No	1200	*	M	*	*	0.279	-	Barb DPH Amphet Meth Phenylprop Lobe Amitryp Diaz Methaq (A)	-	*	Pheno (3.6) Lobe (12.0) Methaq (tr)	-	*
306	San Bernardino, Calif.	11-23-72	No	0700	*	M	*	*	-	-	Meth Nalor Gluteth Mepro DPH (N)	-	*	Mepro (2.4)	-	*
307	Minnesota, ASAP	11-23-72	No	2245	*	*	*	*	0.270	*	(N)	(N)	Phenylprop Barbs	-	-	Pento (2.0)
308	Beloit, Wisconsin	11-26-72	No	0237	*	M	*	*	0.135	-	(N)	(N)	(N)	-	-	-
309	Washington, ASAP	11-22-72	No	2308	*	F	*	*	0.126	-	*	-	Mepro	-	-	Mepro (31.0)
310	Vermont, ASAP	11-25-72	No	0500	*	M	*	*	0.157	-	Meth	-	-	Meth (0.5)	-	-
311	Sacramento, Calif.	11-28-72	No	0550	*	M	*	*	-	-	*	-	Mepro	*	-	Mepro (4.9)
312	Vero Beach, Florida	11-25-72	Yes	*	38	M	S	Yes	-	-	Amphet Trifluo Thior Barb	Barb Mepro	*	-	-	*
313	Orlando, Florida	11-28-72	No	1455	*	*	*	*	0.139	-	*	-	Amphet	*	-	-
314	Daytona Beach, Florida	11-28-72	No	1630	*	M	*	*	-	-	Nalor Chlordiaz Diaz Imip DMMA	-	-	-	-	-
315	San Diego, Calif	12-1-72	No	0545	*	*	*	*	-	-	Barbs Gluteth	-	-	-	-	-
316	Vero Beach, Florida	11-14-72	Yes	1020	55	M	M	Yes	0.230	-	(N)	-	-	-	-	-

TABLE C-I (Continued)

MRI Sample Code	Location of Crash	Date of Crash	Crash Data Available	Time of Crash	Age of Victim	Sex of Victim	Single or Multiple Vehicle Accident	Driver Victim at Fault	Blood Alcohol	Marihuana Analysis	Drugs Indicated by TLC			Drugs Confirmed by GC		
											Urine	Blood	Bile	Urine	Blood	Bile
317	New York, ASAP	11-25-72	Yes	2050	42	M	M	Yes	0.008	-	Chlordiaz DMT (N)	DPH	Barb	Chlordiaz (16.0) DMT (0.1)	-	-
318	St. Petersburg, Florida	11-27-72	Yes	2330	30	M	M	Yes	0.419	-	(N)	-	Amphet DPH	-	-	-
319	St. Petersburg, Florida	12-1-72	Yes	1145	19	M	S	Yes	-	-	-	Phenylprop	-	-	-	-
320	Washington, ASAP	12-3-72	No	2345	*	M	*	*	0.158	-	Nalor Imip (N)	-	-	Imip (0.1)	-	-
321	Oregon, ASAP	12-2-72	Yes	2330	18	M	S	Yes	0.168	-	(N,A)	(A)	*	-	-	*
322	Oakland, Calif.	12-1-72	No	2250	*	M	*	*	0.288	-	Mepro Barbs Meth Phenylprop (N)	(A)	-	Amo (0.2)	-	-
323	Sacramento, Calif.	12-2-72	No	2345	*	F	*	*	0.151	+	*	-	-	*	-	-
324	Maryland, ASAP	12-2-72	Yes	2330	23	M	S	Yes	0.151	-	Barbs Mepro Meth DMT Amphet Phenyl-prop (N)	Barbs Mepro Meth DMT Amphet Phenyl-prop (N)	Barbs Mepro Meth DMT Amphet Phenyl-prop (N)	Amo (1.0)	Amphet (tr)	Buto (tr) Amo (tr) DMT (tr)
325	Daytona Beach, Florida	12-2-72	No	1719	*	M	*	*	-	-	Amphet (N)	-	*	-	-	*
326	Cincinnati, Ohio	12-5-72	No	0620	*	M	*	*	-	-	(N)	(N)	Barbs DPH	-	-	Buta (11.0) DPH (2.1)
327	Oakland, Calif.	12-5-72	No	*	*	F	*	*	-	-	*	Amphet Meth Phenylprop (N)	*	*	Amphet (0.1) Meth (tr)	*
328	Washington, ASAP	12-7-72	No	1600	*	M	*	*	0.366	-	Amphet (N)	-	Barbs Mepro (N)	-	-	Mepro (tr)

TABLE C-I (Continued)

MRI Sample Code	Location of Crash	Date of Crash	Crash Data Available	Time of Crash	Age of Victim	Sex of Victim	Single or Multiple Vehicle Accident	Driver Victim at Fault	Blood Alcohol	Marihuana Analysis	Drugs Indicated by TLC			Drugs Confirmed by GC		
											Urine	Blood	Bile	Urine	Blood	Bile
329	Nebraska, ASAP	12-9-72	Yes	1240	30	M	M	No	-	-	-	-	-	-	-	-
330	Washington, ASAP	12-6-72	No	1420	*	M	*	*	-	-	*	Gluteth Tripel Chlorprom MPYL Thior Diaz Trifluo	*	*	Gluteth (0.8)	*
331	Oregon, ASAP	12-8-72	Yes	1115	30	M	M	Yes	0.342	-	-	-	Phenylprop	-	-	-
332	Oakland, Calif.	12-9-72	No	2015	*	M	*	*	0.288	-	-	Gluteth	Barbs Mepro	-	-	-
333	Sacramento, Calif.	12-9-72	No	0005	*	F	*	*	0.208	-	*	-	Amphet Meth Phenylprop	*	-	-
334	Beloit, Wisconsin	12-9-72	No	1549	*	M	*	*	0.041	-	*	-	-	*	-	-
335	Oregon, ASAP	12-10-72	Yes	0135	37	M	M	Yes	0.187	-	-	-	Amphet Phenylprop Barbs DPH	-	-	Amphet (tr) Phenylprop (1.2) Amo (0.2)
336	Maryland, ASAP	12-11-72	No	0330	*	M	*	*	-	-	Barbs	-	*	Amo (0.8) Seco (0.3)	-	*
337	Vermont, ASAP	12-9-72	No	2240	*	M	*	*	0.284	-	Barb (S)	Gluteth Barb	-	Pheno (2.2)	Gluteth (0.1)	-
338	Appleton, Wisconsin	12-12-72	Yes	0530	24	M	S	*	0.065	-	Phenylprop Amphet Methaq Diphen MPYL (N)	-	-	Phenylprop (2.2) Methaq (0.9) Diphen (0.4)	-	-
339	Cincinnati, Ohio	12-15-72	No	2113	*	M	*	*	0.218	-	-	-	-	-	-	-
340	Oakland, Calif.	12-15-72	No	0020	*	M	*	*	0.234	-	(N)	-	-	-	-	-
341	Washington, ASAP	12-15-72	No	0610	*	M	*	*	0.027	-	Phenylprop (N)	-	-	-	-	-

TABLE C-I (Continued)

MRI Sample Code	Location of Crash	Date of Crash	Crash Data Available	Time of Crash	Age of Victim	Sex of Victim	Single or Multiple Vehicle Accident	Driver Victim at Fault	Blood Alcohol	Marihuana Analysis	Drugs Indicated by TLC			Drugs Confirmed by GC		
											Urine	Blood	Bile	Urine	Blood	Bile
342	Oakland, Calif.	12-13-72	No	*	*	M	*	*	-	-	-	-	Barb Phenylprop Amphet	-	-	-
343	San Diego, Calif.	12-1-72	No	1925	*	*	*	*	0.123	-	Barbs Mepro Amphet Phenylprop	-	Barbs Mepro Amphet Phenylprop	Pento (2.0)	-	Pento (tr) Pheno (tr) Mepro (3.3)
344	Appleton, Wisconsin	12-16-72	Yes	1740	22	M	S	Yes	0.210	-	-	-	*	-	-	*
345	Maryland, ASAP	12-16-72	Yes	1230	47	M	M	No	0.171	-	*	-	*	*	-	*
346	Oakland, Calif.	12-16-72	No	2215	*	M	*	*	-	-	*	-	Barbs Mepro	*	-	Seco (1.7)
347	Las Vegas, Nevada	12-17-72	Yes	1615	23	M	S	Yes	0.267	-	-	-	*	-	-	*
348	Oakland, Calif.	12-17-72	No	0245	*	M	*	*	0.170	-	Barbs Phenylprop (N)	-	(N)	Pento (tr) Buta (1.6) Buto (tr)	-	-
349	Nebraska, ASAP	12-18-72	Yes	0730	*	M	M	No	-	-	Nalor Chlordiaz Morph HDM (N,A)	(A)	-	Chlordiaz (10.0)	-	-
350	Sacramento, Calif.	12-15-72	No	1640	*	M	*	*	-	-	-	-	-	-	-	-
351	San Diego, Calif.	12-18-72	No	1530	*	*	*	*	-	-	Gluteth Phenylprop	-	Morph HDM	Gluteth (1.0)	-	HDM (9.1)
352	Atlanta, Georgia	12-19-72	No	1630	16	M	*	*	-	-	-	-	-	-	-	-
353	Atlanta, Georgia	12-16-72	No	0458	*	M	*	*	0.293	-	*	Chlorprom DMT Prom Imip	*	*	Chlorprom (tr) DMT (tr) Imip (0.27)	*
354	Atlanta, Georgia	12-15-72	No	2307	*	M	*	*	-	-	-	-	-	*	-	*
355	Vermont, ASAP	12-19-72	No	1620	*	*	*	*	-	-	*	(A)	*	*	-	*

TABLE C-I (Continued)

MRI Sample Code	Location of Crash	Date of Crash	Crash Data Available	Time of Crash	Age of Victim	Sex of Victim	Single or Multiple Vehicle Accident	Driver Victim at Fault	Blood Alcohol	Marihuana Analysis	Drugs Indicated by TLC			Drugs Confirmed by GC		
											Urine	Blood	Bile	Urine	Blood	Bile
356	New Mexico, ASAP	12-25-72	No	*	*	M	*	*	-	*	*	-	-	*	-	-
357	Orlando, Florida	12-25-72	No	1430	*	F	*	*	-	-	(A)	(A)	(A)	-	-	-
358	Michigan, ASAP	12-24-72	No	0400	*	M	*	*	0.358	*	*	-	*	*	-	*
359	Tampa, Florida	12-24-72	No	0800	*	*	*	*	0.143	-	*	Barb	-	*	Pheno (tr)	-
360	New York, ASAP	12-13-72	Yes	1000	19	M	M	Yes	-	-	*	-	-	*	-	-
361	Washington, ASAP	12-19-72	No	1750	*	M	*	*	-	-	MPYL Quin Code	-	*	-	-	*
362	Las Vegas, Nevada	12-21-72	Yes	1730	37	F	M	No	0.044	-	*	-	*	*	-	*
363	Washington, ASAP	12-21-72	No	0209	*	M	*	*	0.146	-	(N)	-	-	-	-	-
364	Tampa, Florida	12-20-72	No	2030	*	M	*	*	> 0.500	-	Phenyl-prop Amphet	(A)	*	-	-	*
365	New Mexico, ASAP	12-22-72	No	1943	*	*	*	*	0.292	*	(N,A)	-	(A)	-	-	-
366	Las Vegas, Nevada	12-21-72	Yes	1730	37	M	M	Yes	0.212	+++	Barb Mepro Nalor DET Chlordiaz (N)	(N)	*	-	-	*
367	Oregon, ASAP	12-23-72	Yes	1420	23	M	M	No	-	---	(N)	-	*	-	-	*
368	San Diego, Calif.	12-20-72	No	1855	*	*	*	*	0.224	---	(N)	-	(N)	-	-	-
369	New York, ASAP	12-21-72	Yes	0310	49	M	S	Yes	0.261	---	(N)	-	Barbs Mepro	-	-	Pento (tr) Seco (tr) Mepro (tr)
370	Orlando, Florida	12-20-72	No	0915	*	M	*	*	-	---	(N)	-	(N)	-	-	-
371	Washington, ASAP	12-23-72	No	0310	*	M	*	*	0.097	---	(N)	-	-	-	-	-
372	Washington, ASAP	12-26-72	No	0220	*	M	*	*	0.136	---	(N)	-	(A)	-	-	-
373	Sacramento, Calif.	12-23-72	No	0350	*	M	*	*	0.068	---	(A)	-	*	-	-	*

TABLE C-I (Continued)

MRI Sample Code	Location of Crash	Date of Crash	Crash Data Available	Time of Crash	Age of Victim	Sex of Victim	Single or Multiple Vehicle Accident	Driver Victim at Fault	Blood Alcohol	Marihuana Analysis	Drugs Indicated by TLC			Drugs Confirmed by GC		
											Urine	Blood	Bile	Urine	Blood	Bile
374	Washington, ASAP	12-23-72	No	1830	*	M	*	*	0.329	---	-	Imip Chlorprom Methaq Diphen	DMT, DET	-	Imip (0.1)	DMT (tr)
375	Sacramento, Calif.	12-26-72	No	1215	*	F	*	*	-	---	*	-	MPD Imip Amitryp	*	-	MPD (0.8) Imip (tr)
376	Oregon, ASAP	12-23-72	Yes	1315	*	M	*	*	-	---	Imip Diphen Thior Trifluo	(A)	Imip Diphen Thior Trifluo Mepro (A)	Imip (tr) Trifluo (22.0)	-	Imip (0.2) Trifluo (18.4)
377	St. Petersburg, Florida	12-26-72	Yes	1420	67	M	S	Yes	-	---	-	-	-	-	-	-
378	New York, ASAP	12-22-72	No	0026	*	M	*	*	0.276	---	*	-	-	*	-	-
379	Tampa, Florida	12-27-72	No	2230	*	M	*	*	0.116	---	-	(A)	-	-	-	-
380	St. Petersburg, Florida	12-28-72	No	0835	*	M	*	*	-	---	-	-	-	-	-	-
381	Martinez, Calif.	12-28-72	Yes	0745	62	M	S	No	-	---	Gluteth Mepro (N)	-	Gluteth Mepro	-	-	Gluteth (0.9) Mepro (0.1)
382	New York, ASAP	12-22-72	No	1730	26	F	S	Yes	-	---	(A)	(A)	*	-	-	*
383	Orlando, Florida	12-29-72	No	0215	*	*	*	*	0.130	---	(N)	Phenyl- prop DET Meth	Mepro Barbs DET Meth Phenylprop	-	-	Pento (tr) Phenylprop (0.2)
384	Daytona Beach, Florida	12-29-72	No	2300	*	M	*	*	0.224	---	Code Phenylprop (N)	-	-	-	-	-
385	Atlanta, Georgia	12-27-72	No	1800	*	M	*	*	-	---	(N,A)	(A)	(A)	-	-	-

TABLE C-I (Continued)

MRI Sample Code	Location of Crash	Date of Crash	Crash Data Available	Time of Crash	Age of Victim	Sex of Victim	Single or Multiple Vehicle Accident	Driver Victim at Fault	Blood Alcohol	Marihuana Analysis	Drugs Indicated by TLC			Drugs Confirmed by GC		
											Urine	Blood	Bile	Urine	Blood	Bile
386	Oakland, Calif.	12-31-72	No	0500	*	M	*	*	0.281	---	Code Nalor Thior Barb Mepro Gluteth (N)	(N)	-	-	-	-
387	Atlanta, Georgia	12-30-72	No	0235	*	M	*	*	0.083	---	Nalor (N,S)	(N)	*	-	-	*
388	Cincinnati, Ohio	1-1-73	No	0630	*	M	*	*	0.261	---	(N)	-	-	-	-	-
389	Vermont, ASAP	12-28-72	No	1400	*	F	*	*	-	---	Amphet Phenylprop Prom	Barbs	-	Phenylprop (tr)	Amo (0.1)	-
390	Washington, ASAP	1-3-73	Yes	1645	57	M	M	Yes	-	---	DMT Code Phenylprop Nalor Chlordiaz DPH Barbs	-	Code Phenylprop DMT DPH Barbs Gluteth Mepro	DMT (0.2)	-	-
391	San Diego, Calif.	1-3-73	No	1725	*	*	*	*	-	---	*	-	*	*	-	*
392	Orlando, Florida	1-6-73	No	0005	*	*	*	*	0.172	---	(S,A)	(A)	DPH Barbs	-	-	Seco (tr)
393	San Diego, Calif.	1-7-73	No	1544	*	*	*	*	0.185	--o	-	-	-	-	-	-
394	Washington, ASAP	1-5-73	No	1830	*	M	*	*	-	---	*	Diaz Cocaine Prom Lobe Tripel MPYL	-	*	Cocaine (2.7) Lobe (0.5) MPYL (tr)	-
395	Sacramento, Calif.	1-7-73	No	0019	*	F	*	*	0.296	---	(N)	-	-	-	-	-
396	St. Petersburg, Florida	1-7-73	No	1730	*	*	*	*	-	---	*	-	*	*	-	*
397	New York, ASAP	12-26-72	Yes	2200	27	M	S	Yes	-	---	*	Methaq Diaz	-	*	-	-

TABLE C-I (Continued)

MRI Sample Code	Location of Crash	Date of Crash	Crash Data Available	Time of Crash	Age of Victim	Sex of Victim	Single or Multiple Vehicle Accident	Driver Victim at Fault	Blood Alcohol	Marihuana Analysis	Drugs Indicated by TLC			Drugs Confirmed by GC		
											Urine	Blood	Bile	Urine	Blood	Bile
398	Atlanta, Georgia	1-7-73	No	0240	*	M	*	*	0.311	+++	-	-	(A)	-	-	-
399	Vermont, ASAP	1-4-73	No	1100	*	M	*	*	-	---	Methaq Diaz Phenylprop	-	(A)	-	-	-
400	Orlando, Florida	1-9-73	No	1825	*	F	*	*	-	---	-	-	-	-	-	-
401	Oregon, ASAP	1-11-73	Yes	0720	54	M	S	*	-	---	-	-	-	-	-	-
402	Tampa, Florida	1-13-73	No	0030	*	M	*	*	0.049	---	-	-	-	-	-	-
403	Orlando, Florida	1-11-73	No	*	*	F	*	*	-	+++	Barb (A)	(A)	(A)	Pheno (tr)	-	-
404	Nebraska, ASAP	1-13-73	Yes	1542	*	F	M	No	-	---	*	DPH Barbs	-	*	Amo (0.7)	-
405	Beloit, Wisconsin	1-14-73	No	*	*	M	*	*	0.072	---	Barb Nalor Chlordiaz Thior (N)	Barb Nalor Methaq Diaz Phenylprop	Barb Nalor Chlordiaz	-	-	Chlordiaz (0
406	Cincinnati, Ohio	1-16-73	No	0150	*	M	*	*	0.250	---	*	-	-	*	-	-
407	Everett, Washington	1-13-73	Yes	1250	28	M	M	Yes	0.085	---	(N)	Lobe Tripel MPYL	-	-	Lobe (tr)	-
408	Oakland, Calif.	1-15-73	No	2035	*	F	*	*	0.180	---	(N)	-	-	-	-	-
409	St. Petersburg, Florida	12-22-72	Yes	1901	73	F	M	Yes	-	---	*	(A)	*	*	-	*
410	Oakland, Calif.	1-15-73	No	2035	*	F	*	*	0.280	-+-	Barb (N)	-	Barb	-	-	-
411	Oregon, ASAP	1-16-73	Yes	1419	64	M	M	Yes	-	---	-	(A)	(A)	-	-	-
412	Oregon, ASAP	1-16-73	Yes	1025	*	M	*	*	-	---	-	(A)	(A)	-	-	-
413	Oakland, Calif.	1-17-73	No	1547	*	M	*	*	-	---	*	-	(A)	*	-	-
414	San Diego, Calif.	1-19-73	No	0030	*	*	*	*	0.351	---	(N)	-	-	-	-	-

TABLE C-I (Continued)

MRI Sample Code	Location of Crash	Date of Crash	Crash Data Available	Time of Crash	Age of Victim	Sex of Victim	Single or Multiple Vehicle Accident	Driver Victim at Fault	Blood Alcohol	Marihuana Analysis	Drugs Indicated by TLC			Drugs Confirmed by GC		
											Urine	Blood	Bile	Urine	Blood	Bile
415	Appleton, Wisconsin	1-21-73	Yes	2020	35	M	S	*	0.371	---	*	-	*	*	-	*
416	Washington, ASAP	1-21-73	No	0037	*	M	*	*	0.192	+++	*	-	-	*	-	-
417	Washington, ASAP	1-21-73	No	1445	*	F	*	*	0.308	---	(A)	(A)	(A)	-	-	-
418	San Diego, Calif.	1-21-73	No	0215	*	*	*	*	0.180	+++	-	-	-	-	-	-
419	Sacramento, Calif.	1-20-73	No	*	*	M	*	*	0.156	+++	-	-	*	-	-	*
420	Oregon, ASAP	1-19-73	Yes	1650	29	M	M	No	0.076	---	*	(A)	(A)	*	-	-
421	Las Vegas, Nevada	1-21-73	Yes	0935	35	M	S	Yes	*	---	*	*	*	*	*	*
422	Oregon, ASAP	1-20-73	Yes	0207	37	M	S	Yes	0.345	---	(A)	-	(A)	-	-	-
423	Oakland, Calif.	1-22-73	No	1615	*	M	*	*	-	---	*	(A)	(A)	*	-	-
424	Oregon, ASAP	1-24-73	Yes	1210	45	M	S	Yes	-	---	(N,A)	(A)	(N,A)	-	-	-
425	Washington, ASAP	1-25-73	No	2215	*	F	*	*	-	---	*	-	*	*	-	*
426	Tampa, Florida	1-27-73	No	0600	*	M	*	*	0.037	---	(A)	(A)	(A)	-	-	-
427	Oakland, Calif.	1-24-73	No	1700	*	M	*	*	-	+++	*	-	*	*	-	*
428	Cincinnati, Ohio	1-26-73	No	2112	*	F	*	*	-	---	(A)	-	*	-	-	*
429	Orlando, Florida	1-28-73	No	1505	*	*	*	*	-	---	*	-	*	*	-	*
430	Sacramento, Calif.	1-27-73	No	1900	*	M	*	*	0.112	---	Barbs (N,A)	Barbs (A)	(A)	Pento (1.1)	Pento (0.3) Buta (1.4)	-
431	Washington, ASAP	1-28-73	No	1650	*	M	*	*	0.268	---	(A)	-	Barb (A)	-	-	-
432	Oregon, ASAP	1-26-73	Yes	1800	66	M	M	No	-	+++	(N)	-	-	-	-	-
433	Cincinnati, Ohio	2-1-73	No	0015	*	M	*	*	0.157	---	(A)	-	(A)	-	-	-
434	New York, ASAP	1-16-73	Yes	1945	70	M	S	Yes	0.187	---	*	-	(A)	*	-	-
435	New York, ASAP	1-15-73	Yes	2050	26	M	S	Yes	0.168	---	-	(A)	(A)	-	-	-
436	New York, ASAP	1-8-73	Yes	2006	42	F	M	Yes	-	+++	*	(A)	-	*	-	-

TABLE C-I (Continued)

MRI Sample Code	Location of Crash	Date of Crash	Crash Data Available	Time of Crash	Age of Victim	Sex of Victim	Single or Multiple Vehicle Accident	Driver Victim at Fault	Blood Alcohol	Marihuana Analysis	Drugs Indicated by TLC			Drugs Confirmed by GC		
											Urine	Blood	Bile	Urine	Blood	Bile
437	New York, ASAP	1-8-73	Yes	0530	68	M	M	Yes	-	---	*	-	-	*	-	-
438	New York, ASAP	1-28-73	Yes	1445	54	M	S	Yes	-	---	*	-	*	*	-	*
439	New York, ASAP	1-8-73	Yes	1935	59	F	S	Yes	0.220	+++	*	-	(A)	*	-	-
440	St. Petersburg, Florida	2-3-73	Yes	1615	28	F	M	Yes	0.348	---	(N,A)	-	-	-	-	-
441	Atlanta, Georgia	2-5-73	No	1250	*	M	*	*	-	---	-	-	-	-	-	-
442	Beloit, Wisconsin	2-4-73	No	2116	*	M	*	*	0.350	---	-	-	(A)	-	-	-
443	New York, ASAP	2-2-73	Yes	0235	28	M	S	Yes	0.312	---	-	-	*	-	-	*
444	New York, ASAP	2-1-73	Yes	1540	63	M	S	Yes	0.268	---	*	-	(A)	*	-	-
445	Tampa, Florida	12-8-72	No	1025	*	M	*	*	-	+++	(A)	-	(A)	-	-	-
446	Oakland, Calif.	2-4-73	No	1935	*	F	*	*	-	---	*	-	Barb (N)	*	-	-
447	New York, ASAP	2-1-73	Yes	0900	83	M	M	*	-	---	*	(N)	-	*	-	-
448	Martinez, Calif.	2-11-73	Yes	2345	35	M	S	Yes	0.245	---	*	-	Barb (N)	*	-	-
449	Orlando, Florida	2-11-73	No	1050	*	M	*	*	0.282	---	*	-	(N,A)	*	-	-
450	Washington, ASAP	2-12-73	No	0805	*	M	*	*	0.030	+++	-	-	(N)	-	-	-
451	Vermont, ASAP	1-30-73	No	1530	*	F	*	*	-	---	(N)	(N)	*	-	-	*
452	Vermont, ASAP	1-27-73	No	1900	*	M	*	*	0.168	+++	(N)	-	(N,A)	-	-	-
453	Orlando, Florida	2-15-73	No	1900	*	M	*	*	0.168	+++	(A)	-	(N,A)	-	-	-
454	Sacramento, Calif.	2-9-73	No	2320	*	M	*	*	0.200	---	*	-	(N,A)	*	-	-
455	Sacramento, Calif.	2-9-73	No	1600	*	M	*	*	0.252	---	(N)	(N,A)	(N,A)	-	-	-
456	San Diego, Calif.	2-15-73	No	0235	*	*	*	*	0.260	---	(A)	-	Barb (A)	-	-	-
457	San Diego, Calif.	2-15-73	No	1505	*	*	*	*	0.107	+++	Barb	-	*	-	-	*

TABLE C-I (Continued)

MRI Sample Code	Location of Crash	Date of Crash	Crash Data Available	Time of Crash	Age of Victim	Sex of Victim	Single or Multiple Vehicle Accident	Driver Victim at Fault	Blood Alcohol	Marihuana Analysis	Drugs Indicated by TLC			Drugs Confirmed by GC		
											Urine	Blood	Bile	Urine	Blood	Bile
458	Oregon, ASAP	2-19-73	Yes	1930	19	M	M	Yes	-	---	Phenyl-prop Barb	Barb (A)	Barbs (A)	Pheno (5.6)	Pheno (2.9)	Pheno (1.4) Buto (2.7)
459	Cincinnati, Ohio	2-19-73	No	1722	*	M	*	*	0.107	---	DET Mep (N,A)	(A)	*	Mep (4.5)	-	*
460	Cincinnati, Ohio	2-18-73	No	1630	*	M	*	*	0.205	---	(N,A)	-	-	-	-	-
461	Nebraska, ASAP	2-22-73	Yes	1000	*	F	M	No	*	-+-	(A)	*	*	-	*	*
462	Nebraska, ASAP	2-22-73	Yes	0725	*	M	M	Yes	0.100	---	-	-	*	-	-	*
463	Maryland, ASAP	2-23-73	Yes	0215	28	M	S	Yes	0.095	---	*	-	*	*	-	*
464	Las Vegas, Nevada	2-25-73	Yes	0600	45	M	S	Yes	-	---	*	-	*	*	-	*
465	Oregon, ASAP	2-25-73	Yes	2300	*	M	*	*	-	++-	*	Barb (A)	*	*	Pheno (0.5)	*
466	Oregon, ASAP	2-25-73	Yes	0312	79	F	M	Yes	-	+++	*	-	Barbs (A)	*	-	-
467	Oregon, ASAP	2-25-73	Yes	0030	31	M	S	Yes	0.131	---	(N)	-	*	-	-	*
468	Oregon, ASAP	2-25-73	Yes	0002	22	M	M	No	-	---	Barb	-	*	-	-	*
469	Orlando, Florida	2-25-73	No	0513	*	M	*	*	0.130	---	(N)	-	(A)	-	-	-
470	Atlanta, Georgia	2-25-73	No	1115	*	M	*	*	0.342	+++	Barb (N,A)	-	-	Seco (2.2)	-	-
471	Washington, ASAP	2-25-73	No	0100	*	M	*	*	0.035	--o	(N,A)	-	-	-	-	-
472	Tampa, Florida	3-1-73	No	2050	*	M	*	*	0.258	---	(N,A)	-	(A)	-	-	-
473	Orlando, Florida	2-28-73	No	1840	*	M	*	*	-	---	Barb	-	(A)	-	-	-
474	Washington, ASAP	2-28-73	No	1502	*	M	*	*	-	--o	Barb	Barb (A)	*	Pheno (0.8)	Pheno (0.2)	*
475	St. Petersburg, Florida	3-1-73	Yes	0215	35	M	S	No	0.258	---	*	(A)	(A)	*	-	-
476	Washington, ASAP	2-28-73	No	1502	*	M	*	*	0.013	-+o	(N,A)	(A)	(A)	-	-	-

TABLE C-I (Continued)

MRI Sample Code	Location of Crash	Date of Crash	Crash Data Available	Time of Crash	Age of Victim	Sex of Victim	Single or Multiple Vehicle Accident	Driver Victim at Fault	Blood Alcohol	Marihuana Analysis	Drugs Indicated by TLC			Drugs Confirmed by GC		
											Urine	Blood	Bile	Urine	Blood	Bile
477	St. Petersburg, Florida	3-3-73	Yes	0330	26	M	S	Yes	0.184	---	-	-	(N,A)	-	-	-
478	New Mexico, ASAP	3-3-73	No	0149	*	M	*	*	0.150	***	(N)	(A)	(A)	-	-	-
479	Sacramento, Calif.	3-3-73	No	0045	*	M	*	*	0.296	++o	(A)	-	(A)	-	-	-
480	Atlanta, Georgia	3-3-73	No	*	*	M	*	*	0.102	--o	(N,A)	-	Barbs	-	-	-
481	Washington, ASAP	3-4-73	No	1926	*	F	*	*	-	+-+	*	(A)	(A)	*	-	-
482	Washington, ASAP	3-5-73	No	2145	*	M	*	*	-	---	(N)	-	-	-	-	-
483	Oregon, ASAP	3-8-73	Yes	0244	80	M	M	Yes	0.102	++o	(N)	-	*	-	-	*
484	Tampa, Florida	3-10-73	No	0000	*	M	*	*	-	--o	Mepro Barb (N,A)	Barb -	Barbs -	-	-	-
485	Atlanta, Georgia	3-6-73	No	2031	*	*	*	*	0.105	---	*	(A)	(A)	*	-	-
486	Vermont, ASAP	3-10-73	No	1900	*	M	*	*	0.177	--o	-	-	*	-	-	*
487	Oregon, ASAP	3-13-73	Yes	1720	*	M	*	*	0.245	--o	*	(A)	(A)	*	-	-
488	Cincinnati, Ohio	3-14-73	No	1645	*	M	*	*	-	--+	-	-	(A)	-	-	-
489	San Diego, Calif.	3-2-73	No	2200	*	*	*	*	0.133	o++	-	-	-	-	-	-
490	San Diego, Calif.	3-2-73	No	1750	*	*	*	*	0.145	--o	-	-	-	-	-	-
491	Oregon, ASAP	3-15-73	Yes	0050	29	M	M	Yes	0.156	++o	(N)	(A)	(A)	-	-	-
492	Tampa, Florida	3-15-73	No	0930	*	M	*	*	-	-oo	-	-	(A)	-	-	-
493	Washington, ASAP	3-19-73	No	0200	*	F	*	*	0.107	o-o	*	(A)	*	*	-	*
494	Atlanta, Georgia	3-17-73	No	0220	*	M	*	*	0.135	--o	-	-	*	-	-	*
495	Las Vegas, Nevada	3-18-73	Yes	1822	60	M	M	No	-	++o	*	-	*	*	-	*
496	Washington, ASAP	3-18-73	No	1530	*	F	*	*	-	o-o	(N)	-	*	-	-	*
497	New York, ASAP	3-18-73	Yes	0440	23	M	M	*	0.140	--o	Morph Methadone (N,A)	-	*	Morph (2.?) Methadone (0.7)	-	*

TABLE C-I (Continued)

MRI Sample Code	Location of Crash	Date of Crash	Crash Data Available	Time of Crash	Age of Victim	Sex of Victim	Single or Multiple Vehicle Accident	Driver Victim at Fault	Blood Alcohol	Marihuana Analysis	Drugs Indicated by TLC			Drugs Confirmed by GC		
											Urine	Blood	Bile	Urine	Blood	Bile
498	Everett, Washington	3-20-73	Yes	2215	19	M	S	Yes	0.124	+++	(N)	(A)	(A)	-	-	-
499	Orlando, Florida	3-24-73	No	2115	*	M	*	*	0.218	--o	-	-	-	-	-	-
500	Virginia, ASAP	3-16-73	No	*	*	M	*	*	-	---	Barbs (A)	(A)	(A)	-	-	-
501	Virginia, ASAP	3-16-73	No	*	*	*	*	*	-	-oo	(N)	-	-	-	-	-
502	Virginia, ASAP	3-16-73	No	*	*	*	*	*	-	o+o	Mepro (A)	-	(A)	-	-	-
503	Atlanta, Georgia	3-25-73	No	1800	*	M	*	*	-	+++	*	-	-	*	-	-
504	Unknown	Unknown	No	*	*	*	*	*	-	--o	(A)	-	(A)	-	-	-
505	St. Petersburg, Florida	3-27-73	Yes	1030	71	M	M	Yes	-	---	(A)	-	-	-	-	-
506	Orlando, Florida	1-23-73	No	0200	*	M	*	*	0.154	-+-	(N)	-	-	-	-	-
507	Daytona Beach, Florida	1-9-73	No	2205	*	M	*	*	0.297	--o	Barb (N,A)	(A)	-	Pheno (0.1)	-	-
508	New York, ASAP	3-23-73	Yes	0315	21	M	S	Yes	0.158	+o+	(N)	-	*	-	-	*
509	Orlando, Florida	3-31-73	No	2010	*	M	*	*	0.134	--o	(N)	-	-	-	-	-
510	Sacramento, Calif.	3-30-73	No	1600	*	M	*	*	-	++o	*	-	*	*	-	*
511	Sacramento, Calif.	3-30-73	No	1600	*	M	*	*	0.148	+-o	*	-	*	*	-	*
512	New York, ASAP	3-29-73	Yes	0200	20	M	S	Yes	0.164	--o	(A)	(A)	*	-	-	*
513	San Diego, Calif.	3-29-73	No	1745	*	*	*	*	-	++o	(A)	-	*	-	-	*
514	Orlando, Florida	Unknown	No	*	*	*	*	*	-	-+-	-	-	(A)	-	-	-
515	San Diego, Calif.	3-29-73	No	2005	*	*	*	*	0.161	+-o	-	-	-	-	-	-
516	Washington, ASAP	4-1-73	No	1900	*	M	*	*	0.010	--o	(A)	(A)	-	-	-	-
517	Orlando, Florida	Unknown	No	*	*	*	*	*	-	---	*	-	(A)	*	-	-
518	New York, ASAP	4-1-73	Yes	2019	54	F	M	No	-	-+o	*	(A)	(A)	*	-	-

TABLE C-I (Continued)

MRI Sample Code	Location of Crash	Date of Crash	Crash Data Available	Time of Crash	Age of Victim	Sex of Victim	Single or Multiple Vehicle Accident	Driver Victim at Fault	Blood Alcohol	Marihuana Analysis	Drugs Indicated by TLC			Drugs Confirmed by GC		
											Urine	Blood	Bile	Urine	Blood	Bile
519	Cincinnati, Ohio	4-5-73	No	2015	*	M	*	*	0.305	---	(A)	-	-	-	-	-
520	Everett, Washington	4-6-73	Yes	1245	18	M	M	Yes	-	++o	(A)	-	-	-	-	-
521	Atlanta, Georgia	4-7-73	No	1700	*	*	*	*	-	***	-	-	-	-	-	-
522	Atlanta, Georgia	4-4-73	No	1415	*	M	*	*	-	+++	(N,A)	(A)	*	-	-	*
523	Sacramento, Calif.	4-9-73	No	2214	*	M	*	*	*	---	-	*	*	-	*	*
524	New York, ASAP	4-4-73	Yes	0250	28	M	S	Yes	0.042	-+o	*	(A)	*	*	-	*
525	Oregon, ASAP	4-7-73	Yes	1105	65	M	M	Yes	-	---	-	-	-	-	-	-
526	Oregon, ASAP	4-8-73	Yes	1530	*	M	*	*	-	+-o	Phenylprop	-	*	-	-	*
527	Washington, ASAP	4-10-73	No	2200	*	F	*	*	0.041	ooo	(N,A)	(A)	*	-	-	*
528	Washington, ASAP	4-10-73	No	2200	*	M	*	*	-	--o	Barb	Barb	-	Pheno (1.2)	Pheno (0.5)	-
529	Oregon, ASAP	4-11-73	Yes	2055	79	M	M	Yes	-	---	(A)	(A)	*	-	-	*
530	Cincinnati, Ohio	4-12-73	No	0310	*	F	*	*	0.260	---	(A)	(A)	(A)	-	-	-
531	Oregon, ASAP	4-12-73	Yes	2330	40	M	M	No	-	--o	*	(A)	-	*	-	-
532	New Mexico, ASAP	4-12-73	No	0600	*	M	*	*	-	***	(A)	-	*	-	-	*
533	Tampa, Florida	4-13-73	No	2130	*	M	*	*	0.197	--o	*	-	(A)	*	-	-
534	Orlando, Florida	4-14-73	No	0530	*	M	*	*	-	o-o	(A)	-	(A)	-	-	-
535	Las Vegas, Nevada	4-15-73	Yes	*	19	M	S	Yes	0.199	++o	(A)	-	*	-	-	*
536	New York, ASAP	4-13-73	Yes	1710	59	M	M	Yes	-	++o	*	-	(A)	*	-	-
537	New York, ASAP	4-13-73	Yes	1710	25	M	M	No	-	+-o	*	-	*	*	-	*
538	Daytona Beach, Florida	Unknown	No	*	*	*	*	*	0.252	+-o	(A)	(A)	*	-	-	*
539	Unknown	1-30-73	No	2128	*	M	*	*	0.007	+++	*	-	-	*	-	-
540	Unknown	Unknown	No	*	*	*	*	*	-	-+o	*	-	-	*	-	-

TABLE C-I (Continued)

MRI Sample Code	Location of Crash	Date of Crash	Crash Data Available	Time of Crash	Age of Victim	Sex of Victim	Single or Multiple Vehicle Accident	Driver Victim at Fault	Blood Alcohol	Marihuana Analysis	Drugs Indicated by TLC			Drugs Confirmed by GC		
											Urine	Blood	Bile	Urine	Blood	Bile
541	San Diego, Calif.	4-14-73	No	2330	*	*	*	*	-	--o	*	-	*	*	-	*
542	Unknown	Unknown	No	*	*	M	*	*	0.322	+-o	Barb (A)	Barb	(A)	Pheno (1.3)	Pheno (2.5)	-
543	San Diego, Calif.	4-14-73	No	2330	*	*	*	*	0.146	-+o	*	-	*	*	-	*
544	Daytona Beach, Florida	3-22-73	No	0030	*	M	*	*	0.150	+--	(N,A)	(A)	*	-	-	*
545	Cincinnati, Ohio	4-17-73	No	0455	*	M	*	*	0.195	--o	(A)	(A)	*	-	-	*
546	Cincinnati, Ohio	4-12-73	No	0310	*	F	*	*	0.133	--o	*	-	-	*	-	-
547	Vermont, ASAP	4-19-73	No	1910	*	M	*	*	[illegible]	--o	*	-	*	*	-	*
548	Vermont, ASAP	4-9-73	No	2015	*	M	*	*	0.197	+-o	(N)	-	(N)	-	-	-
549	Las Vegas, Nevada	4-20-73	Yes	1200	36	M	S	*	0.398	+++	-	-	*	-	-	*
550	Vermont, ASAP	4-15-73	No	0200	*	M	*	*	0.255	+-o	-	-	Mep	-	-	Mep (tr)
551	Virginia, ASAP	4-18-73	Yes	1740	57	M	M	Yes	0.368	-+-	(N,S)	(A)	-	-	-	-
552	Oregon, ASAP	4-18-73	Yes	0455	19	M	S	Yes	0.271	--o	-	-	-	-	-	-
553	Washington, ASAP	4-22-73	No	1850	*	F	*	*	-	--o	*	-	*	*	-	*
554	Washington, ASAP	4-22-73	No	1850	*	M	*	*	-	---	*	-	-	*	-	-
555	Atlanta, Georgia	4-20-73	No	*	*	M	*	*	0.313	---	(N)	-	*	-	-	*
556	Las Vegas, Nevada	4-21-73	Yes	1800	40	F	M	Yes	*	+++	*	*	*	*	*	*
557	Orlando, Florida	4-18-73	No	*	16	M	*	*	0.199	***	(S)	-	*	-	-	*
558	New York, ASAP	4-19-73	Yes	1421	42	M	S	Yes	0.285	+-o	(N)	-	-	-	-	-
559	Tampa, Florida	4-26-73	No	2100	*	M	*	*	-	+++	*	-	-	*	-	-
560	New York, ASAP	4-17-73	Yes	2200	17	M	M	Yes	-	++o	(N)	-	*	-	-	*
561	New Mexico, ASAP	4-28-73	No	0053	*	M	*	*	0.076	***	*	-	-	*	-	-
562	Appleton, Wisconsin	5-1-73	No	2248	*	M	*	*	0.035	++o	*	-	*	*	-	*

TABLE C-I (Continued)

MRI Sample Code	Location of Crash	Date of Crash	Crash Data Available	Time of Crash	Age of Victim	Sex of Victim	Single or Multiple Vehicle Accident	Driver Victim at Fault	Blood Alcohol	Marihuana Analysis	Drugs Indicated by TLC			Drugs Confirmed by GC		
											Urine	Blood	Bile	Urine	Blood	Bile
563	Vermont, ASAP	4-27-73	No	2100	*	M	*	*	0.229	+++	(N)	-	-	-	-	-
564	San Diego, Calif.	3-25-73	No	0203	*	*	*	*	0.174	++o	(N)	-	*	-	-	*
565	New Mexico, ASAP	5-4-73	No	1100	*	M	*	*	0.078	***	-	-	-	-	-	-
566	Tampa, Florida	5-2-73	No	2309	*	F	*	*	-	---	(A)	(A)	*	-	-	*
567	Akron, Ohio	5-2-73	No	0400	*	M	*	*	0.131	+-o	*	-	-	*	-	-
568	San Diego, Calif.	5-2-73	No	1525	*	*	*	*	-	+-+	-	-	*	-	-	*
569	Cincinnati, Ohio	5-5-73	No	0505	*	M	*	*	0.132	---	(N)	-	-	-	-	-
570	Atlanta, Georgia	5-5-73	No	1000	*	M	*	*	-	--+	(N)	-	-	-	-	-
571	Sacramento, Calif.	5-5-73	No	1740	*	*	*	*	0.222	+--	-	-	-	-	-	-
572	Akron, Ohio	5-6-73	No	1530	*	M	*	*	-	-+-	*	-	*	*	-	*
573	Oregon, ASAP	5-6-73	No	1740	*	F	*	*	-	--o	(N,S)	-	-	-	-	-
574	San Diego, Calif.	5-5-73	No	2130	*	*	*	*	0.199	+-o	(N)	-	-	-	-	-
575	Oregon, ASAP	5-6-73	No	2145	*	M	*	*	-	-+o	(N)	-	*	-	-	*
576	Nebraska, ASAP	5-8-73	No	1800	*	M	*	*	-	--o	Phenylprop Chlorphen Quin Morph Barb Mepro (N)	-	*	Phenylprop (5.1) Seco (1.6)	-	*
577	St. Petersburg, Florida	5-11-73	No	0130	*	M	*	*	0.171	--o	(N,S)	-	-	-	-	-
578	Washington, ASAP	5-10-73	No	0600	*	M	*	*	-	+-o	*	-	-	*	-	-
579	Appleton, Wisconsin	5-9-73	Yes	2134	39	M	S	Yes	0.425	ooo	-	-	*	-	-	*
580	Everett, Washington	5-12-73	No	1740	*	M	*	*	0.389	-+o	-	-	-	-	-	-

TABLE C-I (Continued)

MRI Sample Code	Location of Crash	Date of Crash	Crash Data Available	Time of Crash	Age of Victim	Sex of Victim	Single or Multiple Vehicle Accident	Driver Victim at Fault	Blood Alcohol	Marihuana Analysis	Drugs Indicated by TLC			Drugs Confirmed by GC		
											Urine	Blood	Bile	Urine	Blood	Bile
581	Atlanta, Georgia	5-12-73	No	0400	*	F	*	*	0.220	-o+	(A)	(A)	-	-	-	-
582	Washington, ASAP	5-4-73	No	1601	*	M	*	*	-	-+o	(N)	-	*	-	-	*
583	Washington, ASAP	5-12-73	No	1830	*	M	*	*	0.149	o+o	*	-	-	*	-	-
584	Washington, ASAP	5-12-73	No	0150	*	M	*	*	0.265	++o	(N,S)	-	-	-	-	-
585	Orlando, Florida	5-13-73	No	*	*	*	*	*	-	++o	*	-	*	*	-	*
586	New Mexico, ASAP	5-14-73	No	0900	*	*	*	*	-	***	Barb (N,S)	-	-	-	-	-
587	San Diego, Calif.	5-15-73	No	1545	*	*	*	*	> 5.0	+-+	-	-	-	-	-	-
588	Orlando, Florida	Unknown	No	*	*	*	*	*	0.362	-++	(N,A)	-	-	-	-	-
589	Atlanta, Georgia	5-16-73	No	0400	*	M	*	*	0.105	-+o	(N)	-	-	-	-	-
590	Unknown	Unknown	No	*	*	*	*	*	-	ooo	-	-	*	-	-	*
591	Atlanta, Georgia	5-16-73	No	2200	*	M	*	*	-	---	-	-	-	-	-	-
592	New York, ASAP	5-12-73	Yes	0200	18	M	S	Yes	0.320	---	*	-	-	*	-	-
593	Atlanta, Georgia	5-18-73	No	0040	*	F	*	*	0.272	---	-	-	-	-	-	-
594	Washington, ASAP	5-18-73	No	0305	*	F	*	*	0.436	---	-	-	*	-	-	*
595	New Mexico, ASAP	5-17-73	No	1552	*	M	*	*	> 0.5	---	*	-	*	*	-	*
596	Orlando, Florida	5-19-73	No	1900	*	M	*	*	0.352	---	-	-	-	-	-	-
597	Everett, Washington	5-19-73	No	2230	*	M	*	*	0.342	---	-	Barb	-	-	-	-
598	Sacramento, Calif.	5-12-73	No	0255	*	M	*	*	0.310	---	-	-	-	-	-	-
599	Washington, ASAP	5-20-73	No	1700	*	F	*	*	-	---	*	(A)	-	*	-	-
600	Atlanta, Georgia	5-22-73	No	1430	*	F	*	*	-	---	-	-	-	-	-	-
601	San Diego, Calif.	5-19-73	No	1055	*	*	*	*	-	---	-	-	-	-	-	-

TABLE C-I (Continued)

MRI Sample Code	Location of Crash	Date of Crash	Crash Data Available	Time of Crash	Age of Victim	Sex of Victim	Single or Multiple Vehicle Accident	Driver Victim at Fault	Blood Alcohol	Marihuana Analysis	Drugs Indicated by TLC			Drugs Confirmed by GC		
											Urine	Blood	Bile	Urine	Blood	Bile
602	Atlanta, Georgia	5-23-73	No	1630	*	M	*	*	-	-+o	(N,S)	-	-	-	-	-
603	Akron, Ohio	5-27-73	No	0236	*	M	*	*	0.444	-oo	(N)	-	*	-	-	*
604	St. Petersburg, Florida	5-29-73	No	*	*	M	*	*	0.388	--o	(N)	-	-	-	-	-
605	Orlando, Florida	5-26-73	No	0015	*	M	*	*	0.052	--o	-	-	*	-	-	*
606	San Diego, Calif.	5-29-73	No	2320	*	*	*	*	0.183	--o	Mepro Barb (N,A)	-	-	Mepro (tr) Seco (2.5)	-	-
607	Cincinnati, Ohio	6-3-73	No	0115	*	M	*	*	0.183	--o	(N)	-	-	-	-	-
608	Oregon, ASAP	6-1-73	No	2100	*	M	*	*	0.347	--+	(N)	-	-	-	-	-
609	Atlanta, Georgia	6-3-73	No	2100	*	M	*	*	-	-+-	Barb (N)	(A)	Barb (A)	-	-	-
610	Nebraska, ASAP	6-4-73	No	1340	*	M	*	*	-	--o	*	-	*	*	-	*
611	San Diego, Calif.	5-30-73	No	2220	*	*	*	*	0.164	---	Barb (N)	(A)	-	-	-	-
612	San Diego, Calif.	6-2-73	No	0420	*	*	*	*	0.320	--o	(N)	-	-	-	-	-
613	Atlanta, Georgia	5-31-73	No	0340	*	M	*	*	-	-++	Mepro Barb (N,A)	-	-	Mepro (0.7) Seco (0.9)	-	-
614	Washington, ASAP	6-5-73	No	1757	*	M	*	*	0.327	---	(N)	-	-	-	-	-
615	Akron, Ohio	6-9-73	No	2215	*	M	*	*	0.164	--o	(N)	(A)	-	-	-	-
616	Orlando, Florida	6-7-73	No	0850	*	F	*	*	-	+-o	*	-	-	*	-	-
617	San Diego, Calif.	6-5-73	No	0545	*	*	*	*	-	++o	(N)	-	-	-	-	-
618	Cincinnati, Ohio	6-8-73	No	0955	*	M	*	*	-	+--	(N)	-	-	-	-	-
619	Cincinnati, Ohio	6-8-73	No	2320	*	M	*	*	0.165	-+-	(N)	-	-	-	-	-
620	Vermont, ASAP	6-9-73	No	2015	*	M	*	*	0.229	-++	-	-	-	-	-	-

TABLE C-I (Continued)

MRI Sample Code	Location of Crash	Date of Crash	Crash Data Available	Time of Crash	Age of Victim	Sex of Victim	Single or Multiple Vehicle Accident	Driver Victim at Fault	Blood Alcohol	Marihuana Analysis	Drugs Indicated by TLC			Drugs Confirmed by GC		
											Urine	Blood	Bile	Urine	Blood	Bile
621	Atlanta, Georgia	6-10-73	No	0510	*	M	*	*	0.346	+++	*	Barb	-	*	Pheno (0.4)	-
622	St. Petersburg, Florida	6-10-73	No	0200	*	F	*	*	-	++-	(N)	-	-	-	-	-
623	San Diego, Calif.	6-11-73	No	0415	*	*	*	*	-	--o	*	-	(A)	*	-	-
624	Vermont, ASAP	6-12-73	No	1720	*	M	*	*	-	-+o	Phenylprop (S)	-	-	Phenylprop (1.0)	-	-
625	Tampa, Florida	6-14-73	No	0847	*	*	*	*	-	++-	-	-	*	-	-	*
626	Orlando, Florida	6-16-73	No	0037	*	M	*	*	0.247	+--	Barb (N)	-	-	-	-	-
627	Orlando, Florida	6-16-73	No	0105	*	M	*	*	0.035	---	Morph (N,S)	(N)	(N)	-	-	-
628	Orlando, Florida	6-16-73	No	0105	*	M	*	*	0.229	+--	(N)	(N)	Barb	-	-	Pheno (tr)
629	Vermont, ASAP	6-18-73	No	0615	*	M	*	*	-	--o	(N)	-	-	-	-	-
630	Oregon, ASAP	6-21-73	No	2000	*	M	*	*	0.220	+--	(N)	-	-	-	-	-
631	New York, ASAP	6-20-73	Yes	1145	53	M	M	No	-	--+	-	-	-	-	-	-
632	New York, ASAP	6-18-73	Yes	0001	*	M	M	No	-	---	Phenylprop Chlorphen (A)	-	-	Chlorphen (0.1)	-	-
633	New York, ASAP	6-18-73	Yes	2030	20	M	M	No	-	o++	-	-	*	-	-	*
634	New York, ASAP	6-15-73	Yes	2110	48	M	S	Yes	0.418	+--	Amphet (N,A)	(N)	Amphet Phenylprop MPD Amitryp (A)	-	-	Phenylprop (20.2) Amitryp (tr)
635	Cincinnati, Ohio	6-25-73	No	2219	*	F	*	*	-	+--	(N,A)	-	-	-	-	-
636	Atlanta, Georgia	6-26-73	No	2230	*	M	*	*	0.307	+--	Methadone (N)	-	(N)	Methadone (1.0)	-	-
637	Virginia, ASAP	6-28-73	No	*	*	M	*	*	0.138	++o	-	-	-	-	-	-

TABLE C-1 (Continued)

MRI Sample Code	Location of Crash	Date of Crash	Crash Data Available	Time of Crash	Age of Victim	Sex of Victim	Single or Multiple Vehicle Accident	Driver Victim at Fault	Blood Alcohol	Marihuana Analysis	Drugs Indicated by TLC			Drugs Confirmed by GC		
											Urine	Blood	Bile	Urine	Blood	Bile
638	Appleton, Wisconsin	6-30-73	Yes	0245	18	F	M	*	0.190	--+	*	-	*	*	-	*
639	San Diego, Calif.	6-30-73	No	1520	*	*	*	*	0.177	---	(N)	-	(N)	-	-	-
640	Akron, Ohio	7-4-73	No	1605	*	M	*	*	0.038	--o	*	-	*	*	-	*
641	New Mexico, ASAP	7-3-73	No	*	*	F	*	*	-	---	-	-	*	-	-	*
642	Orlando, Florida	7-6-73	No	2330	*	M	*	*	0.208	-+-	*	-	(N)	*	-	-
643	Beloit, Wisconsin	7-9-73	No	0216	*	M	*	*	0.068	--o	(N)	-	-	-	-	-
644	Orlando, Florida	7-7-73	No	0050	*	M	*	*	0.260	-oo	(N)	-	(N)	-	-	-
645	Akron, Ohio	7-8-73	No	1840	*	M	*	*	*	ooo	-	*	-	-	*	-
646	Nebraska, ASAP	7-7-73	No	2320	*	*	*	*	-	++-	*	-	*	*	-	*
647	Orlando, Florida	7-10-73	No	0050	*	M	*	*	-	--o	(N)	-	*	-	-	*
648	Akron, Ohio	7-10-73	No	0620	*	M	*	*	0.078	+-o	*	-	(N)	*	-	-
649	Everett, Washington	7-6-73	No	1710	*	M	*	*	*	---	(N)	*	-	-	*	-
650	Las Vegas, Nevada	7-9-73	No	1510	*	M	*	*	-	ooo	(N)	-	*	-	-	*
651	New York, ASAP	7-5-73	Yes	1905	56	M	M	*	0.142	--o	*	-	-	*	-	-
652	New York, ASAP	7-4-73	Yes	2145	30	M	S	Yes	0.340	-oo	(N)	-	(N)	-	-	-
653	Orlando, Florida	7-11-73	No	1750	*	F	*	*	-	---	*	-	(N)	*	-	-
654	Akron, Ohio	7-13-73	No	0300	*	M	*	*	0.157	-oo	(N)	-	-	-	-	-
655	Cincinnati, Ohio	7-13-73	No	2203	*	M	*	*	0.208	---	(N)	-	(N)	-	-	-
656	Las Vegas, Nevada	7-13-73	No	2230	*	M	*	*	-	o+o	-	-	*	-	-	*
657	Vermont, ASAP	7-18-73	No	1800	*	M	*	*	0.070	***	*	-	-	*	-	-
658	Cincinnati, Ohio	7-19-73	No	0135	*	M	*	*	0.240	---	-	-	-	-	-	-
659	Everett, Washington	7-18-73	No	2200	*	M	*	*	0.010	--o	-	-	-	-	-	-

TABLE C-I (Continued)

MRI Sample Code	Location of Crash	Date of Crash	Crash Data Available	Time of Crash	Age of Victim	Sex of Victim	Single or Multiple Vehicle Accident	Driver Victim at Fault	Blood Alcohol	Marihuana Analysis	Drugs Indicated by TLC			Drugs Confirmed by GC		
											Urine	Blood	Bile	Urine	Blood	Bile
660	St. Petersburg, Florida	7-23-73	No	0115	*	F	*	*	0.252	---	*	-	(N)	*	-	-
661	Sacramento, Calif.	7-22-73	No	*	*	M	*	*	0.110	-+-	(N)	-	-	-	-	-
662	New York, ASAP	7-16-73	Yes	0553	58	M	M	No	-	--o	*	-	*	*	-	*
663	Orlando, Florida	7-27-73	No	2105	*	M	*	*	*	--+	*	*	*	*	*	*
664	St. Petersburg, Florida	7-27-73	No	0230	*	M	*	*	0.292	o--	(N,S)	-	(N)	-	-	-
665	Sacramento, Calif.	7-30-73	No	0330	*	F	*	*	-	--+	*	-	*	*	-	*
666	New Mexico, ASAP	7-28-73	No	2200	*	M	*	*	0.179	***	(N)	-	*	-	-	*
667	New Mexico, ASAP	7-31-73	No	0253	*	M	*	*	0.032	***	*	-	*	*	-	*
668	Cincinnati, Ohio	7-31-73	No	1500	*	M	*	*	-	--o	(N)	-	-	-	-	-
669	Virginia, ASAP	7-31-73	No	*	*	M	*	*	0.253	+--	(N)	-	(N)	-	-	-
670	Akron, Ohio	8-3-73	No	1355	*	F	*	*	0.095	--o	*	-	-	*	-	-
671	Vermont, ASAP	7-18-73	No	2045	*	M	*	*	0.190	---	*	-	-	*	-	-
672	Orlando, Florida	8-3-73	No	0020	*	M	*	*	0.238	ooo	(N)	-	(N)	-	-	-
673	Cincinnati, Ohio	8-3-73	No	0205	*	M	*	*	0.248	-+o	(N)	*	-	-	*	-
674	Vermont, ASAP	8-7-73	No	0915	*	*	*	*	-	---	(N)	-	-	-	-	-
675	Las Vegas, Nevada	8-7-73	No	0625	*	F	*	*	0.135	++-	*	-	*	*	-	*
676	Everett, Washington	8-3-73	No	*	*	F	*	*	0.135	***	*	-	-	*	-	-
677	Appleton, Wisconsin	8-6-73	Yes	1825	17	M	M	Yes	-	--o	(S)	-	*	-	-	*
678	Cincinnati, Ohio	8-5-73	No	0500	*	M	*	*	-	--o	-	-	(N)	-	-	-
679	St. Petersburg, Florida	8-10-73	No	0010	*	F	*	*	-	--o	*	-	(N)	*	-	(N)
680	Akron, Ohio	8-9-73	No	2300	*	M	*	*	0.112	ooo	(N)	-	(N)	-	-	-

TABLE C-I (Continued)

MRI Sample Code	Location of Crash	Date of Crash	Crash Data Available	Time of Crash	Age of Victim	Sex of Victim	Single or Multiple Vehicle Accident	Driver Victim at Fault	Blood Alcohol	Marihuana Analysis	Drugs Indicated by TLC			Drugs Confirmed by GC		
											Urine	Blood	Bile	Urine	Blood	Bile
681	Everett, Washington	8-12-73	No	0625	*	M	*	*	-	***	-	-	-	-	-	-
682	Nebraska, ASAP	8-11-73	No	0045	*	F	*	*	0.258	+-o	*	(N)	*	*	-	*
683	Sacramento, Calif.	8-8-73	No	2230	*	M	*	*	-	-+o	*	-	*	*	-	*
684	Orlando, Florida	8-12-73	No	0305	*	M	*	*	0.207	--o	*	Meth	(N)	*	-	-
685	Akron, Ohio	8-12-73	No	0030	*	M	*	*	-	--o	*	(N)	*	*	-	*
686	Orlando, Florida	8-12-73	No	0305	*	M	*	*	-	--+	-	-	-	-	-	-
687	New York, ASAP	8-7-73	Yes	*	*	M	*	*	0.234	ooo	*	-	(N)	*	-	-
688	Everett, Washington	8-12-73	No	2300	*	M	*	*	0.137	oo+	*	(N)	(N,S)	*	-	-
689	St. Petersburg, Florida	8-16-73	No	1415	*	F	*	*	0.289	ooo	(N)	-	(N)	-	-	-
690	St. Petersburg, Florida	8-16-73	No	*	*	M	*	*	0.148	o-o	Meth (N)	(N)	-	Meth (0.1)	-	-
691	New York, ASAP	8-16-73	Yes	1855	50	M	M	Yes	0.023	---	*	(N)	*	*	-	*
692	New York, ASAP	8-13-73	Yes	1346	56	M	M	No	-	--o	*	-	-	*	-	-
693	Eau Claire, Wisconsin	8-19-73	No	*	*	M	*	*	-	--+	-	(N)	-	-	-	-
694	Atlanta, Georgia	8-19-73	No	0800	*	M	*	*	0.010	***	Trifluo (N,S)	(N)	(N)	Trifluo (25.0)	-	-
695	Cincinnati, Ohio	8-18-73	No	0015	*	M	*	*	0.151	++-	-	(N)	(N,S)	-	-	-
696	San Diego, Calif.	7-6-73	No	1125	*	*	*	*	-	---	Imip MPD	(N)	(N)	MPD (7.1)	-	-
697	San Diego, Calif.	7-14-73	No	1945	*	*	*	*	0.140	+-o	-	(N)	(N)	-	-	-
698	Appleton, Wisconsin	8-23-73	Yes	0520	*	M	M	Yes	-	ooo	(N)	(N)	-	-	-	-
699	Vermont, ASAP	8-17-73	No	1225	*	M	*	*	-	-+-	-	Barb (N)	(S)	-	-	-

TABLE C-1 (Concluded)

MRI Sample Code	Location of Crash	Date of Crash	Crash Data Available	Time of Crash	Age of Victim	Sex of Victim	Single or Multiple Vehicle Accident	Driver Victim at Fault	Blood Alcohol	Marihuana Analysis	Drugs Indicated by TLC			Drugs Confirmed by GC		
											Urine	Blood	Bile	Urine	Blood	Bile
700	Everett, Washington	8-19-73	No	0130	*	M	*	*	0.318	+++	(N)	(N)	*	-	-	*
701	Everett, Washington	8-24-73	No	1720	*	M	*	*	*	---	*	(N)	(N)	*	*	*
702	Everett, Washington	8-26-73	No	0155	*	M	*	*	0.076	-+o	-	(N)	(N)	*	*	*
703	Appleton, Wisconsin	8-28-73	No	1835	*	F	*	*	0.193	-+-	*	(N)	Barb (N)	*	*	*
704	Appleton, Wisconsin	8-29-73	No	1544	*	F	*	*	-	---	(N,S)	(N)	*	*	*	*
705	Eau Claire, Wisconsin	8-29-73	No	0800	*	M	*	*	-	--+	(A)	(N)	-	-	-	*
706	Atlanta, Georgia	8-29-73	No	1200	*	M	*	*	0.025	++o	DPH Barbs (N)	(N)	Barbs	Amo (0.6)	*	Amo (2.5)
707	New York ASAP	8-24-73	Yes	1855	39	M	M	No	*	---	*	*	*	*	*	*
708	Cincinnati, Ohio	8-30-73	No	1923	*	M	*	*	0.153	+--	(N)	(N)	-	*	*	*
709	Orlando, Florida	8-30-73	No	1830	*	F	*	*	0.214	+-o	Barb (N)	-	Barb	-	-	Pheno (0.5)
710	St. Petersburg, Florida	9-2-73	No	1230	*	M	*	*	0.135	---	(N)	Meth	-	-	Meth (tr)	*

Note: The following eleven sample sets have been found to be victims other than fatally injured drivers and are not employed in the statistical analysis of the data: Nos. 34, 82, 361, 408, 410, 468, 475, 500, 501, 502, and 562.

APPENDIX D

STATISTICAL ANALYSIS

KEY TO TABLES D-1 - D-11

First stratification	AF +	At fault.
	-	Not at fault.
Second stratification	SV	Single vehicle accident.
	MV	Multiple vehicle accident.
Third stratification	Q_1	Date of accident: Jan.-March
	Q_2	April-June
	Q_3	July-Sept.
	Q_4	Oct.-Dec.
Fourth stratification	00^{00}-05^{59}	Time of accident, self-explanatory.
	06^{00}-11^{59}	
	12^{00}-17^{59}	
	18^{00}-23^{59}	
Fifth stratification	W	Location of accident: West
	NW	Northwest
	S	South
	E	East
	MW	Midwest
Sixth stratification	≤19	Age of victim, self-explanatory.
	20-24	
	25-29	
	30-39	
	40-49	
	50-59	
	≥60	
Seventh stratification	M	Sex of victim: male
	F	female

TABLE D-1

STRATIFICATION OF THE INCIDENCE OF ALCOHOL WITH VICTIM/ACCIDENT DATA

	Alcohol Detected	No Alcohol Detected	Total	Chi-Square Test Significance
AF +	113	74	187	
-	7	33	40	Positive
Total	120	107	227	
SV	76	32	108	
MV	51	80	131	Positive
Total	127	112	239	
Q_1	89	58	147	
Q_2	100	93	193	
Q_3	105	67	171	
Q_4	90	74	164	None
Total	384	291	675	
00^{00}-05^{59}	156	42	198	
06^{00}-11^{59}	27	59	86	
12^{00}-17^{59}	61	105	166	
18^{00}-23^{59}	126	74	200	Positive
Total	370	280	650	
W	99	65	164	
NW	88	76	164	
S	78	77	155	
E	55	41	96	
MW	63	35	98	None
Total	383	294	677	
≤19	15	18	33	
20-24	29	14	43	
25-29	27	10	37	
30-39	26	11	37	
40-49	14	11	25	
50-59	8	21	29	
≥60	6	25	31	Positive
Total	125	110	235	
M	302	198	500	
F	42	57	99	Positive
Total	344	255	599	

TABLE D-2

STRATIFICATION OF THE INCIDENCE OF ALCOHOL INTOXICATION ≥0.100% WITH VICTIM/ACCIDENT DATA

	Drunk (≥0.10 BAC)	Not Drunk	Total	Chi-Square Test Significance
AF +	90	97	187	
-	3	37	40	Positive
Total	93	134	227	
SV	63	45	108	
MV	36	95	131	Positive
Total	99	140	239	
Q_1	74	73	147	
Q_2	86	107	193	
Q_3	78	93	171	
Q_4	68	96	164	None
Total	306	369	675	
00^{00}-05^{59}	128	70	198	
06^{00}-11^{59}	16	70	86	
12^{00}-17^{59}	44	122	166	
18^{00}-23^{59}	105	95	200	Positive
Total	293	357	650	
W	82	82	164	
NW	62	102	164	
S	66	89	155	
E	47	49	96	
MW	51	47	98	None
Total	308	369	677	
≤19	12	21	33	
20-24	22	21	43	
25-29	17	20	37	
30-39	22	15	37	
40-49	12	13	25	
50-59	7	22	29	
≥60	5	26	31	Positive
Total	97	138	235	
M	237	263	500	
F	31	68	99	Positive
Total	268	331	599	

TABLE D-3

STRATIFICATION OF QUANTITATED DRUG INCIDENCE
WITH VICTIM/ACCIDENT DATA

	Positive Drug	Negative Drug	Total	Chi-Square Test Significance
AF +	27	162	189	
-	3	39	42	None
Total	30	201	231	
SV	13	96	109	
MV	21	113	134	None
Total	34	209	243	
Q_1	13	136	149	
Q_2	15	179	194	
Q_3	21	156	177	
Q_4	41	125	166	Positive
Total	90	596	686	
$00^{00}-05^{59}$	21	177	198	
$06^{00}-11^{59}$	12	77	89	
$12^{00}-17^{59}$	30	138	168	
$18^{00}-23^{59}$	26	179	205	None
Total	89	571	660	
W	24	144	168	
NW	25	141	166	
S	17	139	156	
E	12	85	97	
MW	11	90	101	None
Total	89	599	688	
≤19	4	29	33	
20-24	9	34	43	
25-29	3	35	38	
30-39	5	34	39	
40-49	4	21	25	
50-59	6	23	29	
≥60	1	30	31	None
Total	32	206	238	
M	69	441	510	
F	11	89	100	None
Total	80	530	610	

TABLE D-4

STRATIFICATION OF SEDATIVES AND HYPNOTICS INCIDENCE WITH VICTIM/ACCIDENT DATA

	Sedatives and Hypnotics	No Sedatives and Hypnotics	Total	Chi-Square Test Significance
AF +	13	176	189	
-	1	41	42	None
Total	14	217	231	
SV	4	105	109	
MV	12	122	134	None
Total	16	227	243	
Q_1	8	141	149	
Q_2	8	186	194	
Q_3	10	167	177	
Q_4	23	143	166	Positive
Total	49	637	686	
00^{00}-05^{59}	10	188	198	
06^{00}-11^{59}	7	82	89	
12^{00}-17^{59}	17	151	168	
18^{00}-23^{59}	15	190	205	None
Total	49	611	660	
W	12	156	168	
NW	15	151	166	
S	11	145	156	
E	6	91	97	
MW	5	96	101	None
Total	49	639	688	
≤19	4	29	33	
20-24	3	40	43	
25-29	1	37	38	
30-39	2	37	39	
40-49	1	24	25	
50-59	3	26	29	
≥60	1	30	31	None
Total	15	223	238	
M	35	475	510	
F	7	93	100	None
Total	42	568	610	

TABLE D-5

STRATIFICATION OF STIMULANTS INCIDENCE
WITH VICTIM/ACCIDENT DATA

	Stimulants	No Stimulants	Total	Chi-Square Test Significance
AF +	4	185	189	
-	0	42	42	None
Total	4	227	231	
SV	3	106	109	
MV	1	133	134	None
Total	4	239	243	
Q_1	2	147	149	
Q_2	0	194	194	
Q_3	5	172	177	
Q_4	7	159	166	None
Total	14	672	686	
00^{00}-05^{59}	4	194	198	
06^{00}-11^{59}	2	87	89	
12^{00}-17^{59}	4	164	168	
18^{00}-23^{59}	3	202	205	None
Total	13	647	660	
W	6	162	168	
NW	3	163	166	
S	4	152	156	
E	1	96	97	
MW	0	101	101	None
Total	14	674	688	
≤19	0	33	33	
20-24	3	40	43	
25-29	0	38	38	
30-39	0	39	39	
40-49	0	25	25	
50-59	1	28	29	
≥60	0	31	31	None
Total	4	234	238	
M	10	500	510	
F	2	98	100	None
Total	12	598	610	

TABLE D-6

STRATIFICATION OF ANTIHISTAMINES AND DECONGESTANTS INCIDENCE WITH VICTIM/ACCIDENT DATA

	Antihistamines and Decongestants	No Antihistamines and Decongestants	Total	Chi-Square Test Significance
AF +	6	183	189	
-	0	42	42	None
Total	6	225	231	
SV	5	104	109	
MV	2	132	134	None
Total	7	236	243	
Q_1	1	148	149	
Q_2	3	191	194	
Q_3	5	172	177	
Q_4	5	161	166	None
Total	14	672	686	
00^{00}-05^{59}	5	193	198	
06^{00}-11^{59}	1	88	89	
12^{00}-17^{59}	4	164	168	
18^{00}-23^{59}	4	201	205	None
Total	14	646	660	
W	3	165	168	
NW	3	163	166	
S	1	155	156	
E	3	94	97	
MW	4	107	101	None
Total	14	674	688	
≤19	0	33	33	
20-24	3	40	43	
25-29	0	38	38	
30-39	1	38	39	
40-49	1	24	25	
50-59	2	27	29	
≥60	0	31	31	None
Total	7	231	238	
M	12	498	510	
F	1	99	100	None
Total	13	597	610	

TABLE D-7

STRATIFICATION OF TRANQUILLIZER INCIDENCE
WITH VICTIM/ACCIDENT DATA

	Tranquillizers	No Tranquillizers	Total	Chi-Square Test Significance
AF +	4	185	189	
-	1	41	42	None
Total	5	226	231	
SV	3	106	109	
MV	2	132	134	None
Total	5	238	243	
Q_1	0	149	149	
Q_2	3	191	194	
Q_3	4	173	177	
Q_4	11	155	166	None
Total	18	668	686	
00^{00}-05^{59}	5	193	198	
06^{00}-11^{59}	3	86	89	
12^{00}-17^{59}	4	164	168	
18^{00}-23^{59}	6	199	205	None
Total	18	642	660	
W	6	162	168	
NW	5	161	166	
S	1	155	156	
E	2	95	97	
MW	3	98	101	None
Total	17	671	688	
≤19	0	33	33	
20-24	1	42	43	
25-29	1	37	38	
30-39	1	38	39	
40-49	1	24	25	
50-59	0	29	29	
≥60	0	31	31	None
Total	4	234	238	
M	15	495	510	
F	1	99	100	None
Total	16	594	610	

TABLE D-8

STRATIFICATION OF NICOTINE INCIDENCE
WITH VICTIM/ACCIDENT DATA

	Nicotine	No Nicotine	Total	Chi-Square Test Significance
AF +	84	105	189	
-	15	27	42	None
Total	99	132	231	
SV	53	56	109	
MV	50	84	134	None
Total	103	140	243	
Q_1	62	87	149	
Q_2	81	113	194	
Q_3	91	86	177	
Q_4	89	77	166	None
Total	323	363	686	
00^{00}-05^{59}	108	90	198	
06^{00}-11^{59}	40	49	89	
12^{00}-17^{59}	66	102	168	
18^{00}-23^{59}	96	109	205	None
Total	310	350	660	
W	74	94	168	
NW	83	83	166	
S	74	82	156	
E	35	62	97	
MW	57	44	101	None
Total	323	365	688	
≤19	14	19	33	
20-24	21	22	43	
25-29	21	17	38	
30-39	17	22	39	
40-49	13	12	25	
50-59	9	20	29	
≥60	6	25	31	None
Total	101	137	238	
M	255	255	510	
F	32	68	100	Positive
Total	287	323	610	

TABLE D-9

STRATIFICATION OF ASPIRIN INCIDENCE
WITH VICTIM/ACCIDENT DATA

	Aspirin	Non-Aspirin	Total	Chi-Square Test Significance
AF +	69	120	189	
-	12	30	42	None
Total	81	150	231	
SV	39	70	109	
MV	44	90	134	None
Total	83	160	243	
Q_1	68	81	149	
Q_2	55	139	194	
Q_3	29	148	177	
Q_4	39	127	166	Positive
Total	191	495	686	
00^{00}-05^{59}	47	151	198	
06^{00}-11^{59}	20	69	89	
12^{00}-17^{59}	52	116	168	
18^{00}-23^{59}	68	137	205	None
Total	187	473	660	
W	38	130	168	
NW	52	114	166	
S	57	99	156	
E	28	69	97	
MW	21	80	101	None
Total	196	492	688	
≤19	10	23	33	
20-24	13	30	43	
25-29	19	19	38	
30-39	12	27	39	
40-49	6	19	25	
50-59	6	23	29	
≥60	15	16	31	None
Total	81	157	238	
M	141	369	510	
F	35	65	100	None
Total	176	434	610	

TABLE D-10

STRATIFICATION OF SALICYLIC ACID INCIDENCE
WITH VICTIM/ACCIDENT DATA

	Salicylic Acid	Not Salicylic Acid	Total	Chi-Square Test Significance
AF +	13	176	189	
-	4	38	42	None
Total	17	214	231	
SV	8	101	109	
MV	10	124	134	None
Total	18	225	243	
Q_1	4	145	149	
Q_2	21	173	194	
Q_3	15	162	177	
Q_4	6	160	166	Positive
Total	46	640	686	
00^{00}-05^{59}	16	182	198	
06^{00}-11^{59}	5	84	89	
12^{00}-17^{59}	10	158	168	
18^{00}-23^{59}	14	191	205	None
Total	45	615	660	
W	9	159	168	
NW	15	151	166	
S	10	146	156	
E	5	92	97	
MW	6	95	101	None
Total	45	643	688	
≤19	4	29	33	
20-24	4	39	43	
25-29	1	37	38	
30-39	5	34	39	
40-49	1	24	25	
50-59	4	25	29	
≥60	0	31	31	None
Total	19	219	238	
M	37	473	510	
F	5	95	100	None
Total	42	568	610	

TABLE D-11

STRATIFICATION OF MARIHUANA INCIDENCE (ON-THE-SWAB TEST) WITH VICTIM/ACCIDENT DATA

	Marihuana (Any)	No Marihuana	Total	Chi-Square Test Significance
AF +	17	33	50	
-	7	10	17	None
Total	24	43	67	
SV	8	24	32	
MV	18	24	42	None
Total	26	48	74	
Q_1	36	81	117	
Q2	57	49	106	
Q_3	24	33	57	
Q_4	2	24	26	Positive
Total	119	187	306	
00^{00}-05^{59}	30	61	91	
06^{00}-11^{59}	13	22	35	
12^{00}-17^{59}	27	50	77	
18^{00}-23^{59}	41	59	100	None
Total	111	192	303	
W	28	32	60	
NW	22	41	63	
S	35	53	88	
E	19	29	48	
MW	17	32	49	None
Total	121	187	308	
≤19	5	4	9	
20-24	2	3	5	
25-29	3	9	12	
30-39	2	7	9	
40-49	4	4	8	
50-59	5	7	12	
≥60	4	11	15	None
Total	25	45	70	
M	86	137	223	
F	18	29	47	None
Total	104	166	270	

APPENDIX E

PROJECT PARTICIPANTS

PROJECT PARTICIPANTS

Personnel participating in this project included Dr. E. J. Woodhouse, Principal Chemist, who directed the project, and Mr. R. A. Adams, Associate Chemist, who was responsible for development of analytical/instrumental methods. Assisting on the project were Mrs. S. Reich, Assistant Chemist, Miss J. Huerner, Assistant Chemist, and Mr. S. Graves, Assistant Chemist. Brief resumes and tasks performed by the above personnel are presented below.

Dr. E. J. Woodhouse, Principal Chemist. Dr. Woodhouse was the Project Leader and was responsible for directing the project, maintaining communication between DoT, MRI and the sample supply areas, and directing all project personnel in an effort to achieve the aims and goals of the project. Dr. Woodhouse graduated from Nottingham University, England (B.Sc., 1961; Ph.D., 1964). Dr. Woodhouse was a Postdoctoral Fellow at Oregon State University before joining the staff at Midwest Research Institute in 1967. Since then he has directed the Institute's programs involving drug analysis in body fluids. This has involved method development and application to a wide variety of drugs in body fluids for methadone maintenance programs and community treatment centers. Dr. Woodhouse is Project Leader on programs to develop methods for detecting marihuana smokers and LSD users by body fluid analysis. Another study under his direction involves the identification of illicit drug samples from metropolitan areas such as Kansas City, Missouri; Dayton, Ohio; and New York City. Dr. Woodhouse recently completed two projects for the U.S. Army on detection systems for marihuana and heroin users, and a test kit for marihuana plant material.

Mr. R. A. Adams, Associate Chemist. Mr. Adams assumed responsibility on this project for supervising the thin-layer chromatographic screening procedures and for developing and supervising the gas chromatographic and mass spectrometric techniques employed. Mr. Adams graduated from Kansas State College, Emporia (B.A., 1965) and Kansas City University (M.S., 1969). Mr. Adams has had extensive experience with instrumental analysis research including n.m.r., infrared, near infrared spectroscopy. He has drug analysis experience employing mass spectrometry, gas chromatography, GC/MS, and wet chemical techniques. He worked with R. G. Cooks at Kansas State University on the high resolution AEI MS-9, and is currently assisting Dr. Woodhouse in the GC/MS analysis of drug extracts from street drug formulations. Mr. Adams is initiating studies into the feasibility of determination of the origin of opium poppies using gas chromatographic and mass spectometric techniques.

Mrs. S. Reich, Assistant Chemist. Mrs. Reich was responsible for conducting all extraction and thin-layer chromatographic techniques for the drug screening process. Mrs. Reich graduated from the University of Kansas, Lawrence, Kansas (B.A., 1960, Microbiology). She has worked 5 years as a research assistant at the Kansas University Medical Center, Kansas City, Kansas. Her experience included analytical and clinical chemistry, morphology and physiology of the placenta, and microbial fermentations.

Miss J. Huerner, Assistant Chemist. Miss Huerner was responsible for conducting blood alcohol assays and the gas chromatographic quantitative analyses for drugs in the body fluids. Miss Huerner received a B.A. in Chemistry (1970) from Lake Forest College and the M.S. in Inorganic Chemistry (1972) from Michigan State University. Prior to joining the MRI staff in 1972, Miss Huerner was a research assistant at Michigan State University for a period of 2 years where she did research on the synthesis of fluorophosphines and on low-resolution microwave studies of boron adducts of fluorophosphines. While a student at Lake Forest College from 1966 to 1970, she was a research assistant on a kinetic study of chlorosilanes. Miss Huerner has experience with nuclear magnetic resonance (^{1}H, ^{19}F, ^{11}B, ^{31}P), infrared, ultraviolet-visible, microwave, and mass spectral techniques. Her work at MRI has involved the analysis of drugs of abuse by thin-layer and gas chromatography and immunoassay.

Mr. S. Graves, Assistant Chemist. Mr. Graves was also responsible for conducting blood alcohol assays and the gas chromatographic quantitative analyses for drugs in the body fluids. Mr. Graves received a B.S. in Chemistry from Rockhurst College in 1969, and did graduate work in chemistry at the University of Kansas from 1969-1970. Prior to joining the MRI staff in 1972, Mr. Graves was a Forensic Chemist for 2 years in the U.S. Army at Ft. Gordon, Georgia, and Camp Zama, Japan. His activity included the identification and quantitation of drugs of abuse in dosage form and body fluids which were to be used as evidence in criminal proceedings. Prior to this Mr. Graves was a teaching assistant at the University of Kansas, and a research assistant at Rockhurst College. Mr. Graves specializes in analytical determinations of pharmaceutical preparations and drugs by wet and instrumental techniques. Work in which he has been engaged includes the assay and identification of drugs and impurities of pharmaceutical preparations for cancer chemotherapy. Other projects to which he has contributed are the quantitative determination of meperidine and acetaminophen in blood serum samples.