The Contribution of Alcohol to Work-Related Road Crashes in New South Wales

N.L. Haworth & M.A. Symmons
Session: Work-related road safety
Monash University Accident Research Centre
Ph 03 99051092, Fax 0399054363
mark.symmons@general.monash.edu.au

ABSTRACT

About 30% of cars in Australia are used by businesses and about 60% of new "upper medium" size cars are sold to businesses. Work-related travel accounts for about one-third of all travel (more than half if commuting is included). Given these figures, it is not surprising that road crashes are the most common form of work-related death in Australia. Work-related crashes account for 6% of all road fatalities, rising to 7% if commuting deaths are included. Illegal levels of alcohol (exceeding 0.05%) are commonly found in about one-fifth to one-quarter of all drivers killed in road crashes in Australia. Yet little is known about the contribution of alcohol to work-related road crashes. The ability of crash data analyses to answer this question depends on being able to identify work-related driving and being able to identify the level of alcohol present. Both issues present problems.

This paper reports completed analyses of a dataset produced by the New South Wales Roads and Traffic Authority that allows fleet-registered vehicles in crashes to be identified. The analyses examine the involvement of alcohol in these crashes and the potential influences of the temporal patterns of driving, vehicle characteristics and driver characteristics.

INTRODUCTION

Work-related driving comprises a large segment of travel on Australian roads and the human and economic costs of work-related crashes are significant. About 30% of the registered vehicles in Australia are used in business and 60% of all new vehicles are purchased initially for commercial purposes (Wheatley, 1997). Business travel accounts for about a third of all travel, increasing to more than half if commuting to and from work is included (Wheatley, 1997). For example, Harrison, Fitzgerald, Pronk and Fildes (1998) found that between 36% and 47% of car drivers interviewed by the roadside between 12 noon and 8 pm were on a business trip.

Not surprisingly, road crashes are the most common form of work-related death in Australia. While recent data are not available, 541 persons were killed in road crashes while they were working and 628 persons were killed in road crashes while they were commuting to and from work in 1989-92 (National Occupational Health and Safety Commission, 1998). This represents 23% and 26%, respectively, of work-related deaths. From another perspective, it represents 6% and 7%, respectively, of road fatalities during that period (Federal Office of Road Safety, 1999). These figures do not count the other persons who were killed or injured as a result of these

work-related road crashes. It has been estimated that work-related on-road crashes cost Australia $425 million each year, with the average time lost from traffic crashes greater than for any other workplace injury claim (Stewart-Boggle, 1999).

Those who drive for work may be at an increased risk of a crash for a number of reasons (see Symmons & Haworth, 2004, and Broughton, Baughan, Pearce, Smith, & Buckle, 2003). An increase in risk arises as a result of increased exposure: work-related drivers generally travel greater annual distances. Longer periods at the wheel will also increase the likelihood of fatigue, complacency or inattention. As the vehicle is part of the workplace, drivers are also more likely to engage in potentially distracting activities while driving – such as eating, using a mobile phone and concentrating of work-related issues. Work-related drivers may also be more likely to drive in a risky manner; for example, they may be more inclined to speed to arrive on time for appointments or squeeze more into their day (or finish earlier).

Evidence exists that work-related driving may involve a higher likelihood of risky driving behaviours than private driving. Driving for work has been shown to be associated with an increased prevalence of speeding (Adams-Guppy & Guppy, 1995; Harrison, et al, 1998) and driving while fatigued (Fell & Black, 1996). Broughton, et al. (2003) found that work-drivers drive more aggressively than other drivers. The current research examines whether these patterns of risk-taking in work-related driving extend to drink driving.

Much of the published research investigating work-related driving has concentrated on records and surveys from medium and large corporations. These organisations often have employees with oversight over company vehicles and clearly defined rules in regards to the use of the vehicles, with penalties for behaviours such as drink driving. The current data includes fleet sizes as small as one vehicle (around 30% of the business-registered vehicles that crashed in NSW in the period 1996-2000 belonged to fleets of one vehicle, and 66% of business-registered vehicles belong to fleet sizes of three vehicles or less), where drinking during or at the end of working hours (followed by the temptation to drive) might be more likely.

An understanding of the prevalence of behaviours such as drink driving in smaller fleets may point to a change in the focus of education activities or specific deterrence measures related to work-related driving. For example, the WA Road Safety Strategy calls for the fitting of alcohol interlocks in fleet vehicles to be promoted. Smaller fleet owners are less likely to be targeted or swayed by such ‘promotion’ and more direct approaches may be needed. Knowledge of the size of the problem also allows for a means to estimate the potential benefits of future programs.

DATA ISSUES

Data from vehicle insurers relating to claims involving company vehicles have been examined as a source of information about work-related crashes. From a road safety or occupational health and safety viewpoint, these data have proven to be of limited use. Our examination of vehicle insurance data for some large Victorian fleets has shown that crashes resulting in injury cannot be separated from those that result only in property damage and there is little overlap with the variables coded in the Police-

reported road crash databases (Haworth, Senserrick, Watson, & Symmons, 2003). The presence of alcohol is not routinely reported.

In the past, analyses of Police-reported road crash data have provided little insight into the factors affecting the safety of work-related driving. Queensland is the only State where the Police report form asks whether a commercial vehicle was involved. Unfortunately, coding of this variable is likely to be incomplete if the vehicle is a car that does not have obvious signage (Murray, Newnam, Watson, Davey, & Schonfeld, 2002). There is no proxy for purpose of trip in other States. In many States (but not Victoria), business or private ownership of the vehicle is coded in the registration database. Issues relating to the structure of the databases, privacy or other considerations have generally prevented linkages between the road crash and registration databases that could potentially identify business and privately owned vehicles in crashes.

In an attempt to learn more about the extent and nature of work-related crashes, the New South Wales Roads and Traffic Authority (RTA) created a dataset linking some variables from the NSW crash data covering the period 1996 to 2000 inclusive and NSW registration data for the period 31 December 1995 to 30 June 2000. This dataset allows crashed vehicles to be identified as either fleet or non-fleet vehicles. Fleet vehicles were defined as those registered to "fleet owners", which included organisations or individuals with one or more business registrations, and organisations with more than two private registrations. Vehicles registered to car dealers and rental companies were classed as non-fleet vehicles.

The RTA dataset does not directly identify crashes in work-related driving. Rather, it allows crashes involving "fleet vehicles" (as defined earlier) to be identified. Many of these crashes will have occurred in work-related driving. Some "fleet vehicle" crashes will have occurred during commuting to and from work in fleet vehicles and some will have occurred during private use of these fleet vehicles. Some "non-fleet vehicle" crashes may have occurred during work-related use of private vehicles. Despite these limitations, the dataset is the largest and most comprehensive source of information currently available in Australia about crashes in work-related driving.

The dataset allows emergency vehicles (ambulances, Fire Services vehicles, and Police vehicles), taxis and fleet cars to be distinguished from non-fleet cars. While light commercial fleet vehicles cannot be directly identified, these were operationally defined as light trucks, utilities and panel vans owned by a registered operator. Analyses of the data were undertaken to examine the involvement of alcohol in these crashes.

RESULTS & DISCUSSION

Using the above definition, 23.7% of vehicles (or 867,096 vehicles) registered in NSW at 30 June 2000 were classified as fleet vehicles. Approximately 15% of cars registered in NSW were registered to fleets, along with 14% of motorcycles. Just over half of the light trucks were registered to fleet owners, as well as two-thirds of "non-public" buses. Almost all heavy trucks, articulated vehicles, public buses, emergency vehicles and taxis in NSW were registered as fleet vehicles. While these figures suggest that fleet drivers are a minority of drivers, they represent a particular

group that can be specifically targeted using methods that may not be available for drivers as a whole (e.g. company driving policies).

During the period 1996 to 2000 (inclusive), a total of 396,899 NSW-registered vehicles were involved in crashes (fatal, injury or towaway) where the vehicle could be classified as either a fleet or non-fleet vehicle. Overall, one-quarter of these crashed vehicles were fleet vehicles. The level of severity of crashes of fleet and non-fleet vehicles was statistically significantly different ($\chi^2(2)=51.8$; $p<0.001$), but the differences were small in percentage terms. Fleet vehicle crashes were slightly more likely to be fatal (0.9% versus 0.7%), but were less likely to involve an injury (34.2% versus 35.0%).

In NSW, the maximum legal blood alcohol concentration is 0.05% for most drivers. At the time of the study, it was 0.02% for learner and provisional (probationary) drivers, drivers who have been licensed for less than 3 years and who are under 25 years of age, drivers of heavy vehicles (greater than 13.9 tonnes), drivers of public vehicles (including buses, taxis and hire cars) and drivers of vehicles that carry dangerous goods (RTA, 2004).

Table 1 shows that the BAC of about 78% of drivers in crashes was below the legal limit, but that BAC data was missing for almost 20% of drivers. The difference in distributions of BAC levels between fleet and non-fleet drivers was statistically significant ($\chi^2(5)=584.8$; $p<0.001$). Overall, 1.5% of fleet drivers and 2.9% of non-fleet drivers had an illegal BAC. Non-fleet drivers were twice as likely to have a BAC reading of 0.08-0.149% or greater than 0.15% than fleet drivers (1.2% vs. 0.6% and 1.4% vs. 0.7% respectively).

Table 1. BAC levels of drivers of fleet and non-fleet vehicles in all crashes (injury and towaway).

BAC level	Fleet		Non-fleet		Total	
	No.	%	No.	%	No.	%
Legal	77,337	78.2	231,852	77.8	309,189	77.9
Illegal						
.020-.049 (special range)	44	0.0	233	0.1	277	0.1
.050-.079	183	0.2	958	0.3	1,141	0.3
.080-.149	615	0.6	3,456	1.2	4,071	1.0
.150 +	676	0.7	4,036	1.4	4,712	1.2
Unknown	19,996	20.2	57,513	19.3	77,509	19.5
Total	98,851	100.0	298,048	100.0	396,899	100.0

The data in Table 1 was reanalysed in two ways: considering only crashes that resulted in a casualty, and removing those where the BAC was unknown (see Table 2). When the analysis was repeated for vehicles in fatality or injury crashes only (i.e. towaway crashes excluded), 2.1% of fleet drivers and 4.3% of non-fleet drivers had an illegal BAC, a statistically significant difference ($\chi^2(2)=361$; $p<0.001$). When crashes where BACs were unknown were excluded, 1.9% of fleet drivers and 3.6% of non-fleet drivers had illegal BAC levels, a statistically significant difference ($\chi^2(1)=545$; $p<0.001$).

Table 2. Illegal & legal BAC levels (% of total) of drivers in all crashes, in casualty crashes only, & after crashes with unknown BAC removed.

		All	Casualty only	Without unknown BACs
Illegal	Fleet	1.5%	2.1%	1.9%
	Non-fleet	3.0%	4.3%	3.6%
	All	2.6%	3.7%	3.2%
Legal	Fleet	78.2%	77.0%	98.1%
	Non-fleet	77.8%	75.6%	96.4%
	All	77.9%	75.9%	96.8%

The percentages of drivers in crashes with illegal blood alcohol levels differed according to the type of vehicle driven, as well as between fleet and non-fleet drivers. Figure 1 shows that the highest prevalence of illegal alcohol levels among both fleet and non-fleet drivers was found for drivers of light commercial vehicles. The lowest prevalence of alcohol in crashes was found among taxi drivers and drivers of fleet emergency vehicles (in this group, those with an illegal BAC were mainly tow truck drivers).

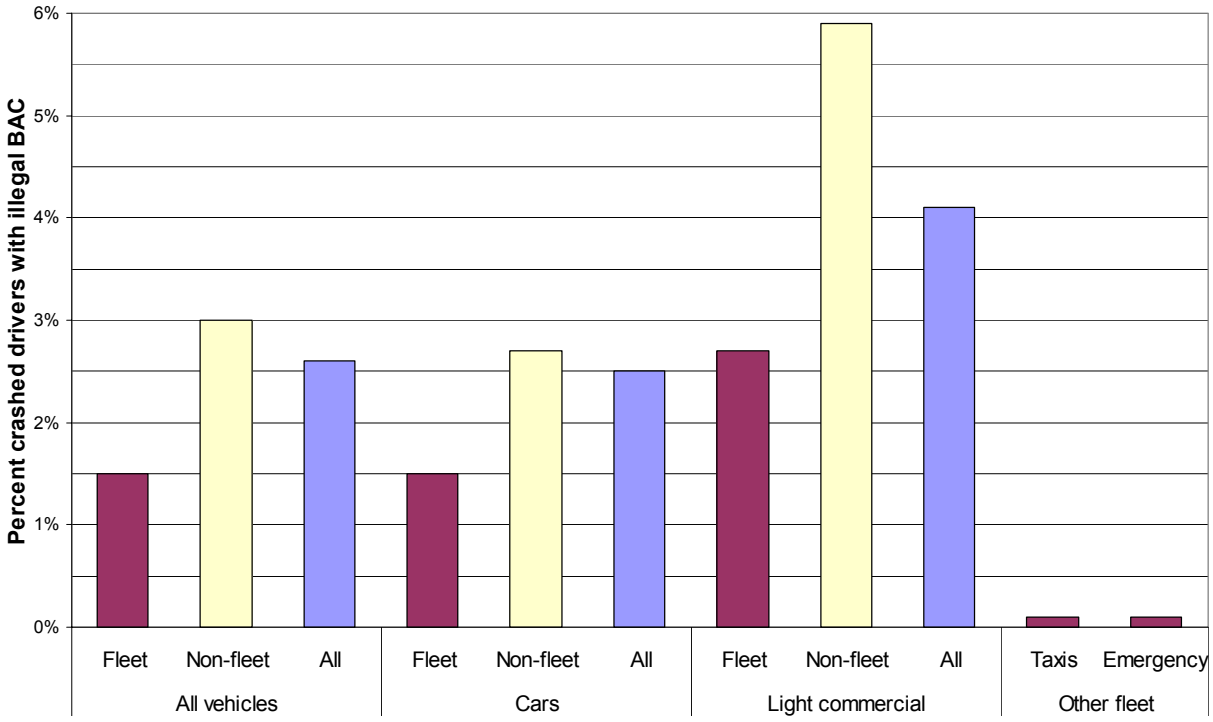

Figure 1. Percentages of drivers in casualty crashes with illegal BAC among particular fleet and non-fleet vehicle groups.

The data also allowed for analyses of a number of factors that may influence the prevalence of alcohol in fleet crashes, such as gender. In the crashed fleet vehicle group, 79.0% of the drivers were male (and 19.3% were female), compared with 61.3% of the non-fleet group being male (36.7% female). For those crashed drivers with an illegal BAC, in the fleet group 90.4% were male and in the non-fleet group 81.8% were male.

Crashed fleet drivers were older, on average, than crashed non-fleet drivers (38.0 vs. 35.8 years). Overall, only 18.4% of fleet drivers in crashes were aged 25 and under, compared with 33.1% of non-fleet drivers in crashes. Published RTA data show that male drivers aged under 40, and particularly those aged 25 and under, are strongly involved in drink driving crashes (RTA, 2000). For those crashed drivers with an illegal BAC level, the mean age for the fleet group was 36.6 years old (with 95% confidence intervals of 35.7 and 37.5 years), compared with 34.6 years old (with 95% confidence intervals of 34.2 and 35 years) for non-fleet drivers.

There was little difference in the average ages of male and female fleet drivers who had crashed with an illegal BAC (36.3 vs. 36.9 years old respectively). The difference was more marked, although still small, for non-fleet drivers – 34.0 years for male non-fleet drivers versus an average age of 35.8 years old for females.

Fewer fleet crashes occurred at night and on weekends, when alcohol-related crashes traditionally cluster. Only 42.0% of fleet car crashes occurred in "non-work periods" (outside 7am-6pm Monday-Friday), compared to 48.4% of non-fleet car crashes. Taxis were the only exception to this general finding: 61.1% of taxi crashes occurred in "non-work periods". When analysing only those crashes where the driver had an illegal BAC level (see Table 3), compared to non-fleet crashes, fleet crashes were relatively more likely to occur during commuting hours (7-9am and 4-6pm Monday to Friday) and less likely to occur during work hours.

Table 3. Fleet and non-fleet crashed vehicles with illegal BAC as a function of day and time of crash.

Time category	Fleet		Non-fleet		Total	
	No.	%	No.	%	No.	%
Commuting (7-9am & 4-6pm M-F)	114	7.5%	587	6.8%	701	6.9%
Work hours (9am-4pm M-F)	63	4.2%	482	5.6%	545	5.3%
Non-work (all other times)	1,341	88.3%	7,614	87.7%	8,955	87.8%
Total	1,518	100.0%	8,693	100.0%	10,201	100.0%

Overall, relatively fewer fleet crashes than non-fleet crashes occurred outside the capital city. Crashes outside the capital city, particularly those in rural areas, are generally associated with a higher involvement of alcohol (RTA, 2000). For crashes of light commercial vehicles, where alcohol was most prevalent, relatively more fleet and non-fleet crashes occurred outside the capital city (33.4% and 48.2%) than for fleet and non-fleet cars (24.5% and 30.8%). When only crashes with an illegal BAC were considered, 61.9% of fleet crashes occurred within the Sydney metropolitan area compared with 52.3% of non-fleet crashes.

GENERAL DISCUSSION

The data analysed here have a number of limitations that should be considered in conjunction with any conclusions. The data relate to crashes involving fleet vehicles, rather than crashes involving work-related travel per se. While the finding that fleet crashes are more likely to occur during business hours provides some confidence for using fleet vehicles as a proxy for work travel, the finding that there is still a reasonable level of fleet-involved crashes after hours suggests that fleet vehicles are also being driven for commuting and leisure purposes.

The analyses showed that illegal blood alcohol levels are less common among drivers of fleet vehicles than among drivers of non-fleet vehicles in crashes. This was true for all types of vehicles examined. However, the prevalence of illegal blood alcohol levels varied as a function of type of vehicle, with the highest prevalence among drivers of fleet and non-fleet light commercial vehicles and the lowest prevalence among drivers of taxis and emergency vehicles.

The increased prevalence of alcohol in crashes of light commercial vehicles may reflect the demographic characteristics of drivers of such vehicles. A number of studies have demonstrated a relationship between socioeconomic variables and the propensity to drink and drive. Baum (1999) found higher rates of drink driving offences in postcode areas characterised by low socioeconomic status, low residential stability, low utilisation or access to public transport, and disadvantage associated with being unemployed. Interestingly, Harrison (1998) identified two groups of occupations that accounted for 58% of male drink drivers. The first occupational category included carpenters, electricians, chefs, mechanics, gardeners and labourers and accounted for 42% of male drink drivers. This category may contain many drivers of light commercial vehicles. A second category included occupations such as business manager, company director, public servant and sales representative and accounted for 16% of male drink drivers. This category potentially contains many of the drivers of fleet cars.

Currently the .02% special BAC limit applies to commercial vehicles only when their gross vehicle mass exceeds 13.9 tonnes. The findings presented here suggest that there may be a case for extending this restriction to include all light trucks to address the relatively high involvement of alcohol in drivers of light commercial vehicles.

A number of factors may potentially underlie the low prevalence of alcohol in taxi crashes. More than 90% of taxi crashes occurred in the capital city, so the contribution of rural drink driving was lower to this category of crashes than to others. It may reflect the success of the .02% limit that applies to taxi drivers and other drivers of public vehicles. It may even be an indication that taxi drivers refrain from drinking because alcohol would make it harder to remain awake during long shifts.

CONCLUSIONS

The analyses showed that illegal blood alcohol levels are less common among drivers of fleet vehicles than among drivers of non-fleet vehicles in crashes. This was true for all types of vehicles. However, the prevalence does vary as a function of type of vehicle, with the highest prevalence among drivers of (fleet and non-fleet) light commercial vehicles and the lowest among drivers of taxis and emergency vehicles.

In crashes where an illegal BAC level was indicated: a relatively higher crash involvement seems to exist for male fleet drivers (compared with male non-fleet drivers); crashed fleet drivers were a little older than non-fleet drivers; fleet crashes were relatively more likely to occur during commuting rather than work hours (a similar pattern to non-fleet crashes but to a greater extent).

These results strictly relate to crashes of fleet vehicles, rather than work-related driving. The strength of the relationship between crashes of fleet vehicles and crashes in work-related driving could not be directly assessed from the data. However, unlike a lot of other analyses, the data include the prevalence of drink driving in a rarely studied work-driving group – those of small fleets. Drivers in small fleets make up a significant proportion of the work driving population and would probably need to be targeted using methods and campaigns different to those than may be successful in medium to large fleets.

REFERENCES

Adams-Guppy, J. and Guppy, A. (1995). Speeding in relation to perceptions of risk, utility and driving style by British company car drivers. *Ergonomics, 38*, 12, 2525-2535.

Baum, S. (1999). An aggregate level analysis of the socioeconomic correlates of drink driving offenders. *Accident Analysis and Prevention, 31*, 213-220.

Broughton, J., Baughan, C., Pearce, L., Smith, L., and Buckle, G. (2003). *Work-related road accidents*. TRL Report No. 582. Crowthorne, United Kingdom: TRL Limited.

Federal Office of Road Safety. (1999). *Road fatalities Australia: 1998 Statistical Summary.* Canberra: Australian Government Publishing Services.

Fell, D. and Black, B. (1996). Driver fatigue in the city. In L. Hartley (Ed.), *Proceedings of the Second International Conference on Fatigue and Transportation: Engineering, enforcement and education solutions*. Perth: Promaco Conventions. (pp.165-187).

Harrison, W.A. (1998). The occupations of drink drivers: Using occupational information to identify targetable characteristics of offenders. *Accident Analysis and Prevention 30* (1), 119-132.

Harrison, W., Fitzgerald, E.S., Pronk, N.J. and Fildes, B. (1998). *An investigation of characteristics associated with driving speed* (Report No. 140). Melbourne: Monash University Accident Research Centre.

Haworth, N., Senserrick, T., Watson, L. & Symmons, M. (2003). *Review of Fleet Safety and Driver Training: Analysis of vehicle insurance claims data*. Melbourne: Monash University Accident Research Centre.

Murray, W., Newnam, S., Watson, B., Davey, J. & Schonfeld, C. (2002). *Evaluating and improving fleet safety in Australia*. Report prepared for Australian Transport Safety Bureau.

National Occupational Health and Safety Commission. (1998). *Work-related traumatic fatalities in Australia, 1989 to 1992. Summary report.* Sydney: National Occupational Health and Safety Commission.

RTA (2000). *Drink driving. Problem definition and countermeasure summary*. Sydney: Roads and Traffic Authority of New South Wales.

RTA (2004). *Blood Alcohol Limits*. www.rta.nsw.gov.au/roadsafety/drinkdriving/bloodalcohollimits.html

Stewart-Boggle, J.C. (1999). *Road safety in the workplace: The likely savings of a more extensive road safety training campaign for employees.* Paper presented at the 1999 Insurance Commission of Western Australia Conference on Road Safety 'Green Light for the Future' www.transport.wa.gov.au/roadsafety/Facts/papers/contents.html

Symmons, M. and Haworth, N. (2004). *Safety attitudes and behaviours in work-related driving. Stage 1: Analysis of crash data.* Melbourne: Monash University Accident Research Centre.

Wheatley, K. (1997). An overview of crashes in work-related driving. In *Staysafe 36: Drivers as workers, vehicles as workplaces: Issues in fleet management*. Report No. 9/51. Ninth report of the Joint Standing Committee on Road Safety of the 51st Parliament Sydney: Parliament of New South Wales.

ACKNOWLEDGMENTS

The data were provided by the Roads and Traffic Authority of New South Wales as part of their support for the MUARC Baseline Project "Safety attitudes and behaviours in work-related driving" which was funded by VicRoads, Transport Accident Commission and Department of Justice. The conclusions are those of the author and not of any of the organisations listed.