The Investigation of Blood Alcohol Levels in 967 Road Accident Fatalities

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This paper deals with the relationship between alcohol and road fatalities in the State of Victoria during the period 1970-1973. If the problem of alcohol is related to the per capita consumption of alcohol, Australia has the greatest problem of all the English speaking countries. The pattern of the problem appears to be the short term effect of explosive drinking over a few hours in the evening and at week-ends. Most workers now accept that the case against alcohol as a major factor in road accidents has been proved.

This series deals with the blood alcohol levels estimated on 967 post-mortems personally conducted on road accident victims. I would like to consider the report in two parts in order to see if there were any significant changes in the blood alcohol picture in road fatalities in the second series after a fairly low-key period of media education of the driving public.

In the first series of post-mortems over a period from June 1970 to May 1971 I performed 400 post-mortems. The breakdown of the different categories is shown in Figure 1. Of 171 drivers killed, 103 (60%) had ingested alcohol. This is a conservative figure as 13 were not tested due to prior hospitalisation.

Figure 1  Breakdown of 400 fatal road accidents.

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Figure 2 shows the blood alcohol levels in the 103 drivers killed. In the State of Victoria driving with a blood alcohol level above 50 mg/100 ml of blood is illegal since evidence indicates that driving skill rapidly deteriorates after this level is reached. In this series of drivers, 50% of the total 171 killed had blood alcohols greater than 100 mg/100 ml of blood. Borkenstein (1) and his fellow workers showed that a level of 160 mg/100 ml of blood was likely to increase the risk of accident to 20 times that of a non-drinker. It will be seen that of these 171 drivers, 38% had blood alcohol levels well above this point.

Figure 3 shows the age of killed drivers and it will be noted that 29% of these were under 25 years of age. It was also found that of the under 25-year-old drivers killed, 78% had a blood alcohol above the legal limit. If 150 mg/100 ml of blood indicates a possible problem drinker, then 58% of drivers under 25 years of age were possible problem drinkers. In the drivers killed in this series, 92% were males and few only of the women drivers had blood alcohol levels above the legal limit.

Analysis of the blood in 119 passengers killed revealed approximately 50% had blood alcohol levels resembling those of the drivers.

Pedestrian deaths revealed approximately 54% with very high blood alcohol levels. It was noted that 69% of pedestrians killed were males and mostly in their sixties and seventies. Alcohol did not appear to be an important factor in killed cyclists or motorcyclists.

The second part of this report covers 567 post-mortems on fatal accidents over the period January 1972 to June 1973 (Figure 4).

Of the 273 killed drivers, 22 had been hospitalised and were not analysed. Of the 251 cases analysed, 46.6% had blood alcohols in excess of the legal limit of 50 mg/100 ml. Figure 5 shows the actual blood alcohol levels in these 127 killed drivers. As in the first series, very few female drivers had blood alcohol levels of a significant degree.
The age distribution of the 273 killed drivers is shown in Figure 6. One hundred and twenty-eight (46.9%) were under 30 years of age. Of 85 killed drivers who were 25 years or younger, 49 (57.7%) had blood alcohol levels greater than 50 mg/100 ml.

Figure 4  Breakdown of 567 fatalities – January 1972 to June 1973.

Figure 5  Blood alcohol levels of 127 drivers who had ingested alcohol and were killed between January 1972 and June 1973.

Figure 7 shows the actual blood alcohol levels in 52 drivers who were 25 years and under. Thus, in this series of 251 killed drivers tested, approximately 27% had blood alcohol levels above 150 mg/100 ml suggesting a possible drinking problem. It was found that approximately 30% of killed drivers under 25 years of age would also have blood alcohol levels suggestive of a drinking problem.

In the other categories of pedestrians, passengers, cyclists and motor cyclists, the pattern of blood alcohol levels was similar to the first series.
Figure 6  Age distribution of 274 drivers killed between January 1972 and June 1973.

Figure 7  Blood alcohol levels in 52 drivers aged 25 years and under.

Figure 8  Breakdown of 967 fatalities – June 1970 to June 1973.
Figure 8 shows the breakdown of 967 post-mortems. Of the 444 killed drivers, 409 were tested for alcohol and 230 (51.8%) had ingested alcohol. Of these 181 (44%) had blood alcohol levels above 100 mg/100 ml. Actual blood alcohol distribution in the 230 drivers, of the total 444, who had ingested alcohol is shown in Figure 9. Of the 444 drivers killed, 203 or 45% were 30 years old or younger (Figure 10).

**DISCUSSION**

If the number of killed drivers in each category of blood alcohol level is expressed as a percentage of the total number of drivers killed in each of the first and second series, it will be seen that there is no significant change in the blood alcohol levels in either group despite the low-key education program in the media.

However, there has been a significant reduction in the death toll and accidents involving casualties in the State of Victoria over the past 3-4 years—a pattern which is not reflected throughout Australia.

From a steadily rising casualty and death toll up to 1970, when the accident casualty rate was 131.9 per 10,000 vehicles registered or 488 casualties per 100,000 of population, the casualties dropped steadily in 1971 and 1972. In 1973 the rate per 10,000 vehicles registered was 96.1 and the casualties per 100,000 of population down to 402.7.

The death rate is equally surprising in that it falls from 8.1 per 10,000 vehicles registered in 1970 to 6.2 per 10,000 vehicles registered in 1973. This was also reflected in the fall of deaths from 30.7 per 100,000 of population in 1970 to 26 per 100,000 in 1973.

It would be tempting to attribute this improvement to the education program aimed at the drinking driver. However, I think the improvement can be explained by
the introduction of compulsory seat-belt legislation. The Royal Australasian College of Surgeons urged the Government to introduce such legislation and this was done in December of 1970. Apart from the reduction in death since then, there has been a notable decline in the number of paraplegics in the State.

CONCLUSION

It is becoming apparent, that if our version of a tribal system is to survive, it will be accompanied by increasing restrictions of personal liberty in relationship to both the environment and to the other members of the community. Such restrictions, regrettably, are required when the community does not voluntarily follow advice for their own safety as well as the safety of the community at large. Evidence now indicates that the drunk driver is far more responsible for the carnage on the roads than are other members of the community. To support this statement, the Department of Transport’s National Highway Safety Bureau reported to the United States Congress that 53% of drivers killed had blood alcohol levels greater than 100 mg/100 ml of blood. This compared with 2% of a similar driving population not involved in accidents. Similar results were found by McCarroll and Haddon in New York City in 1962 (2). Over the past year in Melbourne 54 drivers who collapsed and died whilst driving their cars were found to have significant blood alcohol readings in less than 5% compared with nearly 50% in drivers killed in accidents.

The Trauma Committee of the Royal Australasian College of Surgeons has advised the Government to introduce legislation for the compulsory wearing of seat belts with outstanding success. It has now persuaded the Government to introduce new legislation, so that every victim of an accident over the age of 15 years admitted to the casualty department of hospitals after an accident, has a blood alcohol estimation. The purpose of this is to detect the drunken driver, to manage the patient more thoroughly and to detect those persons with alcohol problems and advise them on proper treatment. In 1974 the Government proposes to introduce legislation to allow traffic police to stop any car at any time and request a puff-bag test to estimate blood alcohol levels.

These new areas of legislation, it is hoped, will, along with seat belts and a 60 mile per hour maximum speed, reduce the carnage on the road even more. It has been found that the public will accept these restrictions willingly if sufficient preparation from respected and authoritative bodies precedes their introduction.

REFERENCES
