

**LATE NIGHT DRINK DRIVING IN ADELAIDE TWO YEARS
AFTER THE INTRODUCTION OF THE 0.05 LIMIT**

Kloeden CN and McLean AJ

**NHMRC Road Accident Research Unit
The University of Adelaide**

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EXECUTIVE SUMMARY

The legal blood alcohol limit for drivers in South Australia was lowered from 0.08 to 0.05 g/100mL on 1 July 1991. The effect of this change on late night drink driving was assessed by two roadside breath alcohol surveys, one before and one after the reduction in the legal limit. The current survey was conducted in 1993 to gauge the effect two years later. The surveys were conducted from 10pm to 3am by the NHMRC Road Accident Research Unit in a similar manner to six previous surveys over the previous 15 years.

A small reduction in drink driving, both legal and illegal, was found after the lowering of the limit in 1991. Two years later, in 1993, the level of drink driving had continued to decrease and was at the lowest level observed in the seven years of observation during the roadside surveys.

Seatbelt usage by both drivers and passengers was around 97% in 1993, the highest level observed since 1987 when recording of seatbelt usage first began in the roadside surveys.

INTRODUCTION

The NHMRC Road Accident Research Unit (RARU) has been carrying out late night roadside breath alcohol surveys in Adelaide since 1979 to monitor the rates of drinking and driving at both legal and illegal levels and to evaluate the effects of random breath testing by the police (McLean, Clark, Dorsch, Holubowycz and McCaul, 1984; McCaul and McLean, 1990; McLean, Kloeden and McCaul, 1991). In early 1991, a survey was conducted for 3 months as part of the on-going monitoring of the blood alcohol concentrations of Adelaide night time drivers (Kloeden and McLean, 1992). At that time the legal blood alcohol limit was 0.08 g/100mL but was changed to a new limit of 0.05 on 1 July 1991. A second survey was conducted in the latter half of 1991 to assess the immediate effects of the new limit on drinking and driving in the general night time driving population (McLean and Kloeden, 1992).

It was found that there was a reduction in drink driving at all levels of blood alcohol concentration soon after the lowering of the limit. However, the data suggested that the effect was decreasing with time after the lowering of the limit. It was recommended at the time that another survey be conducted at a later stage to examine the longer term effects of lowering the limit.

With this in view, the South Australian Department of Transport Office of Road Safety commissioned the NHMRC Road Accident Research Unit to conduct a followup survey in 1993. This paper reports the results of that survey and compares it with the previous surveys in 1991 in an attempt to establish the longer term effects associated with the introduction of the new blood alcohol limit for drivers.

Further surveys are also planned at two year intervals to continue the monitoring of drinking trends in the Adelaide driving population. Consequently, this survey can also be taken as part of a long term series beginning in 1979 and extending into the future.

METHOD

The procedure used to obtain breath samples from a representative sample of Adelaide drivers in the 1993 Survey was the same as that which had been used since 1979 (Holubowycz, McLean and McCaul, 1991). Twenty intersections controlled by traffic signals were visited by two teams of RARU research assistants on a rostered basis. The first driver to stop at a red light was approached and asked to blow into a hand-held breath alcohol meter (a Lion Laboratories Alcolmeter SD-2). The sex of the driver was recorded, together with his or her estimated age group (under 21 years / 21-29 / 30-50 / over 50). Data on seatbelt use of the driver and passenger and the number of occupants of the vehicle were also recorded. The driver was also given a reply-paid questionnaire to fill out and mail back. Testing continued at each survey site for approximately 40 minutes after which the team would move to the next site.

Sampling was conducted between the hours of 10pm and 3am, allowing each team to test drivers at five different survey sites per night. Every Thursday, Friday and Saturday night was sampled and two of the remaining four nights each week on a rotating schedule.

The 1991 Pre-0.05 survey ran from 14 February to 21 May and the 1991 Post-0.05 survey ran from 8 August to 2 December. The Easter period (27 March to 3 April) was not included in the Pre-0.05 survey and the Australian Formula One Grand Prix period (23 October to 6 November) was not included in the second due to possibly atypical drinking patterns during these times. The 1993 survey ran from 18 February to 6 June and again excluded the Easter period (8 April to 14 April).

The twenty sites used in the surveys were the same as those used in previous roadside surveys conducted by RARU in Adelaide. They were at intersections on major roads and were selected so that no site was near an hotel or licensed premises, thus reducing the chance of testing a driver whose BAC might be overestimated because of the presence of mouth alcohol.

The BAC distributions were weighted on a daily and hourly basis to allow for varying traffic flows. A correction was also made to allow for the estimated BACs of drivers who refused to provide a breath sample, using a method developed by Carlson (Wolfe, 1973; Carlson, 1979). All percentages presented in this paper have been weighted and corrected in this manner. Ninety-five per cent confidence intervals were then calculated for the

weighted and corrected percentages using the delta method (Bishop, Fienberg and Holland, 1975). These confidence intervals enable a conservative assessment to be made of the statistical significance of differences in percentages.

RESULTS

Table 1 shows the number of drivers approached during the course of the three surveys along with the number and percentage who refused to give a breath sample.

Table 1
Number of drivers approached for a breath sample
and refusal rates for each of the surveys

Survey Period	Number Approached	Number Refused	Refusal Rate (%)
1991 Pre-0.05	6789	358	5.3
1991 Post-0.05	7162	350	4.9
1993	7841	350	4.5

In 1993, 1.5% of drivers were at or above the old legal limit of 0.08, 3.5% were at or above the current legal limit of 0.05 and 17.3% of drivers had been drinking (Tables 2, 3, 4). When comparing the results of the survey conducted in 1993 with the survey in 1991 before the limit was lowered, this represents a relative reduction in illegal drink driving of 32.7% in terms of the limit of 0.05 and 38.2% based on 0.08. The proportion of drivers who had been drinking any alcohol decreased by 14.1%. All of these reductions were statistically significant at the 5% level.

In the survey conducted in 1993 there was a reduction in the proportion of drivers at each of these BAC levels in all but one of the demographic and temporal subdivisions of the data shown in Tables 2, 3 and 4.

Drinking Drivers

Sex of Driver

As in previous surveys, male drivers in 1993 were more likely to have been drinking than were female drivers (18.9 and 14.3% respectively). However, when comparing the 1993 survey with the pre-0.05 survey in 1991 the reduction in the proportion of drinking drivers was greater for males than for females. Because the drinking and driving rate for

males appears to be falling more rapidly than the rate for females (the reduction in the latter was not statistically significant) there is now only a proportional difference of 32% in the male and female rates, compared to 43% in early 1991.

Table 2
Comparing the percentage of drivers with a positive
blood alcohol concentration before and after the
introduction of the 0.05 limit, Adelaide, 1991-93
(weighted and corrected for refusal bias)

Group	1991 Pre-0.05			1991 Post-0.05			1993			% Change
Total	19.16	20.18	21.19	16.61	17.59	18.56	16.44	17.33	18.23	-14.1
Male	21.11	22.42	23.73	18.13	19.37	20.62	17.72	18.86	19.99	-15.9
Female	14.10	15.66	17.22	12.14	13.65	15.16	12.87	14.29	15.71	-8.7
under 21	11.87	14.67	17.47	10.27	13.42	16.56	5.93	8.35	10.77	-43.1
21-29	18.19	20.02	21.85	15.65	17.55	19.44	16.23	17.95	19.67	-10.3
30-50	20.56	22.24	23.92	17.61	19.17	20.74	17.52	18.79	20.05	-15.5
over 50	14.97	17.11	19.26	12.86	14.84	16.81	11.68	14.21	16.73	-16.9
10pm-11pm	14.54	16.19	17.83	13.02	14.64	16.27	12.60	14.08	15.56	-13.0
11pm-12am	16.55	18.45	20.35	14.11	15.93	17.74	16.09	17.82	19.56	-3.4
12am-1am	23.17	25.69	28.20	20.42	22.90	25.38	18.35	20.61	22.87	-19.8
1am-2am	24.23	27.41	30.59	17.59	20.50	23.40	16.67	19.14	21.61	-30.2
2am-3am	21.52	24.89	28.25	20.86	24.43	28.00	16.99	19.85	22.70	-20.2
Monday	14.58	18.05	21.53	12.94	16.17	19.39	10.89	13.53	16.17	-25.0
Tuesday	13.19	16.15	19.11	13.95	17.31	20.67	13.81	16.51	19.21	+2.2
Wednesday	19.45	22.73	26.01	12.35	15.48	18.60	12.59	15.20	17.81	-33.1
Thursday	20.11	22.62	25.13	19.16	21.52	23.88	16.07	18.00	19.94	-20.4
Friday	19.93	22.05	24.18	19.25	21.42	23.60	19.84	21.87	23.90	-0.8
Saturday	19.39	21.41	23.43	15.79	17.67	19.55	16.59	18.54	20.48	-13.4
Sunday	14.62	17.93	21.25	9.15	11.98	14.80	10.73	13.77	16.81	-23.2

Note: Small numbers indicate the 95% confidence limits of the percentages
 % Change is change from 1991 Pre-0.05 to 1993

Age of Driver

The percentage of drivers who had been drinking in 1993 ranged from 8.4% for those aged less than 21 years of age to 18.8% for those in the 30 to 50 year age group and 14.2% for those drivers over 50 years of age (Table 2). The relative reduction from the corresponding percentages in the pre-0.05 survey in 1991 was greatest for the under 21 year olds (43.1%) although the other age groups also showed reductions.

Time of Day

The peak times for drinking in 1993 continued to be the hours after midnight. The biggest relative reductions (up to 30%) since the pre-0.05 1991 survey were also after midnight and so the difference between 10pm to 12am and 12am to 3am decreased.

Day of Week

The latter part of the week (Thursday to Saturday nights) had a higher percentage of drinking drivers than did the rest of the week. The statistically significant relative reductions from the pre-0.05 1991 survey (33.1 and 20.4%) occurred on Wednesdays and Thursdays respectively. The sole increase in any of the comparisons listed in Table 2 occurred on Tuesday but this result was clearly not statistically significant nor was it particularly meaningful.

Drivers At or Above 0.05

In 1993, 3.5% of drivers were at or above the current legal limit of 0.05 (Table 3). This represents a statistically significant relative reduction of 33% from the 1991 pre-0.05 survey. Further, all subcategories showed reductions in 1993 from the pre-0.05 1991 survey.

Sex of Driver

The proportion of male drivers at or above the 0.05 limit was still greater than for female drivers in 1993. However, the drop since the 1991 pre-0.05 survey was much greater for males than for females (37% vs 14%) so that the proportions for the two sexes appear to be converging.

Age of Driver

The largest reductions in the proportion of drivers at or above 0.05 from the 1991 pre-05 survey to the 1993 survey were among those aged less than 21 years and those aged over 50. Both of these reductions were over 50% and left the proportion of drivers at or above 0.05 in these groups less than half of that for those in the 21-50 year old group.

Time of Day

The largest reductions (of about 40% in relative terms) between the 1991 pre-0.05 survey and the 1993 survey were observed after midnight. However, there is still a steadily increasing percentage of drivers at or above 0.05 from 10pm to 3am with the rates varying from 2.6% from 10pm to 11pm to 6.0% from 2am to 3am.

Table 3
Comparing the percentage of drivers with a blood alcohol concentration ≥ 0.05 g/100mL before and after the introduction of the 0.05 limit, Adelaide, 1991-93 (weighted and corrected for refusal bias)

Group	1991 Pre-0.05			1991 Post-0.05			1993			% Change
Total	4.55	5.14	5.73	4.07	4.58	5.10	3.04	3.46	3.88	-32.7
Male	4.85	6.10	7.36	4.66	5.35	6.03	3.30	3.85	4.40	-36.9
Female	2.41	3.15	3.90	2.17	2.88	3.59	2.06	2.70	3.34	-14.3
under 21	2.45	4.00	5.56	1.49	2.99	4.49	0.23	1.71	3.19	-57.3
21-29	5.10	6.18	7.25	4.09	5.22	6.36	3.09	3.93	4.77	-36.4
30-50	3.95	4.79	5.63	3.75	4.53	5.30	3.20	3.82	4.44	-20.3
over 50	2.64	3.74	4.84	2.46	3.50	4.54	0.88	1.72	2.57	-54.0
10pm-11pm	2.75	3.77	4.78	1.95	2.70	3.44	1.90	2.57	3.25	-31.8
11pm-12am	3.16	4.11	5.05	3.06	4.05	5.05	2.32	3.10	3.87	-24.6
12am-1am	5.68	7.22	8.76	5.38	6.92	8.47	2.89	3.97	5.05	-45.0
1am-2am	6.29	8.27	10.25	5.22	7.15	9.08	3.61	4.95	6.28	-40.1
2am-3am	7.35	9.81	12.26	7.84	10.67	13.50	4.24	5.96	7.68	-39.2
Monday	2.55	4.52	6.50	3.35	5.38	7.42	1.18	2.31	3.45	-48.9
Tuesday	2.13	3.66	5.18	2.15	4.00	5.85	1.26	2.36	3.45	-35.5
Wednesday	4.81	6.70	8.58	3.28	5.16	7.03	2.42	3.84	5.25	-42.7
Thursday	5.13	6.65	8.16	4.49	5.85	7.20	3.24	4.24	5.24	-36.2
Friday	3.76	4.87	5.98	4.08	5.30	6.52	3.42	4.42	5.42	-9.2
Saturday	5.13	6.33	7.52	3.91	4.99	6.06	2.91	3.85	4.79	-39.2
Sunday	2.81	4.65	6.48	1.53	3.06	4.60	0.94	2.26	3.57	-51.4

Note: Small numbers indicate the 95% confidence limits of the percentages
 % Change is change from 1991 Pre-0.05 to 1993

Day of Week

The distribution of drivers at or above 0.05 by day of week in the 1993 survey was similar to that for all drinking drivers. Although there were reductions on all days from the 1991 pre-0.05 survey the only statistically significant reduction was on Saturday with a 40% reduction.

Drivers At or Above 0.08

In 1993, the proportion of drivers at or above the previous legal limit of 0.08 was 1.5%. This represents a statistically significant relative reduction of 38% from the 1991 pre-0.05 survey. All of the subcategories in Table 4 also showed reductions, many in the 50% range.

Table 4
Comparing the percentage of drivers with a blood alcohol concentration ≥ 0.08 g/100mL before and after the introduction of the 0.05 limit, Adelaide, 1991-93 (weighted and corrected for refusal bias)

Group	1991 Pre-0.05			1991 Post-0.05			1993			% Change
Total	2.04	2.46	2.88	1.77	2.13	2.48	1.23	1.52	1.80	-38.2
Male	2.44	2.96	3.49	2.07	2.54	3.01	1.37	1.75	2.13	-40.9
Female	0.91	1.39	1.87	0.62	1.05	1.48	0.63	1.01	1.38	-27.3
under 21	0.61	1.44	2.27	0.38	1.21	2.03	0.00	1.21	2.60	-16.0
21-29	2.15	2.89	3.64	1.61	2.46	3.32	0.99	1.51	2.03	-47.8
30-50	1.81	2.41	3.02	1.48	1.99	2.49	1.37	1.81	2.25	-24.9
over 50	1.04	1.82	2.60	0.78	1.39	2.00	0.15	0.70	1.25	-61.5
10pm-11pm	0.92	1.60	2.28	0.44	0.86	1.28	0.74	1.21	1.69	-24.4
11pm-12am	1.42	2.11	2.80	1.47	2.23	2.99	0.85	1.36	1.88	-35.5
12am-1am	2.10	3.13	4.17	2.84	4.10	5.37	0.94	1.63	2.33	-47.9
1am-2am	2.95	4.43	5.91	2.31	3.77	5.24	1.21	2.01	2.82	-54.6
2am-3am	3.60	5.49	7.38	2.49	3.96	5.43	1.50	2.56	3.61	-53.4
Monday	0.82	2.14	3.46	1.87	3.57	5.27	0.23	0.90	1.57	-57.9
Tuesday	0.83	1.94	3.04	0.15	1.15	2.16	0.33	1.09	1.85	-43.8
Wednesday	1.77	3.08	4.38	1.86	3.42	4.98	0.68	1.65	2.62	-46.4
Thursday	2.08	3.13	4.18	1.54	2.41	3.28	1.50	2.21	2.92	-29.4
Friday	1.64	2.43	3.21	1.63	2.40	3.17	1.46	2.17	2.88	-10.7
Saturday	1.94	2.76	3.57	1.65	2.42	3.18	0.77	1.33	1.90	-51.8
Sunday	1.38	2.79	4.19	0.29	1.32	2.36	0.02	0.86	1.70	-69.2

Note: Small numbers indicate the 95% confidence limits of the percentages
 % Change is change from 1991 Pre-0.05 to 1993

Sex of Driver

The relative reduction in the proportion at or above 0.08 was greater for males than for females (41% and 27% respectively) with only the reduction for males being statistically significant.

Age of Driver

In 1993, the proportion of drivers at or above 0.08 increased slightly with age with the exception of the over 50 age group who had the lowest level (0.7%). The over 50 group also experienced the greatest relative reduction from the 1991 pre-0.05 survey (over 60%), however, this was not a statistically significant difference, possibly because of the small numbers in the two groups. In fact, the only statistically significant reduction was in the 21-29 age group (48%).

Time of Day

As for drivers who were at or above 0.05, the proportion of drivers at or above 0.08 steadily increased later in the night, from 1.2% from 10pm to 11pm up to 2.6% from 2am to 3am. Also the relative reductions from the 1991 pre-0.05 survey were greatest after midnight (around 50%).

Day of Week

The only statistically significant change in the percentage of drivers at or above 0.08 by day of week from the 1991 pre-0.05 survey was on Saturday, with a 52% reduction. This resulted in the percentage for Saturday being less than that for Wednesday night, although not a statistically significant difference. Wednesday to Saturday was still the peak period for the percentage of drivers at or above 0.08.

Survey Results 1981 - 1993

The results for all of the surveys conducted by the Unit from 1981 to 1993 can be seen in Table 5. Comparing the results in 1993 (the lowest on record) with the highest levels for each category the following are arrived at: The proportion of drivers at or above 0.08 has fallen by 70% since its peak in 1983; the proportion of drivers at or above 0.05 has fallen by 64% since its peak in 1983; and the proportion of drivers who had been drinking has fallen by 38% since its peak in 1981.

Table 5
Drinking and driving among Adelaide drivers
10pm to 3am, 1981-93
(weighted and corrected for refusal bias)

Year	% > zero	% ≥ .05	% ≥ .08
1981	27.7	9.3	4.1
1982	26.1	8.5	3.4
1983	26.4	9.6	5.0
1987	22.9	7.5	3.9
1989	22.4	7.1	3.4
1991 (Pre-0.05)	20.2	5.1	2.5
1991 (Post-0.05)	17.6	4.6	2.1
1993	17.3	3.5	1.5

Seatbelt Usage

Table 6 shows the seatbelt usage rates for both drivers and front seat passengers for all surveys where this data has been collected. It can be seen that the rates have generally been increasing over time and are now very high at around 98%. The wearing rate among drivers with a BAC at or above 0.08 in 1993 was found to be 94.6%. While this is lower than that for drivers as a whole it is still very high.

Table 6
Seatbelt wearing rates among Adelaide drivers
10pm to 3am, 1987-93

Survey Year	% drivers wearing belt	% passengers wearing belt
1987	87.5	85.0
1989	96.0	96.1
1991 (Pre-0.05)	95.8	93.6
1991 (Post-0.05)	96.0	94.6
1993	97.5	96.8

Note: Seatbelt wearing was not recorded in roadside surveys prior to 1987

DISCUSSION

Throughout the decade of the 1980's and into the 1990's there has been a reduction in late night drink driving in Adelaide with the exception of the year or so after the introduction of RBT in 1981. The percentages observed for drinking drivers, drivers at or above 0.05 and drivers at or above 0.08 were lower in 1993 than at any other time since the roadside surveys began.

During the six months following the introduction of the 0.05 legal blood alcohol limit on 1 July 1991 there was a small reduction in both legal and illegal drink driving. However, large reductions were evident two years later in 1993.

A larger proportion of male drivers had been drinking at all levels than was the case for female drivers in all of the surveys reported here and both sexes are reducing their drinking rates as time goes on. However, the rates among male drivers are dropping faster than those for female drivers, so that the two groups are coming closer together. Indeed, the rates for male and female drivers at or above both 0.05 and 0.08 in the 1993 survey were no longer statistically significantly different. If this trend continues, drink driving countermeasures aimed specifically at females as part of anti-drink driving programs will begin to play a more important role in reducing the drink driving problem.

The relative reductions observed in the proportion of drivers at or above 0.05 two years after the introduction of the 0.05 legal limit were greatest for drivers under 21 years of age and those over 50. This emphasises the need to find ways to deter more effectively those drinking drivers aged between 20 and 50 years who still have the highest rate of illegal drink driving.

The 1993 results obtained by time of day showed, as has consistently been the case in previous surveys, that there was a steady increase in illegal drink driving from 10pm to 3am. The results obtained by day of week showed that the highest levels of drink driving occurred on Thursday and Friday nights followed by Saturday and Wednesday nights.

CONCLUSION

The change in the legal blood alcohol limit for drivers in South Australia on July 1, 1991 was followed by a small reduction in both legal and illegal night-time drink driving. Two years later, in 1993, large reductions were observed in all areas. It is not yet possible to say to what extent these reductions were a consequence of the introduction of the 0.05 limit, the operation of random breath testing, or to general changes in social attitudes to drink driving in general.

RECOMMENDATIONS

- That the 0.05 limit and associated enforcement be maintained.
- That enforcement should be concentrated on Wednesdays through Saturdays.
- That very late night drink driving be considered a particular problem.

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