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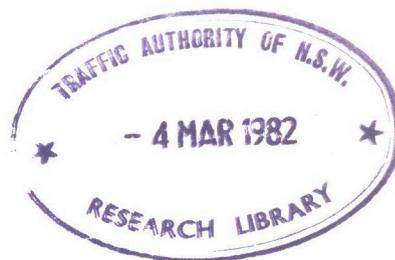
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SPECIAL REPORT SR79/111

BLOOD ALCOHOL LEVELS OF PERSONS
KILLED IN MOTOR TRAFFIC ACCIDENTS

REISSUED AS RESEARCH NOTE,
RN 6/81. DATE 4/8/81.

DEPARTMENT OF MOTOR TRANSPORT
TRAFFIC ACCIDENT RESEARCH UNIT
NEW SOUTH WALES



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ABSTRACT

Coroners' data on blood alcohol concentrations of fatally injured crash victims in New South Wales are examined. Published data from Victoria and Queensland are summarised. It is found that in New South Wales the blood alcohol concentrations of a large proportion of all fatally injured drivers and riders remains unknown. An exact estimate of the proportion of drivers and riders with a blood alcohol concentration above the legal limit of 0.08g/100ml cannot be obtained. However, a range of estimates may be obtained by assuming that the unknown blood alcohol concentrations may all be either above or below the legal limit.

Based mainly on data collected from New South Wales coroners' courts, and supported by data from other States, it is estimated that 30% to 60% of all drivers and motorcyclists who die as a result of a motor traffic crash have a blood alcohol concentration of 0.08g/100ml (.08%) or more.

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1. INTRODUCTION

It cannot be disputed that alcohol plays a large causal role in fatal crashes. The proportion of fatal crashes "caused" by alcohol is, however, a difficult figure to determine.

Most studies carried out in Australia have only examined the blood alcohol levels of people killed in crashes; surviving drivers are quite often not tested for blood alcohol. It is not valid to assume that the blood alcohol levels of surviving drivers are the same as the blood alcohol levels of fatally injured drivers, nor is it valid to assume that fatally injured drivers are always responsible for the crashes. Therefore, armed only with the blood alcohol levels of people killed in crashes, it is not possible to determine the proportion of crashes caused by people who had a blood alcohol concentration above a certain level.

This study examines estimates of blood alcohol levels of persons killed in crashes. The study is divided into two parts, the first examining data collected in New South Wales, and the second examining data collected in Victoria and Queensland.

2. BLOOD ALCOHOL LEVELS OF PEOPLE KILLED IN CRASHES IN NEW SOUTH WALES

Clerks of Petty Sessions with whom depositions are filed by Coroners have been instructed to lodge a quarterly return of data relating to deaths which resulted from road accidents and were reported to Coroners. One of the items of data requested from the Clerks of Petty Sessions is the blood alcohol concentration of people killed in motor vehicle accidents.

In an instruction to the Clerks of Petty Sessions on 16th December, 1970, the Chief Executive Officer of the Petty Sessions Branch of the Department of the Attorney General and of Justice stated "Whilst every effort should be made to supply the whole of the information in respect of each matter, it is appreciated that every detail might not be available in every instance, (e.g., blood alcohol concentration where no blood alcohol test was carried out)".

An examination of blood alcohol data contained in the quarterly returns for the years 1974, 1975 and 1976 indicated that 46% of all traffic crash fatalities were not tested for blood alcohol concentration. A further 5% were tested, but the results were not known. For 1% of the cases it was unknown whether a test was performed.

Telephone conversations with the Coroner's clerk and with a Police Sergeant in the City Coroner's Office, revealed that for all deaths due to mechanical trauma which occurred within 24 hours of the accident (excepting children under seven years, and people who received massive blood transfusions), a sample of blood should be taken for blood alcohol concentration. It was not certain how strictly this practice was adhered to in the country. Examination of crash data has shown that about 10% of people who died as a result of a crash do so after 24 hours, and about 4% of crash fatalities are less than seven years old. It seems unlikely that the remaining 30% of untested crash victims all receive massive blood transfusions.

From notations made on some of the returns from Coroners' Courts it seems that some victims are not tested for blood alcohol because it is believed that they had not been drinking. This would result in a bias among the unknown group towards a lower proportion of alcohol involvement than for the known group. It is also possible that in some cases a deceased person who was known to have been drinking just prior to death may not have been tested in order to protect that person's reputation. This situation could perhaps arise in small rural communities. The extent of biases in the untested group is unknown, and the extreme situation could arise where all of the unknown group had a blood alcohol level of less than .08g/100ml ("0.08%"), or alternatively where all of the group had a blood alcohol level of more than 0.08%.

3. NEW SOUTH WALES RESULTS

(i) All Fatalities

A summary of the blood alcohol information for all traffic crash fatalities for the years 1974, 1975 and 1976 is given in Table 1.

BAC < .08%	951	29.3%
BAC \geq .08%	625	19.2%
UNKNOWN	1671	51.5%
TOTAL	3247	100.0%

TABLE 1: Summary of blood alcohol tests for all traffic crash fatalities for 1974, 1975 and 1976.

If all those whose blood alcohol levels were unknown had a blood alcohol level of less than .08% the proportion of all fatalities with a blood alcohol level of .08% or more would have been $625/3247 = 19.2\%$. If all the unknowns had BAC's of .08% or more, the proportion of all fatalities with a blood alcohol level of .08% or more would have been $2296/3247 = 70.7\%$. Thus the estimate of the proportion of all traffic crash fatalities with a blood alcohol level of .08% or more is a range of between 19.2% and 70.7%.

(ii) Drivers and Riders

An examination similar to that for all fatalities has been made of Coroners' data regarding drivers of motor vehicles and riders of motorcycles for each of the eight quarters ended September 1976, December 1976, March 1977, June 1977, March 1978, June 1978, September 1978, December 1978. Results are given in Table 2.

	BAC < .08%	BAC \geq .08%	UNKNOWN	TOTAL
September 1976	31	39	56	126
December 1976	57	51	55	163
March 1977	61	35	51	147
June 1977	48	30	37	115
Total, year ended June 1977	197	155	199	551

	BAC < .08%	BAC \geq .08%	UNKNOWN	TOTAL
March 1978	46	33	44	123
June 1978	57	33	45	135
September 1978	42	44	45	131
December 1978	25	17	42	84
Total, year ended December 1978	170	127	176	473

TABLE 2*: Blood alcohol levels of drivers and riders killed in crashes.

For the year ended June 1977, 44% of all tested drivers and riders had a blood alcohol level of .08% or more. For the year ended December 1978, the figure was 43%. These results, however, overlook the fact that the untested drivers and riders may have had different blood alcohol concentrations to those of the tested drivers and riders. For this reason, a range of values should be considered.

As before, assuming firstly that all of the unknowns fall in the blood alcohol level category of less than .08%, a minimum estimate for the proportion of drivers and riders with a blood alcohol level of .08% or more may be obtained. Similarly, a maximum estimate may be obtained. The resulting ranges are given in Table 3.

Quarter ending - September 1976	31% - 75%
December 1976	31% - 65%
March 1977	24% - 59%
June 1977	26% - 58%
Year ending - June 1977	28% - 64%

* The time periods listed in Table 2 refer to the periods during which Coroner's returns were submitted, not to the periods during which the fatalities occurred. Thus the 126 fatalities described under the September 1976 quarter may have occurred over a six month period prior to September 1976. The number of returns submitted during the December 1978 quarter was particularly low.

Quarter ending - March 1978	27% - 63%
June 1978	24% - 58%
September 1978	34% - 68%
December 1978	20% - 70%
Year ending - December 1978	27% - 64%

TABLE 3: Estimated ranges for the proportions of drivers and riders killed in crashes with blood alcohol levels greater than .08g/100ml.

Ranges for the eight quarters have been presented separately to illustrate the size of the variations which may be observed from one quarter to the next. The estimated range based on all eight quarters' data is 28% to 64%.

4. BLOOD ALCOHOL LEVELS OF PEOPLE KILLED IN CRASHES IN VICTORIA AND QUEENSLAND

Three fairly large and reasonably representative studies of post-mortem blood alcohol levels in crash victims in Victoria and Queensland have been examined. These studies were carried out by D. Hossack (Victoria)^{1,2}, V. Plueckhahn (Geelong)³ and J. Tonge (Brisbane)⁴.

Hossack claimed his group was "unselected" but it is not known whether victims of, say, urban crashes are over-represented. Hossack's study was conducted in two stages. People who were less than 15 years old or had been admitted to hospital before death were not tested. Results are given in Table 4.

	1970-71	1972-73
Drivers	58%	47%
Passengers	43%	25%
Motorcyclists	5%	13%
Pedestrians	50%	22%
Drivers and Motorcyclists	52%	41%

TABLE 4: Percentages of people killed in crashes in Victoria, with blood alcohol levels of .05g/100ml or more.

Tonge was mainly concerned with Brisbane fatalities, though he did do a small urban/rural comparison which indicated that rural blood alcohol levels were much higher than urban blood alcohol levels. In Queensland those responsible for coronial autopsies are instructed to take blood from all traffic fatalities over the age of 14 years who survive up to 12 hours. Tonge found that in the metropolitan area 65% of all fatalities were being tested, and in the country only 50% were being tested. Tonge stated "Even allowing for those excluded by age, it is apparent that for many victims taken to hospital who survive more than 12 hours the alcohol levels are unknown".

Tonge's study was conducted in three stages. His results are given in Table 5.

	1955-63	1963-68	1968-71
Drivers	50%	53%	52%
Passengers	38%	31%	31%
Motorcyclists	40%	29%	25%
Pedestrians	37%	27%	36%
Drivers and Motorcyclists	47%	50%	49%

TABLE 5: Percentages of people killed in crashes in Brisbane with blood alcohol levels of .05g/100ml or more.

Plueckhahn's study excluded people aged less than 17 years or who died four or more hours after the accident. His results are given in Table 6.

	1967-78
Drivers	49%
Passengers	Not available
Motorcyclists	46%
Pedestrians	56%
Drivers and Motorcyclists	48%

TABLE 6: Percentages of people killed in crashes in Geelong with blood alcohol levels of .05g/100ml or more.

Dr. Ian Johnston⁵ has given the following estimates based on Hossack's and Tonge's figures.

Drivers	50%
Passengers	20 - 25%
Motorcyclists	25 - 30%
Pedestrians	25 - 30%

Dr. Johnston also estimated that one in three of the persons killed in road accidents in Australia in 1975 had blood alcohol concentrations above 0.05 g/100ml ("0.05%").

5. DISCUSSION OF VICTORIAN AND QUEENSLAND RESULTS

The estimates of the proportion of people killed in crashes with a blood alcohol level of .05% or more which have been derived from studies by Hossack, Tonge, and Plueckhahn all assume that the blood alcohol levels of untested people were the same as that of tested people. Since children were not tested in the studies, it is unlikely that this assumption would hold for passengers and pedestrians. The figures given for drivers and motorcyclists are likely to be more reliable, but, since it is not known for certain what biases may have existed among the untested groups, these figures should be treated cautiously.

The main point to be made from Tonge's and Hossack's figures is that there are quite large differences between data from different States, and even within a State the percentage of victims with blood alcohol levels of .05% or more does not remain constant over time.

6. CONCLUSIONS

Based on Coroners' data from New South Wales it has been found that between 28% and 64% of fatally injured drivers and riders had blood alcohol concentrations of .08% or more.

Estimates of the percentage of fatally injured drivers and motorcyclists in Queensland and Victoria with blood alcohol levels of .05% or more ranged from 41% to 52%. Estimates from these States based on the .08% level were not available, but would be lower than those given for the .05% level.

It was found that there were differences between Victoria and Queensland, and thus it is possible that differences would occur between these two States and New South Wales. While the figures from Victoria and Queensland could not be used directly in an estimate of the situation in New South Wales, it is worth noting that they do support the range of figures found in New South Wales.

The range of 28% to 64% found in New South Wales is based on the two extreme cases of (i) all untested drivers and riders being below .08% and (ii) all untested drivers and riders being above .08%. Because it is unlikely that either of these two extreme cases would ever occur, and because figures of 28% and 64% imply a degree of accuracy which does not exist, the limits of the range should be "rounded off".

Therefore, it is estimated that 30% to 60% of all drivers and riders who die as a result of a motor traffic crash have a blood alcohol concentration of 0.08g/100ml or more.

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