A roadside and hospital survey of drinking and driving in Port Moresby, Papua New Guinea

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TRL Report 211

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TRL REPORT 211

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by B L Hills TRL, UK, N Thompson, DOT PNG and F Johnson, C D Posanau, University of Papua New Guinea

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EXECUTIVE SUMMARY

Alcohol has been a growing social problem for over twenty years or more in Papua New Guinea. This paper is concerned with just one aspect of the alcohol problem - Drinking and Driving. This is acknowledged to be a problem in a number of Developing Countries, particularly in non-Muslim countries, but there has been little objective study of the problem. "Road Accidents Papua New Guinea 1992", produced jointly by the Department of Transport and the Royal Papua New Guinea Constabulary, reported that 20% of all casualties occurred in accidents that were classified "Alcohol Suspected", resulting in 58 deaths and 247 casualties hospitalised. A study using 1987/88 statistics estimated alcohol related accidents cost the country some $US5.5 million. Friday and Saturday were the worst two days, with at least a third of accidents during the hours 10pm-2am on Friday and Saturday nights being "Alcohol Suspected". One of the studies of the alcohol problem undertaken by the Faculty of Medicine of the University of Papua New Guinea found that 16 out of 33 driver fatalities had Blood Alcohol Concentrations over 80 mg of alcohol per 100 ml of blood (mg%), the current UK legal limit; also 20 out of 30 pedestrians tested were over 80 mg%.

With the background of growing concern about drinking and driving in Papua New Guinea, it was decided in 1990 to carry out roadside surveys similar to those that had been conducted in the UK and Australia. The work formed part of a program of co-operative road safety research between the Department of Transport and the Transport Research Laboratory, and involved close collaboration with the Port Moresby General Hospital, the University of Papua New Guinea, the Royal Papua New Guinea Constabulary and the Alcohol and Drugs Abuse Sub-Committee of the National Health Education Advisory Committee.

The objective of the surveys was to establish the general levels of alcohol in drivers in Port Moresby (the National Capital) during the weekend night drinking periods, and to compare these with the alcohol levels of drivers and other road users involved in accidents in the same periods. The measurements were carried out at the same time during the hours of the survey - 10pm-2am Thursday, Friday, Saturday and Sunday nights. Three main surveys were planned:

(i) A roadside survey of a sample of drivers in which breath alcohol is measured and a brief questionnaire carried out

(ii) Roadside measurements of the breath alcohol levels of all drivers involved in accidents during those hours

(iii) Measurements of the breath or blood alcohol levels of all drivers, passengers or pedestrians brought into Port Moresby General Hospital during those hours.

In the event, it was found that for those accidents that were attended during the hours of the roadside survey, only two drivers were not injured and were actually breathalysed at the scene of the accident. All the other drivers in the accidents attended were injured and were breathalysed as part of the hospital survey. Newspaper publicity was given to the survey which included the use of a well known national newspaper cartoon character called Grassroots. Also, each driver who took part in the roadside survey was given a serial number and their readings were published in a newspaper the following weekend.

Roadside Survey

Nearly 900 drivers were breathalysed in the roadside survey, with only 2% of drivers who were stopped refusing to take part in the survey. It was found that:

- overall 24% of those drivers breathalysed had Blood Alcohol Concentrations (BACs) exceeding 80 mg%, the UK legal limit. This compares with some 1.5% of drivers in the UK (Sabey et al 1988; Everest et al 1990; Everest et al 1991) and 4% of drivers in Adelaide, Australia (Holubowycz et al 1990) found exceeding 80 mg% in similar roadside surveys. 7% of the drivers had BACs over 190 mg%.

- The percentage of drivers with BACs exceeding 80 mg% was found to be much lower on Sundays (8%) compared with Thursdays (27%), Fridays (29%) and Saturdays (24%).

- If those drivers who estimated that it was less than 20 minutes since their last drink were excluded from the survey (to eliminate any possibility of alcohol still remaining in the mouth at the time of measurement), then the overall figure of drivers exceeding 80 mg% fell from 24% to 17% .

- There was no evidence of different age distributions between the drinking and non-drinking drivers.

- Only 3% of the drivers were female, but 21% of those were found to have BACs exceeding 80 mg%.

Hospital Survey

In the parallel survey conducted at Port Moresby General Hospital, thirty seven casualties from road accidents that occurred during the same times of the week were either breathalysed or had blood samples analysed. It was found that nearly 50% of all the road accident casualties, and 80% of drivers had BACs exceeding 80 mg%.

Conclusion

Despite the many initiatives, alcohol abuse remains a serious social problem in Papua New Guinea. The surveys in this study have shown an extremely high incidence of Drinking and Driving and accident statistics, albeit dependent upon the classification "Alcohol Suspected", suggest that at least 300 people are killed or seriously injured every year as a result of drinking and driving. Many of these casualties are potentially avoidable through a well planned and targeted campaign of countermeasures. The introduction of the breathalyser is probably the most promising countermeasure, although the problems of implementation should not be underestimated. As stated by the then Minister of Transport, the Honourable Anthony Temo, when the results of this survey were first published in newspaper advertisements: "It is hoped that this survey and the preliminary results outlined above will have some educational value for those drivers who took part, and that there will be a reduction in the level of drink/driving so that our roads become safer for everyone to travel on."

A ROADSIDE AND HOSPITAL SURVEY OF DRINKING AND DRIVING IN PORT MORESBY, PAPUA NEW GUINEA

ABSTRACT

Nearly 900 drivers in Port Moresby were breathalysed in a roadside survey that covered the hours of 10pm to 2am over five weekends. Only 2% of drivers stopped refused to take part in the survey. It was found that overall 24% of those drivers breathalysed had Blood Alcohol Concentrations (BACs) exceeding 80 mg%, the UK legal limit. This compares with some 1.5% of drivers in the UK and 4% of drivers in Adelaide, Australia found exceeding 80 mg% in similar roadside surveys. 7% of the drivers had BACs over 190 mg%. The percentage of drivers with BACs exceeding 80 mg% was found to be much lower on Sundays (8%) compared with Thursdays (27%), Fridays (29%) and Saturdays (24%). If those drivers who estimated that it was less than 20 minutes since their last drink were excluded from the survey, then the overall figure fell from 24% to 17% of drivers exceeding 80 mg%. There was no evidence of different age distributions between the drinking and non-drinking drivers. Only 3% of the drivers were female, but 21% of those were found to have BACs exceeding 80 mg%.

In a parallel survey conducted at Port Moresby General Hospital, thirty seven casualties from road accidents that occurred during the same times of the week were either breathalysed or had blood samples analysed. It was found that nearly 50% of all the road accident casualties, and 80% of drivers had BACs exceeding 80 mg%.

1. INTRODUCTION

1.1 DRINKING AND DRIVING IN PAPUA NEW GUINEA

Alcohol has been a growing social problem for more than twenty years in Papua New Guinea. In 1981, Marshall (1982) was able to cite over 90 references on the alcohol problem in Papua New Guinea. In a recent review, Marshall (1990) considers that the country during the eighties "has gone over the brink" and alcohol is now a major social and health problem. He has proposed that a National Alcohol & Drug Abuse Centre be established as soon as possible.

This paper is concerned with just one aspect of the alcohol problem - Drinking and Driving. This is acknowledged to be a problem in a number of Developing Countries (Jacobs, 1982; WHO, 1984), particularly in non-Muslim countries, but there has been little objective study of the problem. In Papua New Guinea, legislation introducing the use of the breathalyser has twice been rejected by Parliament. For the time being, it is therefore necessary to rely upon the assessment "Alcohol Suspected" in police accident reports in attempting to quantify the problem. Whilst this is not ideal, it is generally believed that these accidents classified as "Alcohol Suspected" give an underestimate rather than an overestimate of the real situation. The first analysis of these accidents was published in "Road Accidents Papua New Guinea 1987", produced jointly by the Department of Transport and the Royal Papua New Guinea Constabulary. This reported that 731 accidents during the year were "Alcohol Suspected", resulting in 77 deaths and 309 people hospitalised and these have been estimated to cost the country some $US5.5 million (Marshall 1990). At least a third of accidents during the hours 10pm-2am on Friday and Saturday nights were "Alcohol Suspected". "Road Accidents Papua New Guinea 1992" found 20% of all casualties occurred in alcohol-related accidents. Most casualties in these accidents occurred in the Highlands Region. Friday and Saturday were the worst two days for alcohol related accidents. The highest incidence of alcohol related accidents was Saturday evening.

A number of studies of the alcohol problem have been undertaken by the Faculty of Medicine of the University of Papua New Guinea. Blood alcohol levels are routinely obtained from every fatally injured Road Traffic Accident (RTA) victim arriving at Port Moresby General Hospital. As part of a larger study of road accident fatalities, Sinha et al (1989) have analysed those tests that have been carried out and found that 16 out of 33 driver fatalities who were tested were over 80 mg% and 20 out of 30 pedestrians tested were over 80 mg%. Twelve of the fatalities were over 150 mg%. Posanau (1989) in a study of 188 hospitalised road accident victims concluded that nearly 60% of drivers, 21% of passengers and 27% of pedestrians had consumed alcohol prior to the accident. Johnson (1990) has found in a survey of student and clerical workers in Port Moresby in the age range 20-35 that both groups are moderately involved in both alcohol and drug abuse, especially cannabis.

It is generally believed that weekends on which workers are paid - i.e. every second weekend - result in higher levels of drinking, but the evidence for this in Papua New Guinea is difficult to demonstrate with the public and private sectors tending to pay their employees on alternate weekends.

Hills and Baguley (1993) have compared the variation in accidents by day of week for five Asian countries, including Papua New Guinea. Three of the four other countries (Indonesia, Malaysia and Pakistan) were Muslim, the fourth country being Sri Lanka. Of these countries, Papua New Guinea was the only one to show a strong variation across the week, the authors concluding that this was 'almost certainly associated with the weekend alcohol problem'.

1.2 UK AND AUSTRALIAN SURVEYS

Preliminary roadside surveys by TRL were carried out in two counties in the UK in 1988. The measurements were made between 10pm and 3am at weekends. It was found that 1.7% of drivers were over the UK legal limit of 35µg/100ml BrAC (Sabey, Everest and Forsyth 1988). [A breath alcohol level of 35µg/100ml BrAC is equivalent to a blood alcohol level of 80mg/100ml.] However, it had been previously established that during those hours, over 50% of drivers killed in road accidents were above the UK legal limit (Jones and Everest 1987; TRRL 1989). Because the procedures adopted in 1988 were found to be unsuitable for general application, a revised experimental method was developed in pilot experiments carried out in Wiltshire in 1989 (Everest, Davies and Coffey, 1990). The times for these surveys were between 7pm and 2am. Following the success of the revised procedures, the TRL in 1990 carried out a more extensive roadside survey covering 10 English counties for the hours 7pm to 2am. It was found that 1.0% of the 13,500 drivers tested were over the UK legal limit, although there were considerable variations between counties spread over the range from 0.5% to 1.6% (Everest, Davies and Banks, 1991). Only 0.8% of those drivers approached refused take part in the survey.

A roadside study by the University of Adelaide's Road Accident Research Unit found about 4% of drivers in Adelaide were over the legal limit between 10pm and 3am (Holubowycz et al, 1990). Results of this study and other roadside surveys carried out over a two year period in Adelaide concluded that Random Breath Testing (RBT) alone was not sufficient to reduce drinking and driving; the combined influence of RBT and a well-designed and targeted community education programme would have a greater impact than either alone (Barker et al 1990).

1.3 ACCIDENT RISK AND SUSCEPTIBILITY TO ALCOHOL

Behind these surveys is the considerable body of research throughout the world that has shown that (i) the risk of having an accident rises with the amount of alcohol consumed, but (ii) that there is a wide range in the susceptibility of different drivers to the amount of alcohol they have consumed. This research is summarised in Figure 1, taken from a Transport Research Laboratory leaflet (TRRL, 1986). The figure also shows the relationship between Blood Alcohol Concentration (BAC) and Breath Alcohol Concentration (BrAC).

2. THE PORT MORESBY SURVEYS

2.1 AIM OF THE SURVEYS

With the background of growing concern about drinking and driving in Papua New Guinea, it was decided in 1990 to carry out roadside surveys similar to those conducted in the UK and Australia. The work formed part of a program of co-operative road safety research between the Depart-

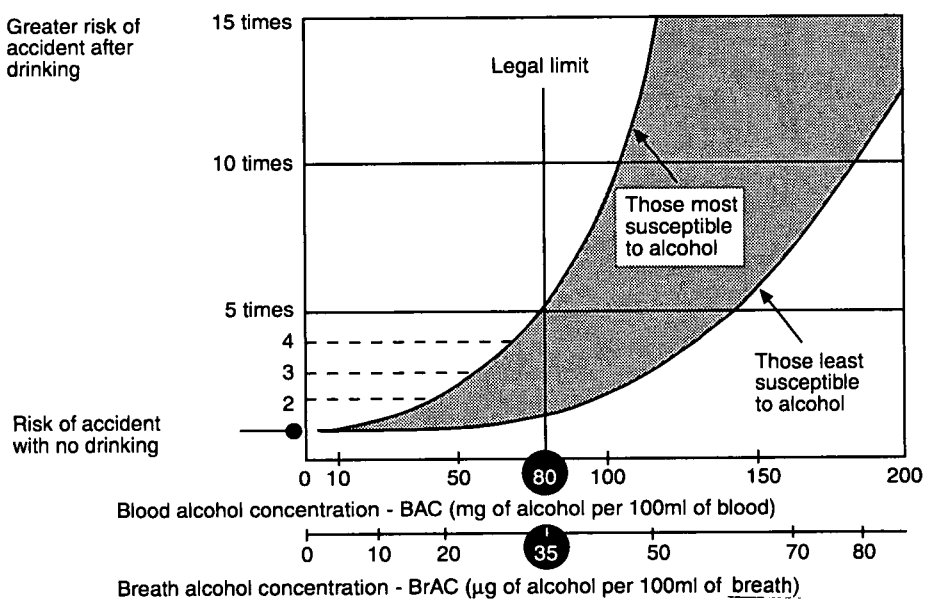


Fig. 1 Summary of research showing the relationship between accident risk and alcohol levels for different degrees of susceptibility to alcohol (TRRL, 1986)

ment of Transport and the Transport Research Laboratory, and involved close collaboration with the Port Moresby General Hospital, the University of Papua New Guinea, the Royal Papua New Guinea Constabulary and the Alcohol and Drugs Abuse Sub-Committee of the National Health Education Advisory Committee.

The original objective of the surveys was to establish the general levels of alcohol in drivers in Port Moresby during the weekend night drinking periods, and to compare these with the alcohol levels of drivers involved in accidents in the same periods. It was intended that three separate sets of measurements would be carried out at the same time during the hours of the survey (10pm-2am Thursday, Friday, Saturday and Sunday nights):

- A roadside survey of a sample of drivers in which breath alcohol is measured and a brief questionnaire carried out
- Roadside measurements of the breath alcohol levels of all drivers involved in accidents during those hours
- Measurements of the breath or blood alcohol levels of all drivers, passengers or pedestrians brought into Port Moresby General Hospital during those hours.

In carrying out the survey, it was found that for those accidents that were attended during the hours of the roadside survey, only two drivers were not injured and were breathalysed at the scene of the accident; all the other drivers in the accidents attended were injured and were breathalysed as part of the hospital survey. Thus, in effect there were just two surveys, the main roadside random survey and the hospital survey.

3. SURVEY TECHNIQUES

3.1 ROADSIDE BREATHALYSER SURVEY

Two different roadside techniques appropriate for use in Port Moresby were considered:

(i) TRL mobile survey method

This method, illustrated in Fig 2, was used successfully by the TRL in its most recent roadside surveys carried out in the UK in 1989 and 1990 (Everest et al 1991). The survey team, using a van, moved the survey point about every hour, usually stopping at a lay-by or similar site where drivers could safely draw off the road. Police were used to wave down vehicles when the next vehicle was required. The interviewers talked to the drivers through their opened driver window, avoiding the need for the drivers to get out of their cars. Spot lights mounted on the roof of the van were used to flood-light the survey point. "Survey Point" signs and cones were used to warn drivers.

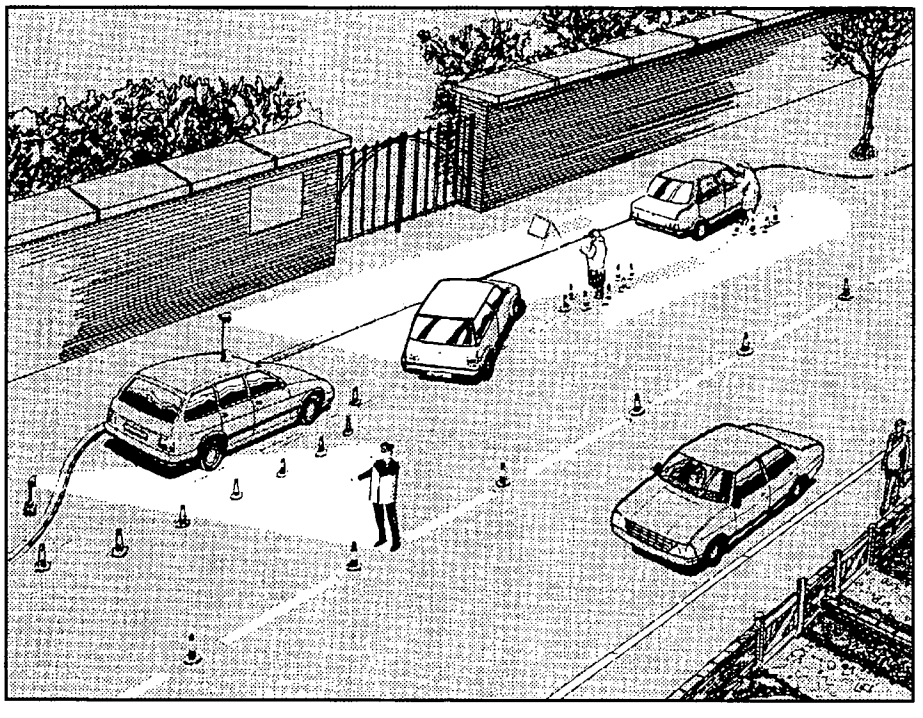


Fig.2 Survey layout developed by TRL for UK alcohol surveys at a typical urban location (from west Everest, Davies and Banks, 1991)

(ii) Adelaide Road Accident Research Unit technique

The main advantages of this technique are that it does not require police intervention and does not disrupt the traffic flow (Holubowycz et al, 1990). Sampling is carried out at intersections controlled by traffic lights. The investigator approaches the driver of the first car to stop at a red traffic light. After explaining the nature of the survey, the driver is asked to give a breath sample and is handed a reply-paid mail questionnaire focusing on drink and driving. The entire procedure requires less than 25 seconds. The investigator is instructed not to read the meter until the car has moved away to avoid ethical issues.

Refusal rates of between 5 and 10 per cent occurred, higher than the 0.8% rate occurring in the UK surveys. An interesting feature of the Adelaide survey technique was that drivers were encouraged to co-operate with the survey by the publication in the following weekend's paper of the BAC's for those drivers who returned their questionnaires, using only the reference number on the questionnaire for identification. "This procedure attracted considerable public interest and hence publicised the survey".

Ethical issues in the Roadside Survey

A road side survey can raise a number of ethical issues which the TRL went to some considerable length to deal with (Sabey et al 1988), especially the problem of what to do with drivers exceeding the legal alcohol limit. This particular problem is largely avoided with the Adelaide technique, whereby the readings are not made until after the car has moved on. This was the procedure adopted for the Port Moresby survey.

Port Moresby technique

It was decided to adopt a mixture of the TRL and Adelaide techniques for Port Moresby. A pool of DOT staff was formed and trained. On any particular night, the survey team consisted of four members of the pool together with a supervisor. Generally two sites per night were used. These sites were selected on the main road network at locations that were considered both safe and where traffic volumes would be relatively large at the time of night concerned.

Usually these were at locations where there was a wide shoulder or a lay-by. The layout of cones and signs was similar to that used by the TRL as shown in Figure 2. However, to avoid the drivers thinking it was a normal police road block, Department of Transport "Survey Point" advance warning signs, flashing lights and good illumination of the survey point itself were used. This enabled the survey team to wave down drivers.

The survey time period was set to be 10pm - 2 am on Thursdays, Fridays, Saturdays and Sundays. Two of the survey team were equipped with Breathalysers and carried out measurements simultaneously. As soon as one of the two breath testers became available to carry out another test, a third member of the team waved down the next vehicle to appear. The survey team were supported by RPNGC police discreetly in the background.

It was agreed that the interviewers should be instructed not to read the Alcolmeter reading until after the driver had driven off, thus avoiding the ethical issues discussed above. The procedure was for the breath tester to approach the stopped driver and read out the following:

> *"Good evening. I am carrying out a survey on drinking and driving for the Department of Transport and Department of Health. I am not from the police and this is voluntary and confidential. I would be grateful if you would help us by blowing into this Alcohol meter."*

After a breath sample had been given, the drivers were asked how old they were and they were asked to estimate how many glasses of beer/wine they had consumed. They were also asked to estimate how long ago it was since they last had a drink; as discussed below, strictly, 20 minutes should have elapsed before a breath sample was taken. The interviewer also noted the sex of the driver and whether or not the driver was a National or Expatriate.

After the interview, the driver was handed a card with a serial number on it (see Figure 3). The serial numbers of each driver Breathalysed with their alcohol readings were published in a national newspaper the following Friday (see Figure 5).

3.2 BREATH SURVEY OF DRIVERS AT THE SCENE OF ACCIDENTS

The survey team was provided with a 2-way radio that kept them in contact with the police. If an accident were reported whilst the roadside survey was being conducted, a member of the team who was also a part-time policeman, would drive to the accident scene. The vehicle used was either the survey team vehicle or the vehicle of the background support police. At the scene, once the police had finished dealing with the driver(s) involved in the accident, the survey team member would invite the driver to take part in the breathalyser survey, emphasising confidentiality. During this, the rest of the team carried on with the roadside survey at a reduced rate of testing.

3.3 HOSPITAL SURVEY

A small group of staff of the Faculty of Medicine in the University of Papua New Guinea (UNPG) have carried out several alcohol studies on patients arriving in the Casualty Department of Port Moresby General Hospital (see Secn 1.1). These studies have included taking blood and breath

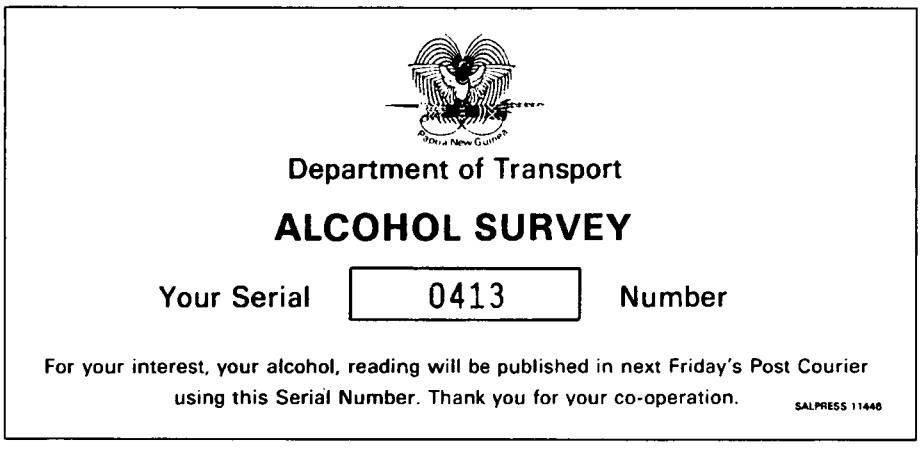


Fig. 3 Example of Alcohol Survey serial number card handed to each driver after taking part in the survey

alcohol measurements and also conducting interview surveys of patients. During the time periods of the Port Moresby roadside surveys, two of the UPNG

group were on call at the Hospital. For the badly injured or fatal road casualties, it was possible to carry out an alcohol analysis during the routine blood tests, as the information was for research purposes only. The less seriously injured casualties were invited to give breath samples. The Hospital survey ran from 11pm to 3am. This was to allow time for the casualties to get from the accident scene to the hospital.

3.4 ALCOHOL MEASUREMENT DEVICES

Both the TRL and Adelaide teams used the Lion Laboratories Alcolmeter S-D2, and this was the same device used by the UPNG team at Port Moresby General Hospital during their own alcohol studies. Six of these devices were acquired for the surveys in this study and the survey teams were trained in their use.

Breathalysers are designed to measure the alcohol content of breath coming from the lungs, this breath alcohol concentration being directly related to the blood alcohol concentration. Any alcohol remaining in the mouth at the time of measurement will clearly lead to false readings and therefore the manufacturers recommend that 20 minutes should elapse between the last drink of alcohol and the breath test. In practice, if 10 minutes have elapsed the error should be negligible.

Although the breathalysers were measuring Breath Alcohol Concentrations (BrAC), the readings on the instruments were calibrated in equivalent Blood Alcohol Concentrations (BAC). The units of BAC are mg of alcohol per 100 ml of blood (mg%) and BrAC are micrograms of alcohol per 100 ml of breath (µg%). The equivalent values between BAC and BrAC are shown in Figure 1.

3.5 PUBLICITY

(i) The local artist, Bob Browne, was commissioned to create a poster for the survey using the Grassroots cartoon character that is very familiar to most Papua New Guineans.

(ii) Quarter-page advertisements incorporating the Grassroots cartoon were taken out in national newspapers two days before and on the first day of the survey (Figure 4). The advertisement was also run in two weekend newspapers.

(iii) A 15-second announcement on television went out two days before and on the first evening of the survey.

(iv) The Press Release issued two days before the survey is given in Appendix A.

During the survey itself, all survey staff both in the roadside tests and in the hospital wore T-shirts with the Grassroots cartoon. The roadside survey staff also wore reflective jackets.

As previously noted, the results of each weekend's survey were published in a national newspaper on the following Friday. An example of the notice is shown in Figure 5.

4. RESULTS

4.1 THE ROADSIDE SURVEY

(i) The sample size

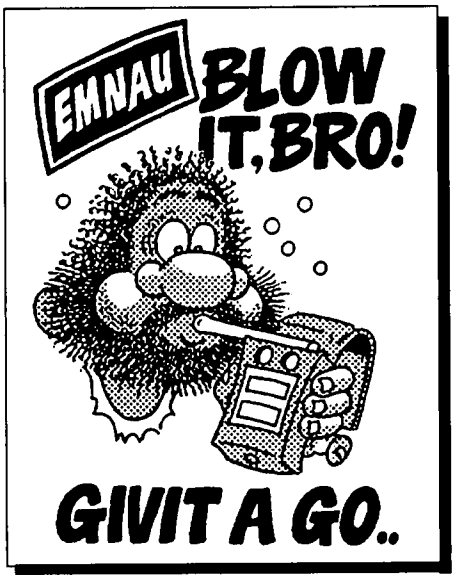
Over 1000 drivers were stopped over the six consecutive weekends of the survey during September and October 1990. Under 2% refused to take part in the survey. Due to calibration problems with a breathalyser, the first week's

Port Moresby

DRIVER ALCOHOL SURVEY

Begins September 21st

Look for this poster:



No names, addresses or vehicle registrations will be recorded.

Your co-operation is requested.

Department of Transport in collaboration with the Department of Health, Port Moresby General Hospital, UPNG and Transport & Road Research Laboratory (UK)

Fig. 4 Public Notice published in a national newspaper immediately prior to the survey

results had to be discarded, leaving a total sample of 893 drivers who gave valid breath tests over the five week period. Of these, 97% were males. Because of the large expatriate community in Port Moresby, it was decided to record whether or not the driver was a National or Expatriate. 110 of the drivers (12%) were Expatriates. Twelve different locations were used.

(ii) BACs by Day of Week

Table 1 and Figure 6 shows the distribution of BACs by Day of Week for the days of the survey. It shows that overall, 24% of the drivers had BACs over 80 mg%, the UK legal limit. 12% had BACs greater than 150 mg% and 4% were greater than 215 mg%. The worst night was Friday night/Saturday early morning, with 29% of the drivers over 80 mg%. Thursday and Saturday nights were only marginally lower with 27% and 25% respectively, but Sunday nights were much lower with 8% of drivers over 80 mg%.

(iii) BACs with the 20 minute criterion applied

As noted in Secn 3.4, it is recommended that 20 minutes should elapse between the last drink of alcohol and the breath test, although in practice, if 10 minutes have elapsed, the error should be negligible. In the Port Moresby roadside survey, it was not practical to ask drivers to wait 20 minutes to ensure that all alcohol in the mouth had dissipated. Therefore, during the survey, the drivers were asked to estimate how long ago it was since their last drink. Whilst these subjective estimates will inevitably be unreliable, they do give some insight into the likely effects of strictly adopting the 20 minute criterion. Table 2 and Figure 7 show analyses of the BAC data with those drivers who estimated it was less than 20 minutes since they had had a drink excluded from the survey. The sample size was then reduced from 893 to 771. There were still 17% of drivers over the 80 mg% level.

Port Moresby

DRIVER ALCOHOL SURVEY

Weekend October 18th 21st, 1990

The Following table shows the results for drivers who gave a positive reading on the breathalyser (Lion Alcolmeter SD-2). Drivers who recorded Zero or had finished their last drink within 10 minutes of the test are not shown The readings give the Blood Alcohol Concentration (BAC) in mg of alcohol per 100m of blood (mg%). Internationally, the most common legal limit is 80 mg%, although in most Australian States the limit is 50 mg%. Fora completely accurate reading, no alcohol should have been consumed within the 20 minutes prior to the test, although, the error is usually quite small if the last drink was consumed 10 minutes prior to the test. Four drivers (2%) refused to take part in this weekend's survey.

Driver Serial Number	575	577	578	580	584	585	586	592	593
BAcreading(mg%)	40	220	15	145	115	145	60	320	35
Driver Serial Number	598	599	600	604	607	609	611	612	615
BAC reading (mg%)	40	80	80	190	90	190	135	30	175
Driver Serial Number	620	621	622	626	627	633	637	638	640
BAC reading (mg%)	185	25	80	80	245	55	35	45	35
Driver Serial Number	642	648	652	654	661	663	669	670	671
BAC reading (mg%)	205	175	180	110	190	290	125	100	10
Driver Serial Number	675	677	678	680	682	686	690	691	701
BAC reading (mg%)	260	140	90	195	150	75	70	125	25
Driver Serial Number	703	705	706	718	721	723	724	725	726
BACreading(mg%)	90	45	130	115	165	115	160	195	190
Driver Serial Number	727	728	731	732	734	737	740	741	742
BACreading(mg%)	140	80	25	180	90	165	60	170	100
Driver Serial Number	743	744	746	747	748	751			
BAC reading (mg%)	180	175	20	25	20	35			

We thank the drivers for their cooperation

Department of Transport in collaboration with the
Department of Health, Port Moresby General Hospital, UPNG and
Transport & Road Research Laboratory (UK)

Fig. 5 Example of a public notice published on a Friday giving the results of the previous weekend's survey

Table 3 and Figure 8 compare the results for "All Drivers" tested in the survey and those that estimated that it was more than 20 minutes since their last drink. It can be seen from Figure 8 that the 20 minute criterion lowers the percentages of drivers in each category equally across the whole range of alcohol readings. If it had been found that the percentages at the high alcohol readings were reduced to a greater extent than at lower readings then this would have raised concern that alcohol in the mouth was a significant problem distorting readings for the "All Drivers" group.

(iv) BACs by Nationality Group

Table 4 and Figure 9 show that there were 33% of Expatriate drivers and 22% of Nationals (Papua New Guineans) with BACs greater than 80 mg%. In considering these data, it must be appreciated that the sampling errors for the Expatriate group is greater since the sample size for this group (110) was much smaller than that of the Nationals (781). The Kolmogorov-Smirnov Test indicates that the differences between the two groups were statistically highly significant ($p<.001$), both with and without the 20 minute criterion applied.

The data also suggest major differences in the drinking habits of the two groups: 66% of Papua New Guinean drivers had not been drinking at all or had very low levels of alcohol (0-5 mg%), whereas for Expatriates, only 30% of drivers had BACs in this range. However, almost 40% of Expatriate drivers had BACs of 10-80 mg%; this sizeable group of drivers would probably consider themselves "social drinkers". Only about 12% of Papua New Guinean drivers had BACs in this range. Almost 22% of Expatriate

TABLE 1

Distribution of Blood Alcohol Concentrations by Day of Week

BAC(mg%)	No of Drivers Thursdays*	Fridays	Saturdays	Sundays	Total
0-5	98	159	154	138	549
10-40	12	23	26	7	68
45-80	16	25	22	2	65
85-115	13	19	19	4	55
120-150	10	19	14	3	46
155-180	7	16	16	2	41
185-215	8	14	9	1	32
>215	9	15	10	3	37
Total	173	290	270	160	893
>80 mg%	27%	29%	25%	8%	24%

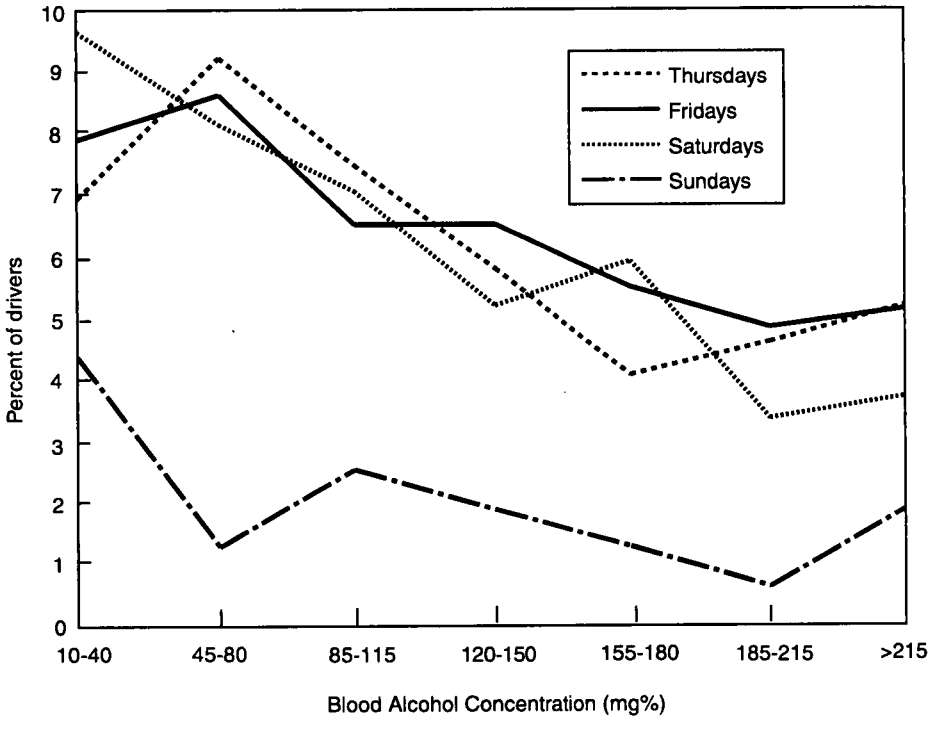


Fig. 6 Distribution of Blood Alcohol Concentrations day of week

drivers had BACs in the range 85-150 mg% compared with 10% for Nationals. There is some evidence in Table 4 and Figure 9 of a rather greater proportion of National drivers who are very heavy drinkers, with 8% of drivers with BACs greater than 180 mg%, whereas the figure is 5% for Expatriates. (The sample sizes for the Expatriates are very small at these high ends of the BAC distributions, and therefore it was not possible to show the differences were statistically significant.)

(v) Self Estimates of Alcohol Consumption

The drivers were asked to estimate how much alcohol they had drunk in the past 12 hours, in terms of bottles of beer, glasses of wine or standard measures of spirit consumed (Figures 10 and 11). It is recognised that there will be inevitable inaccuracies in these estimates for a variety of reasons, and that the data must be treated as such. It will be noted that there is a tendency for drivers to estimate in groups of six beers: 6, 12, 18, or 24 bottles. This reflects the marketing of beer in packs or boxes of 6, 12 or 24 bottles.

TABLE 2

Distribution of Blood Alcohol Concentrations - 20 minutes or more since last drink

BAC(mg%)	No of Drivers Nationals	Expatriates	Total
0-5	514	33	547
10-40	35	10	45
45-80	32	14	46
85-115	27	10	37
120-150	22	5	27
155-180	23	2	25
185-215	20	1	21
>215	21	2	23
Total	694	77	771
>80	16%	26%	17%

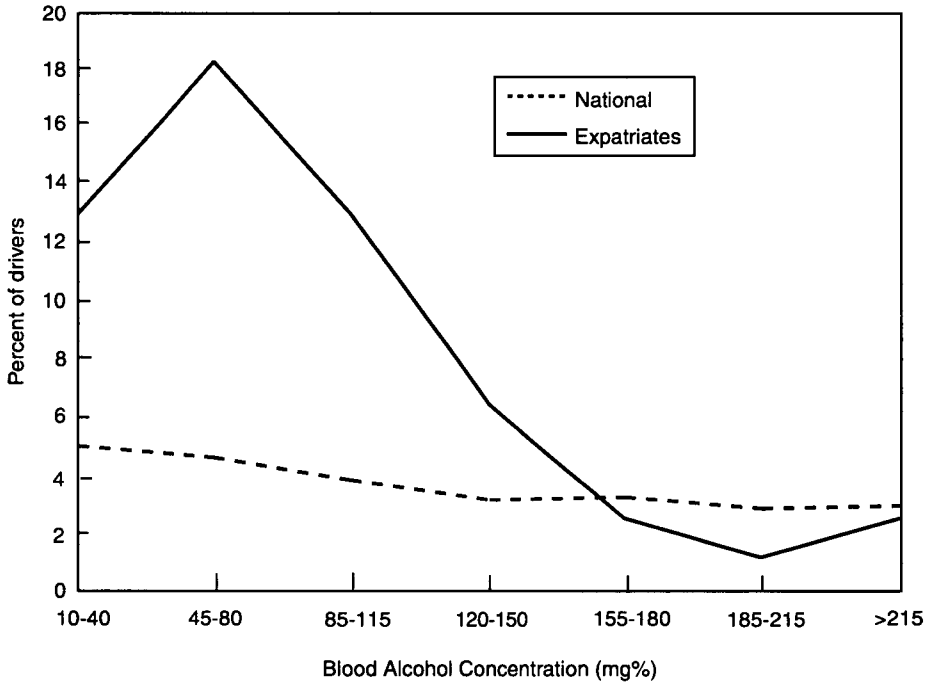


Fig. 7 Distribution of Blood Alcohol Concentrations 20 minutes or more since last drink

In the survey, 60% of drivers stated they had not been drinking at all; this closely corresponds with the breathalyser measurements, in which 61% of drivers were in the range 0-5 mg%. Thirty five percent of all the drivers stated they had been drinking beer, 2% wine and 3% spirits. Fifty two drivers (6%) estimated that they had drunk 12 or more beers. Two drivers estimated they had consumed 12 or more glasses of spirit.

(vi) BACs by Driver Age and Sex

Table 5 and Figure 12 show analyses of the equivalent Blood Alcohol Concentrations against Driver Age. It can be seen that there is no evidence that older drivers or younger drivers are over-represented in those drivers with BACs of more than 80 mg%. In the UK, there is evidence that the heavy drinking driver problem is more prominent amongst older drivers (Everest, Davies and Banks, 1991).

Table 6 shows that only 3% of the drivers who took part in the survey were females. However, Figure 13 suggest that of those female drivers, similar proportions had been drinking heavily as compared with male drivers, with 21% of the female drivers being over 80 mg% compared with 24% of male drivers. However, the small sample sizes in the female

TABLE 3

Comparison of distributions of Blood Alcohol Concentrations for (i) All Drivers Tested and (ii) Drivers who estimated it was more than 20 minutes since their last drink

BAC(mg%)	Percentage of Drivers	
	All Drivers Tested	Drivers >20 mins
0-5	61	71
10-40	8	6
45-80	7	6
85-115	6	5
120-150	5	4
155-180	5	3
185-215	4	3
>215	4	3
Total	100	100
>80	24	17

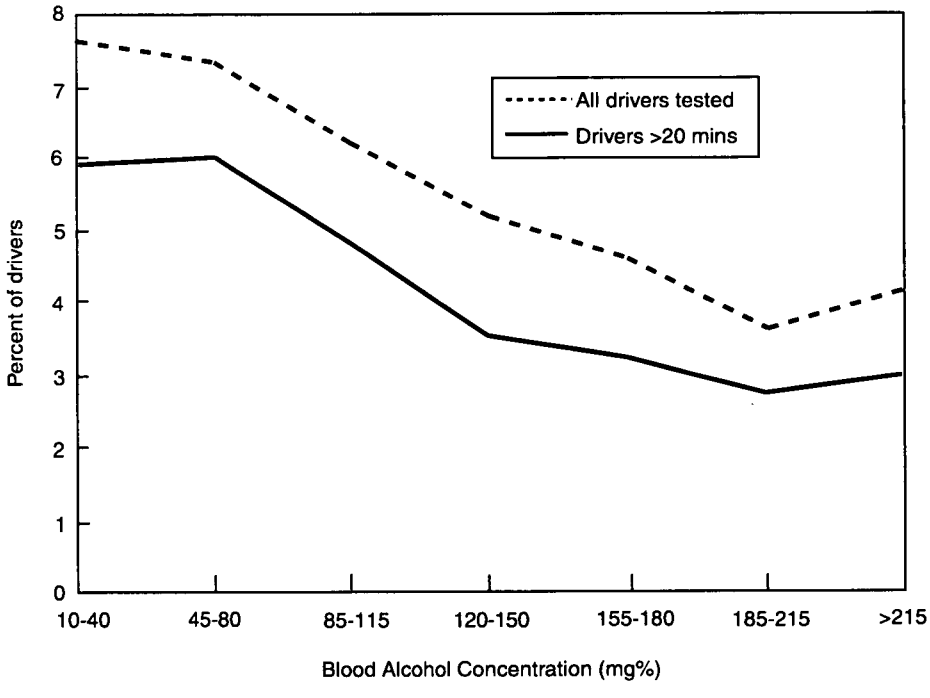


Fig. 8 Comparison of BACs for all drivers and drivers who estimated it was more than 20 minutes since last drink

group make this a tentative conclusion (Kolmogorov-Smirnov Test: Not Significant with $p < .10$). The UK surveys have found a greater incidence of drinking and driving amongst male drivers.

(vii) Comparison with UK surveys

As discussed in Section 1.2, a series of roadside surveys were carried out in the UK in 1988, 1989 and 1990 (Sabey et al, 1988; Everest et al, 1990; Everest et al 1991). The 1988 survey was carried out in two counties and 2,488 drivers were breathalysed. In 1989, 3,373 drivers in Wiltshire were surveyed in a trial using modified procedures. This led to the large scale survey in 1990 covering ten English and Welsh counties and involving 13,476 drivers being surveyed. In 1988, the surveys took place between 10pm and 2am on Thursday, Friday and Saturday nights. The 1989 and 1990 surveys took place on the same nights but between the hours of 7pm and 2am. The Port Moresby surveys were carried out between 10pm and 2am.

TABLE 4

Distribution of Blood Alcohol Concentrations by Nationality

BAC(mg%)	No of Drivers Nationals	Expatriates	Total
0-5	514	33	547
10-40	51	17	68
45-80	41	24	65
85-115	41	14	55
120-150	36	10	46
155-180	36	5	41
185-215	30	2	32
>215	32	5	37
Total	781	110	891
>80	22%	33%	24%

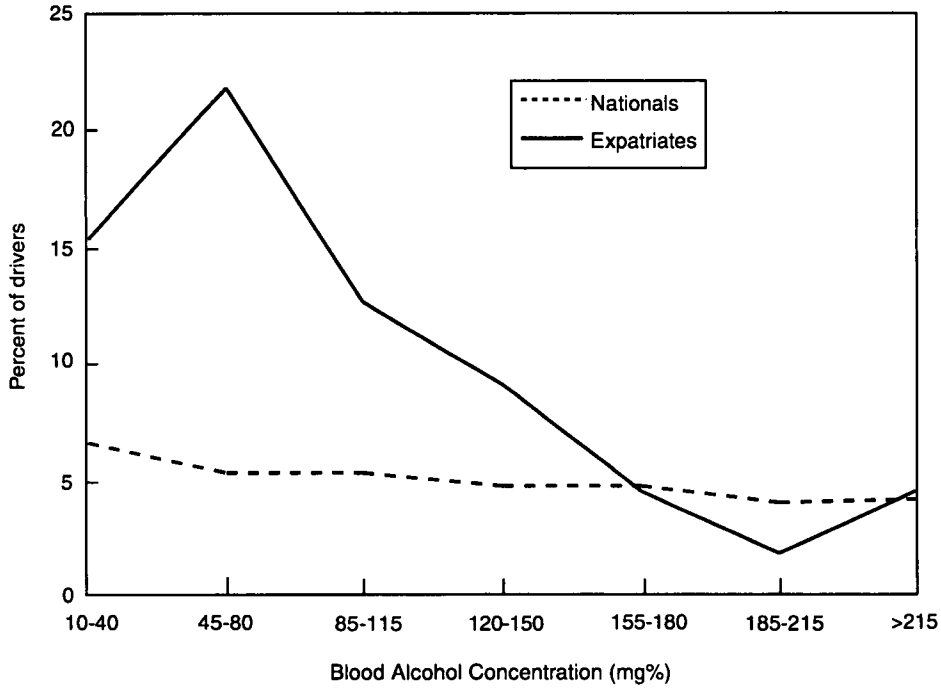


Fig. 9 Distribution of Blood Alcohol Concentrations by nationality

A comparison between these three UK surveys and the Port Moresby survey is shown in Table 7 and Figure 14. There is clearly a huge difference between the proportion of drivers with BACs over 80 mg% (the UK legal limit) in Port Moresby (24%) and in the UK (less than 2%).

The time differences between the surveys will only have a minor effect on the comparison between the countries. For the drivers over the legal limit (80 mg%) in the 1990 UK survey, 28% were recorded between 7pm and 10pm, 36% between 10pm and midnight and 36% between midnight and 2am. For this 1990 UK survey, 6,483 drivers were surveyed between 10pm and 2am. 1.51% of these were over 80 mg% compared with 1.03% for the full sample taken between 7pm and 2am.

4.2 BREATH SURVEY OF DRIVERS AT THE SCENE OF ACCIDENTS

As noted in Section 3.1, in the event it was found that for those accidents that were attended during the hours of the roadside survey, only two drivers were not injured and were actually breathalysed at the scene of the accident. All the

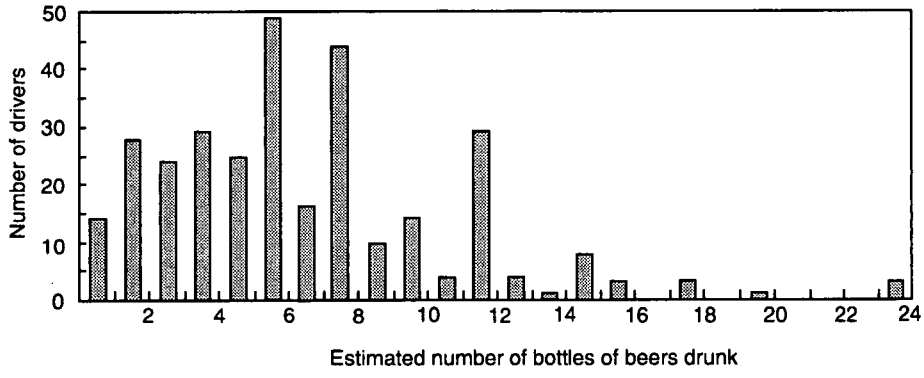


Fig. 10 Drinking drivers - estimated number of beers drunk

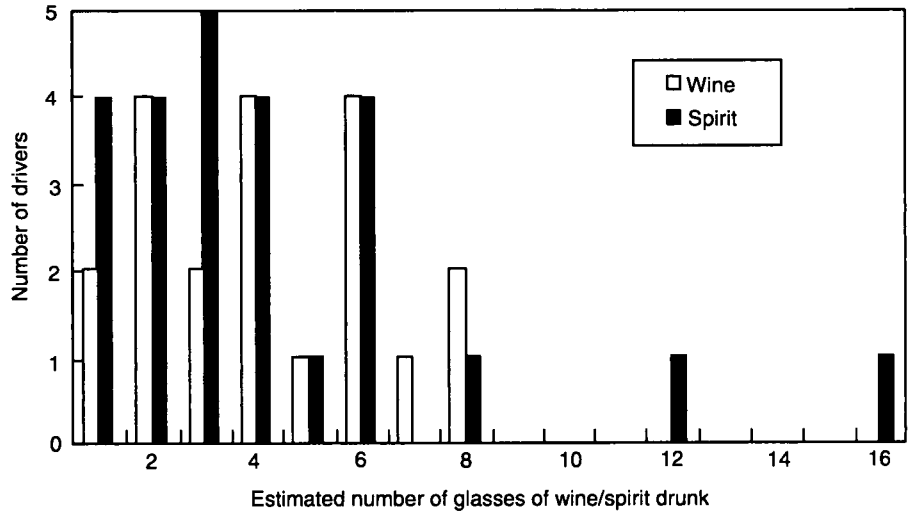


Fig. 11 Drinking drivers - estimated wine and spirit consumption

TABLE 5

Blood Alcohol Concentrations(BAC%) by Driver Age

	BAC(mg%)									
AGE	0-5	10-40	45-80	85-115	120-150	155-180	185-215	>215	Total	>80
0-5	0	0	0	0	0	0	0	0	0	0
6-10	0	0	0	0	0	0	0	0	0	0
11-15	0	0	0	0	0	0	0	0	0	0
16-20	8	2	2	0	0	1	2	0	15	3
21-25	99	12	17	8	7	6	4	4	157	29
26-30	120	20	15	15	11	12	9	8	210	55
31-35	132	11	10	12	8	12	13	11	209	56
36-40	103	10	11	10	12	5	3	9	163	39
41-45	43	8	3	4	2	2	1	2	65	11
46-50	20	3	2	3	2	2	0	2	34	9
51-55	5	0	2	0	0	0	0	0	7	0
56-60	4	1	0	1	0	0	0	0	6	1
61-65	0	1	0	0	1	0	0	0	2	1
66-70	0	0	0	0	0	0	0	0	0	0
71-75	0	0	1	0	0	0	0	0	1	0
>75	0	0	0	0	0	0	0	0	0	0
TOTAL	534	68	63	53	43	40	32	36	869	204

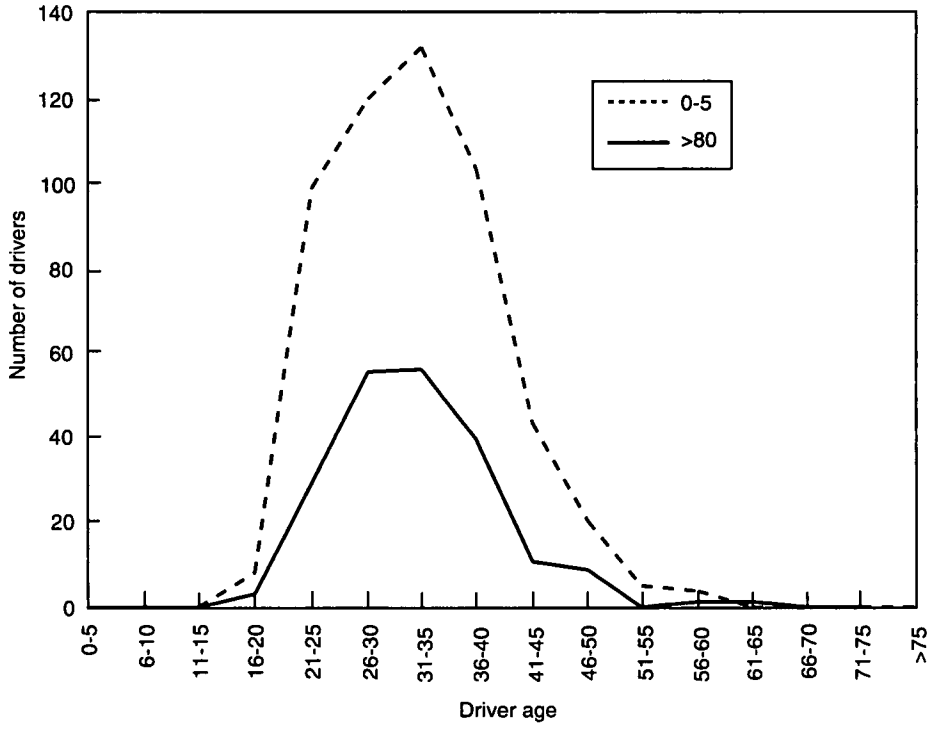


Fig. 12 Comparison of Age distributions for non-drinkers (0-5 mg%) and Heavy Drinkers (>80mg%)

TABLE 6

Blood Alcohol Concentrations(mg%) by Driver Sex

BAC(mg%)	Male	Female	Total
0-5	534	14	548
10-40	62	6	68
45-80	62	3	65
85-115	53	2	55
120-150	44	2	46
155-180	39	2	41
185-215	32	0	32
>215	36	0	36
Total	862	29	891
>80 mg%	204	6	210

other drivers in the accidents attended were injured and were breathalysed as part of the hospital survey. The first driver was a male aged 29 and had a BAC of 205 mg%; the second was a male aged 34 and had a BAC of 130%.

4.3 HOSPITAL SURVEY

The Port Moresby Hospital survey took place over 15 weekends between September and December 1990. Members of the hospital survey team were on call between 10pm and 3am. Breathalyser tests were made or blood samples were taken from a total of 37 casualties: 10 drivers, 23 passengers and 4 pedestrians. Of these, there were 4 blood samples taken from fatal or seriously injured patients. Of the total 37 casualties, there were 2 fatalities, 7 hospitalised and 28 non-hospitalised casualties.

Tables 8 and 9 show that nearly 50% of all the hospital casualties had BACs greater than 80 mg%, this figure rising to 80% for the 10 drivers in the survey. These rates compare with the 24% of drivers for over 80 mg% in the road side survey. Figure 15 compares the distributions of BACs for

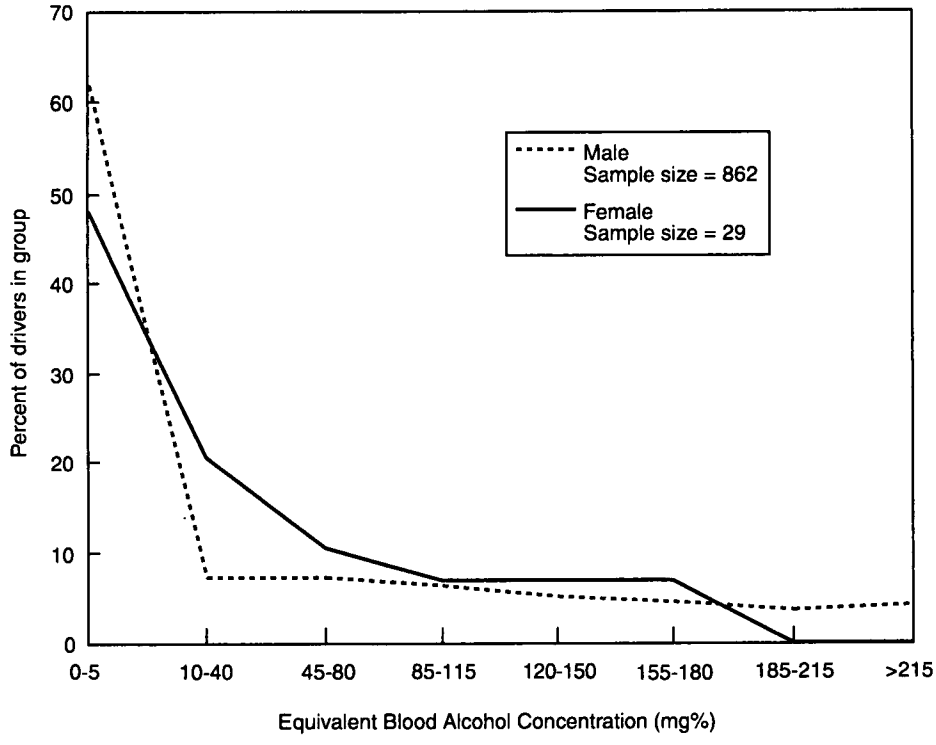


Fig. 13 BACs by Driver Sex (showing percentages of drivers in each group)

TABLE 7

Comparison of Port Moresby and three UK roadside surveys

BAC(mg%)	PNG	Percentage of drivers UK 1988	UK 1989	UK 1990
0-5	61.48	82.72	87.70	88.34
10-40	7.61	11.94	8.66	8.49
45-80	7.28	3.66	2.19	2.14
85-115	6.16	1.00	0.80	0.55
120-150	5.15	0.44	0.44	0.27
155-180	4.59	0.16	0.12	0.11
185-215	3.58	0.08	0.03	0.03
>215	4.14	0.00	0.06	0.07
Total	100.00	100.00	100.00	100.00
>80	23.63	1.68	1.45	1.03

the two surveys, and shows the high proportion of very high BAC readings in the Hospital survey group. Table 10 show that the average number of casualties and accidents fell considerably for the last two months of the survey. The reasons for this are not known, but it may possibly have been the result of increased police roadblocks for crime prevention purposes or the Seat Belt legislation that came into force on October 1st, 1990. Alternatively, it is just possible that the publicity given to the results of the roadside survey in September and October may have affected drinking and driving patterns in the following months (see Section 6).

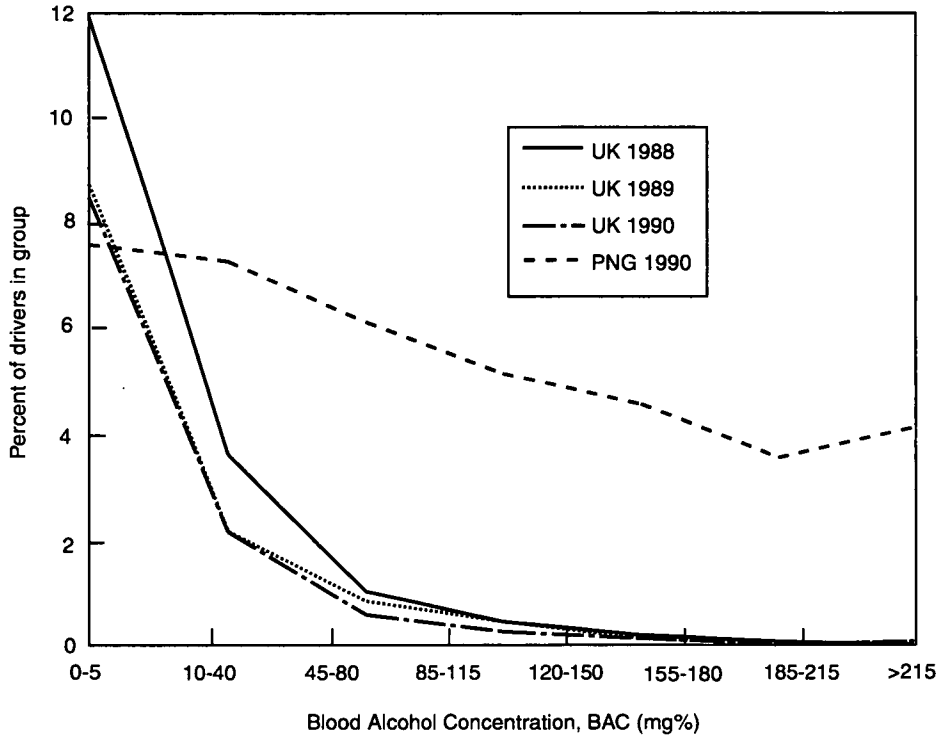


Fig. 14 Comparison of Port Moresby and three UK surveys

TABLE 8

Distribution of Breath and Blood BACs measured in the Hospital survey (road accident casualties)

	0-5	10-40	45-80	85-115	120-150	155-180	185-215	>215	Refused	Total
BAC (Breath)	6	6	4	2	2	4	1	5	3	33
BAC (Blood)						1	2	1		4
Total Hospital	6	6	4	2	2	5	3	6	3	37
Drivers Only		2				2	1	5		10
Pedest'ns Only				1		1	1		1	4

TABLE 9

Comparison of BAC distributuions for Hospital and Roadside surveys (percentages)

	0-5	10-40	45-80	85-115	120-150	155-180	185-215	>215	Refused	Total
All Hospl Casualties	16.2	16.2	10.8	5.4	5.4	13.5	8.1	16.2	8.1	100
Hosp Drivers Only	0.0	20.0	0.0	0.0	0.0	20.0	10.0	50.0	0.0	100
Roadside Drivers	61.5	7.6	7.3	6.2	5.2	4.6	3.6	4.1		100

	Sample size	Percent >80 mg%
All Hospl Casualties	37	49
Hosp Drivers Only	10	80
Roadside Drivers	893	24

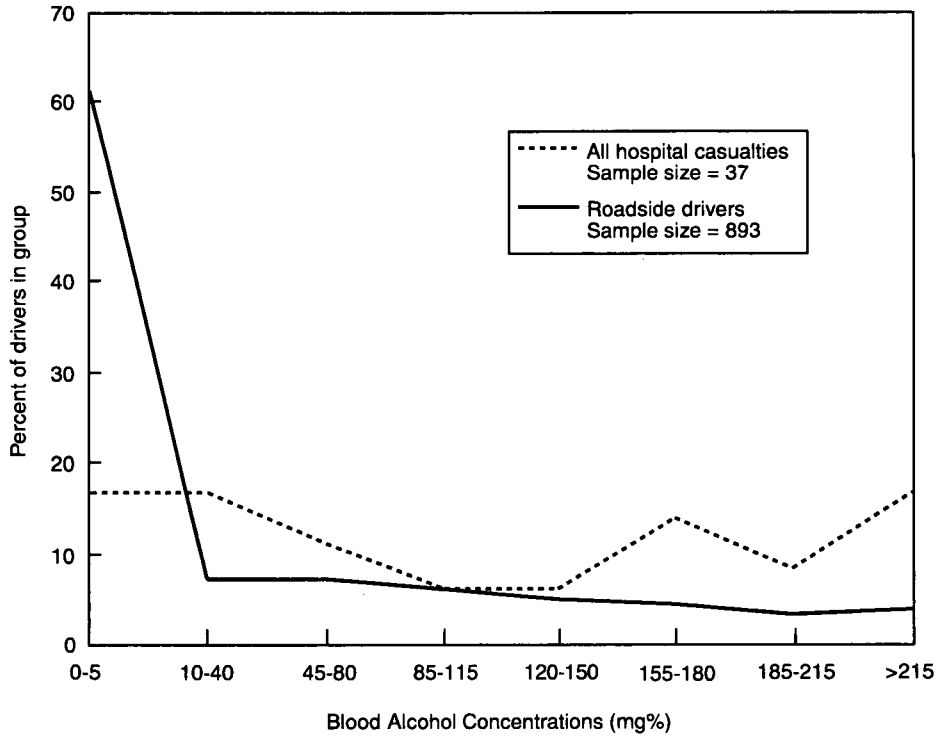


Fig. 15 Comparison of Hospital and Roadside Surveys

5. DISCUSSION

5.1 DRINKING AND DRIVING

The main finding of the roadside survey has been that for the four days, Thursdays to Sundays, between the hours of 10pm and 2am, 24% of drivers in Port Moresby exceed equivalent Blood Alcohol Concentrations of 80 mg%. This is a level of drinking and driving that is an order of magnitude greater than that found in the UK (1.7%) and Adelaide, Australia (4%). The hospital survey also found very high levels of alcohol, with eight of the ten drivers admitted to hospital having BACs over 80 mg% and 50% of all the casualties having BACs over 80%. This survey confirms earlier hospital survey findings of very high levels of alcohol in road accident casualties (see Section 1.1).

Over the 15 weeks of the Hospital survey, there were two fatalities and seven hospitalised casualties amongst the 37 road casualties who were examined in the study. Whilst the road accidents that led to these hospital casualties were tragic events, it is perhaps surprising that there were not more casualties in view of the very high levels of drinking and driving found in the roadside survey. One of the major factors in this is almost undoubtedly the low traffic volumes at night in the city. The relatively low speeds of urban areas compared with rural areas is another factor - it was noted in section 1.1 that the worst levels of 'Alcohol Suspected' casualties are in the Highlands Region, where the roads are predominantly rural. For all Papua New Guinea, 72% of casualties in 'Alcohol Suspected' accidents occurred in rural areas in 1992.

Table 11 shows for the whole year (1990) casualties attributed to Drink and Driving accidents for the National Capital District (greater Port Moresby) and for all of Papua New Guinea. The figures are also shown for passenger casualties who were classified as 'Liquor Affected' (in accidents where the driver was not classified as 'Alcohol Suspected' to avoid double counting). Unfortunately, the current accident report form does not indicate whether or not a pedestrian casualty was affected by alcohol - this is known to be a major problem in the UK. There are other factors that lead to the conclusion that these figures are an underestimate of the effects of alcohol. For example, during the hospital survey, it was noted that a number of the casualties were brought to hospital without notification of the police e.g. two motorcycle casualties. Another significant cause of underestimation is the large incidence of Hit and Run accidents, with 10% of all fatalities and 6% of all casualties occurring in Hit and Run accidents in 1992. There is reason to believe that in a significant proportion of these, the drivers were affected by alcohol.

In 1989, a Policy Submission was made by the Minister for Police to the National Executive Council seeking its 'approval to introduce legislation to empower the Police Force to use Breath Testing and Breath Analysis instruments in connection with drivers who are under the influence of alcohol'. Unfortunately, this was turned down as had a similar proposal in 1985. The Submission was re-intro-

TABLE 10

Casualty and Accident Rates by Month in the Hospital Survey

	Average Number of Casualties per weekend	Average Number of Accidents per weekend
September	4.5	3
October	3.25	2.25
November	1.4	1.2
December	1.75	0.75

TABLE 11

Casualties in 1990 accidents in which Driver 'Alcohol Suspected' or Passenger 'Liquor Affected'

	Fatal	Hospitalised	Non-Hospitalised	Total
1. PORT MORESBY				
Drinking and driving	7	19	57	83
Passenger Liquor Affected	3	8	15	26
2. PAPUA NEW GUINEA				
Drinking and driving	61	210	233	504
Passenger Liquor Affected	8	28	38	74

duced in 1991. Because of their awareness of the Drinking and Driving problem, the Royal Papua New Guinea Constabulary commissioned a series of posters from the National Art School in the NCD, including the excellent "Yu Dring, Yu Drive, Yu Dai" poster (Figure 16); and the Department of Transport commissioned a TV commercial that was regularly shown in 1990/91.

5.2 COMBATING THE PROBLEM OF ALCOHOL ABUSE

As indicated in the Introduction to this report, Drinking and Driving is part of the much wider general problem of alcohol abuse in Papua New Guinea, and there have been a number of initiatives to combat it. Much of the work, particularly in government departments, is co-ordinated by the Department of Health's Alcohol and Drug Abuse Subcommittee of the National Health Education Advisory Committee. Its work includes proposing and drafting amendments to legislation, such as restrictions on the sale of liquor to under 21-year olds, limiting the number of liquor licences, and controls on advertising. It also runs a variety of publicity campaigns and frequently addresses the problem of alcohol abuse in its regular Health News feature in national newspapers. It has sponsored for a number of years the Wokabout Theater Group, which tours villages with plays illustrating the problems that drinking can bring to family life. The plays make considerable use of comedy and are very popular with the villagers. [A video of this is available from the Department of Health.] With the World Health Organisation, the Department of Health commissioned a thorough review of the alcohol problem in Papua New Guinea. Its major conclusion was that a National Alcohol & Drug Abuse Centre should be established as a matter of urgency (Marshall, 1990).

A number of Non-Government Organisations also run campaigns to counter the alcohol problem. For example, the churches in Papua New Guinea collaborate each year in running an Alcohol Awareness Week organised by the Melanesian Alcohol Study Institute. The Women and Law Committee has issued a Public Information Leaflet on the laws about drinking.

The province of Enga has introduced Liquor Bans for periods in 1989 and 1991 to combat the general drinking problem. During the ban, it is reported that there was still a considerable quantity of alcohol drunk in Enga with beer being smuggled across provincial borders. The province also ran a publicity campaign "Operation Moderation" with a video and posters. This was severely criticised in some quarters as it was considered that the publicity did not tackle the fundamental problem of alcohol abuse.

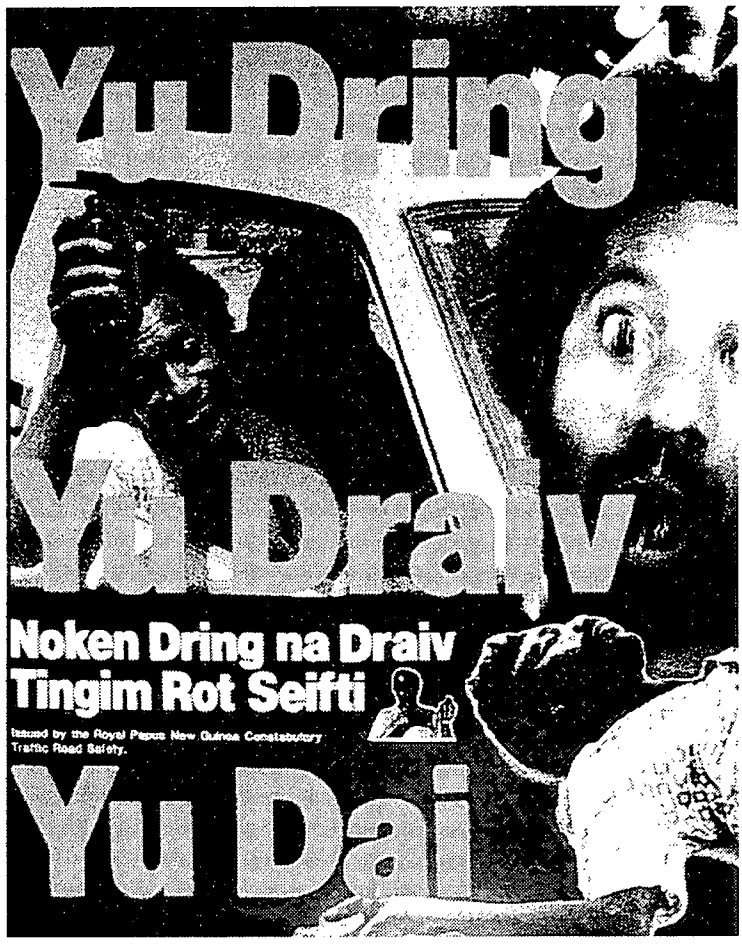


Fig.16 Example of drink drive poster commissioned by the Royal Papua New Guinea Constabulary from the National Art School

6. CONCLUSION

Despite the many initiatives, alcohol abuse remains a serious social problem in Papua New Guinea. The surveys in this study have shown an extremely high incidence of Drinking and Driving and accident statistics, albeit dependent upon the classification "Alcohol Suspected", suggest that at least 300 people are killed or seriously injured every year as a result of Drinking and driving. Given the total fleet size of only 50,000 vehicles, these are alarming levels of injury. Many of these casualties are potentially avoidable through a well planned and targeted campaign of countermeasures. The introduction of the breathalyser is probably the most promising countermeasure, although the problems of implementation should not be underestimated, including the need for close supervision and calibration of the instruments. Perhaps the greatest need is for there to be a change of attitude to Drinking and Driving in Papua New Guinea. A major change in attitudes has come about in a number of developed countries in recent years, with groups of young people regularly appointing one of their number to be the driver and avoid drinking alcohol for the evening. This change has been brought about through the combination of Enforcement, Education and Publicity programmes over many years. Such a concerted programme should become a very high priority in Papua New Guinea.

As stated by the then Minister of Transport, the Honourable Anthony Temo, when the results of this survey were first published in newspaper advertisements in November 1990, "It is hoped that this survey and the preliminary results outlined above will have some educational value for those drivers who took part, and that there will be a reduction in the level of drink/driving so that our roads become safer for everyone to travel on."

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8. ACKNOWLEDGEMENTS

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APPENDIX A: EXTRACT FROM PRESS RELEASE

"The Department of Transport in collaboration with the Department of Health, Port Moresby General Hospital and the Transport & Road Research Laboratory (UK) will begin a survey of driver breath alcohol levels on Friday 21st September. The purpose of the survey is to establish the actual levels of breath alcohol among the general driving population. The survey will also include drivers who are involved in accidents and also road casualties admitted to hospital. No names, addresses or vehicle registrations will be recorded and the information obtained will be confidential. At the time of the survey, drivers will be issued with a serial number; they will be able to check their breath alcohol reading in the following Friday's Post Courier using this serial number. Participation in the survey is voluntary, but everyone's co-operation is requested and would be appreciated. It is expected that the survey will last about six weeks."