

# This Is What Happened: A Narrative Analysis of What Was Happening Immediately Prior to and During Road Crashes

Blackman, R., O'Connor, T. & Veitch, C.

## ABSTRACT

People living in rural and remote regions of Australia are significantly over-represented in road transport-related fatality and injury figures. Multiple factors combine to produce a disproportionately high risk for rural road users. Patients admitted to hospital for at least 24 hours following a vehicle crash in rural and remote areas of North Queensland were asked to describe what happened immediately before, during and after the crash. Those interviewed include vehicle operators, passengers, pedestrians and cyclists.

Thematic analysis has been performed on 230 narratives obtained from these patients with transport-related injuries in North Queensland. Some of these narratives illuminate concerns that are often concealed by statistical analyses. This paper explores through narrative analysis the experiences, attitudes and behaviours of road users in rural and remote areas. The data generated by narrative analysis has potential to complement and also challenge that which is grounded in the quantitative domain and thus may be used to enhance future road safety policies and interventions.

## INTRODUCTION/BACKGROUND

Compared with their urban counterparts, rural and remote road users in Australia are at greater risk (per capita) of injury and death as a result of motor vehicle crashes. Risk of transport-related injury or death is several times higher in rural and remote regions than in urban areas (Austroads 2005; Parliamentary Travelsafe Committee 2001). This disproportionate risk is accompanied by significantly higher costs in terms of medical, social and economic impacts for rural communities. While the risks associated with vehicle use increase with remoteness, we also see access to driver training, health, emergency and other services become more limited as distances from urban centres increase (Veitch et al 2005).

Differences between urban road crashes and those in rural and remote areas were first formally acknowledged at a national level in the 1996 *Rural Road Safety Action Plan* (RRSAP) (FORS 1996). The Rural and Remote Road Safety Study (RRRSS), a unique and tailored research program, has since been developed and implemented with significant Queensland intra-state partnerships and all-of-government support as its foundation. The program consists of multiple overlapping phases of data collection and analysis, followed by the design and delivery of appropriate interventions targeting rural and remote road safety. Our purpose here is to present a particular element of this project's data analysis that centres on contributing factors in crashes as identified and described by hospitalised road users. The basic unit of analysis is therefore termed the 'patient crash narrative', on which we will focus after first providing some background information.

The RRRSS was designed by the Centre for Accident Research and Road Safety (CARRS-Q) at Queensland University of Technology in partnership with the Rural Health Research Unit at James Cook University. It is a direct response to the nationally recognised need for road safety research with a specifically rural and remote area focus, as outlined in the RRSAP. Targeting North Queensland the study addresses important differences between urban and rural areas; differences found not only in the provision of infrastructure and services, but also in the actions, behaviour and attitudes of road users that might contribute to their vulnerability. For example, Queensland Transport (2005) reports that the fewest of all reported Queensland crashes (11%) in 2003 occurred on Sundays. Preliminary RRRSS data inverts this finding, with the highest number of crashes resulting in hospitalisation for at least 24 hours (21%) occurring on Sundays since data collection began in 2003. Of course the most crucial characteristic of rural and remote crashes, as already mentioned, is their disproportionately high social, economic and medical costs compared with those in urban environments.

The study is a five-year multi-stage project employing a nested methodology that includes a screening study, in-depth injury study, case-control study, focus groups, and subsequent development and delivery of appropriate interventions. Tailored and innovative strategies such as this are recognised as one way to address road safety issues on which previous approaches have struggled to make inroads (Queensland Transport 2006). While blanket policies and interventions are an economical measure arguably suitable for relatively dense and homogenous populations, they are not universally appropriate across Australia's diverse environmental and socio-cultural settings (Veitch et al 2005). The narrative analysis that is our particular concern here lies within the in-depth injury study, anticipated ultimately to involve up to 400 patients over the age of 16 years who have been hospitalised due to rural and remote transport-related injuries.

While also addressing technical issues, the study seeks to build our historically limited understanding of behaviour, attitudes and other social factors that continue to limit the success of road safety interventions, particularly in rural areas. These factors combine to help constitute what has previously been identified as 'cultural resistance' (Smith 2005). The behavioural/social focus of the project reflects the informed belief among authorities and government that the vast majority of crashes are avoidable. In other words, deficiencies in infrastructure such as 'bad roads' can be countered by adequate driver awareness and by driving to prevailing conditions. Whether or not this belief is also widely held by road users is but one of the specific questions the study seeks to answer. Narrative analysis is central to this problem as it extracts from road users just what and whom they feel were responsible for crashes resulting in their injuries.

## THE STUDY

Many aspects of the relationship between risk and remoteness are well understood through statistics, yet as already suggested there are others that may not be revealed by purely quantitative analysis. The RRRSS therefore incorporates an analysis of transcripts (narratives) in which patients describe events immediately surrounding the crash that led to their injury. At the time of writing there were 230 patient crash narratives available for analysis. The narratives should not be taken as representing an entire or complete recollection of events, for patients may have omitted or overstated certain elements. But in most cases they reveal important information, the reliability of which can often also be tested against other available data, including police crash narratives.

Narrative analysis has been used in Australia, Europe and the US as a means to identify factors contributing to road crashes (see TFHRC 2004; MCNSW 2002; NHTSA 1997). These narratives are predominantly those authored and supplied by authorities investigating crashes for the purpose of law enforcement. Essentially, their analyses involve querying the frequency of keywords as they appear in sets of narratives assembled to allow investigation of specific contributing factors. These studies are quite similar to that undertaken by the RRRSS, except that they analyse the narratives of a third party, rather than those who were directly involved in crashes.

The narrative themes used for analysis here were drawn from existing RRRSS data, which indicates the prominence of certain themes as factors in crashes. As the patient narratives themselves consist on average of only a short paragraph, the necessary theme count was conducted manually. As a point of clarification, it should be stressed here that we are analysing the content of patient narratives *thematically*, rather than employing in-depth narrative analysis of a type commonly used in broader qualitative research. Narrative themes are assessed quantitatively to determine their rank frequency, after which qualitative assessment is directed toward selected narrative extracts in which prominent themes appear. The extracts selected represent both typical and extreme cases with regard to patient perceptions, attitudes and behaviour.

## RESULTS

Systematic analysis of the 230 interview transcripts revealed a number of key themes concerning what happened immediately prior to and during rural road (and off-road) crashes. The frequency of themes and the percentage of narratives in which each theme appears are presented below in Table 1. Among these themes are those factors often referred to as the ‘fatal four’ contributors to vehicle crashes: speed, alcohol, fatigue and seatbelts. Interestingly, while speed ranks as the third most frequent theme, the top two noted factors in crashes place responsibility largely beyond driver behaviour and more firmly with external agents. It should be kept in mind however that many narratives contain multiple themes and that these are not prioritised within single narratives during analysis. Hence, while eighteen narratives mention animals as a contributing factor, many also contain other themes such as alcohol, excessive speed, and/or other factors.

*Table 1: Prevalent themes in 230 patient narratives*

Theme		Frequency	%	Rank
Unclear/no memory		39	16.9	*
Other vehicle		34	14.8	1
Road condition		23	10.0	2
Speed		20	8.7	3
Distractions	Inside 13	18	7.8	4-6
	Outside 5			
Animal		18	7.8	4-6
Mechanical failure		18	7.8	4-6
Inexperience/Inexperience		16	7.0	7
Alcohol		14	6.1	8-9
No seatbelt/helmet		14	6.1	8-9
Weather condition		10	4.3	10
Fatigue		7	3.0	11-12
Obstacle (other than animal)		7	3.0	11-12
Medical condition		6	2.6	13
Emotional		3	1.3	14

\* Lack of memory is not considered useful for further narrative analysis and we thus focus on twelve remaining themes, ranked from one to twelve.

### 1. Other vehicles

The first-ranked theme, appearing in about 15% of narratives, identified other vehicles as contributing to crashes. This appears roughly consistent with other data showing that 75% of crashes involve single vehicles. In some cases at least, a crash may indeed be difficult to avoid if other drivers have completely lost control or have a total disregard for others, as the following two extracts suggest:

*Basically what caused it was the other car deciding not to give way or not seeing me coming. They didn't brake – they had the 'give way' sign and we were travelling along the highway. Our car hit from (the) front into side of other car.*

*(Motorcyclist) Could see a ute doing donuts on side of road...flashed lights and slowed down and stop(ped). Just as (I was) passing the ute I think they started doing donuts again. Difficult to see as there was so much dust. They hit me and I remember going through the air, bouncing and tumbling along the ground.*

## 2. Road condition

Although road condition ranks relatively high, appearing in 10% of narratives, it is very difficult to find an example in which factors attributable to driver error do not also feature. In many instances, road condition combines with speed, driver inexperience, inattention and other factors all of which point to a failure to drive to prevailing conditions:

*Before (the) crash (I) was speaking to cars ahead and behind in convoy talking re bad sections of road...Wife said corrugations bad 'I am doing 80K'. I said 'slow down'. Next moment tyre blew out. Heard the bang. Then said to wife 'You are losing control'. Then lost rear end and vehicle rolled over.*

In the narratives of off-road recreational motorcyclists who deliberately seek challenging terrain this theme has been disregarded; although some riders mention it none have sought to attribute responsibility to surface condition. By contrast road surface appears critical to motorcyclists on sealed roads, with gravel patches and other debris on corners posing a particular threat:

*Coming down long straight on motorbike doing 50 – 60k/hr... gravel was built up on the corner. My front wheel hit the gravel...I hit the brake...the front wheel slid out...I lost control of bike and crashed.*

Road surface was a prominent theme in the following narrative, which describes a midnight car crash on the Bruce Highway in which the driver was not the owner of the vehicle. Given that this is the only crash to occur at that specific location during the data collection period, the additional contribution of other factors appears likely:

*The fellow who was driving was talking to us – we were all just talking – and then the car hit a bump in the road. It just bounced up a bit. The driver yanked the wheel suddenly and braked and then lost control. There was no alcohol involved. The car had power steering so I'm not sure if that made him lose control. Anyway the next thing I remember is seeing the grass coming at me. We'd rolled a couple of times and then we were just sliding along on our roof.*

## 3. Speed

Excessive speed is mentioned or implied in many of the extracts appearing under other theme headings. It is often found in association with alcohol and inexperience, and to a lesser extent with fatigue, road and weather condition. One driver's awareness of his possible impairment (and punishment) has ironically even triggered a seemingly impulsive act of speeding that went awry:

*A big factor was speed going over loose gravel on road...We passed police having RBT...We decided to wait until they finished their shift. We took a back road...We saw 2 vehicles coming – we thought it was the police. My mate shot off to the left; he'd had a few - about 800 metres away, that's where he stacked the car.*

Another driver appears to have ignored the advice of an uncomfortable passenger:

*I think the driver was driving a little too fast for his experience level, but not for the road conditions. He didn't know the road or the route. That was because of the need to catch up to other vehicles – where the other drivers did know the road. I felt uncomfortable with the speed – thought the driver was a little nervous – I said 'take it easy, they'll wait'. Car unable to take a bend and we went head on into a tree.*

#### 4-6. Distractions

Most distractions originated within the vehicle itself. These internal distractions include using or attempting to use mobile phones, adjusting car stereos, inappropriate communication between occupants and rolling cigarettes. The following example also reveals the possible contribution of other factors:

*I was trying to roll a smoke when I went off the road for 5-6 metres...after about 100 metres I hit a tree stump and the tyre blew. Then I lost it...I had been at the...Pub celebrating my birthday for about 4 hours before the accident.*

In the next example driver inexperience is almost certainly involved, but the contributing internal distraction could have been avoided had both driver and passenger been concentrating on the task of driving:

*My daughter was driving – on L plates. We argued about her choice of music. She looked away to change (a) CD – swerved the car and kept overcorrecting. She drove into a drain and into a culvert and hit a post.*

The use of mobile telephones while driving is of particular concern given their widespread general use and increasingly sophisticated functions and capabilities (NHTSA 1997; Walker, Williams and Jamrozik 2006). The following extract suggests that other contributing factors were negligible in this case, although it remains possible that the patient withheld information about speed, for example, or other factors:

*My mobile phone rang and I leaned over to the left to pick it up – it was just a second, and by the time I had the phone I had moved into the gutter on the side of the road and then I hit a driveway and it flicked my car over and I rolled three times.*

#### 4-6. Animals

About eight percent of narratives mentioned animals either on the road surface or roadside. In some cases animals were not on the roadway or in the path of vehicles; these events constitute distractions. Other patients claimed prior awareness of the likely presence of animals around the crash site, yet this knowledge did not help prevent them from hitting an animal:

*Kangaroo jumped out in front of me. I didn't see him until he was on the road...I'd seen a car before me going over the rise, so I didn't think there would be roos around...I was probably doing 100 - 110kms...I always tell people to slow down because of the roos on the road.*

#### 4-6. Mechanical failure

Mechanical failure is sometimes given by patients as a primary cause of their crash and potentially serves to conceal other contributing factors, such as in the following example:

*Me and my mate were driving...and the gears got stuck and jammed. I put the brakes on and the car just flipped over 2-3 times. My mate had just bought the car from someone – second hand for 150 a few days ago and we thought it was alright. Then we realised there might be something wrong with it. We asked a guy at a garage but he said there was no problem. It was the gears, they just got stuck, that was what happened...*

Then, finally and as if from a completely different narrative, emerges an important clue as to 'what happened' in actuality:

*...I've learned my lesson. I want to help the University tell all those young people, 'don't drink and drive'.*

Tyre blowouts also fall under the theme 'mechanical failure'. While tyre failure may occur for a number of reasons, tyre condition and operating pressure are rarely mentioned in narratives, suggesting that important elements of driver preparation are sometimes overlooked. In some cases however mechanical failure seems largely responsible for crashes:

*I went to pull out of the car parking space...and lightly touched the accelerator. All of a sudden the accelerator just stuck on the maximum and we just started flying along. I tried the brake but nothing happened. There were people around – going to their cars after bingo, and it's a miracle we didn't hit any of them. We were going so fast we would have killed them for sure. We ended up hitting a wall and getting airborne and flying over a big gully about 20 feet high. We were airborne over about eight lots of cement steps leading down into a gully before landing at the bottom of the gully on the edge of a field where we ended up crashing head on into a goal post.*

## **7. Inexperience/experience**

Inexperience with particular vehicles and/or roads is noted in 7% of patient narratives, of which the following is an outstanding example:

*We had just stopped at the lookout and I had swapped to an unfamiliar bike and was on an unfamiliar road. I lost sight of the bike in front – I had thought I could follow him and stay out of trouble. I crept up on a bend and I couldn't get the turn tight enough and I drifted onto the other side of the road and hit a car coming the other way. It was basically the unfamiliar bike and the unfamiliar road...I return to the UK in about 12 days.*

The narrative concerning a learner-driver presented previously under 'distractions' is worth mentioning again here as it illustrates not only driver inexperience but also that of the supervising passenger in the role of driver-trainer. Conversely, some patients mentioned high levels of experience with particular road sections on which they have crashed. That this stated experience has not resulted in crash avoidance strongly suggests complacency and/or the presence of other contributing factors.

*...I came around the bend to where the wallabies normally hang out. They like the sweet grass there. I never take this corner at anything over 60km/hr. I came around the corner about a metre over onto the wrong side of the road (but it was night and quiet). Right in the middle of the road there is a set of ripples. The high side of the ripples (on my side of the road) is shitty road and the low side (wrong side) is much better. I've been driving that road since 1978 – I am very well aware of the conditions. I was on the apex of the corner. Before this I have excellent vision to the left and from here I have excellent vision along the straight as I pull out of the bend. This is where the wallaby got me.*

## **8-9. Alcohol - No Seatbelt/Helmet**

Alcohol was explicitly mentioned as a contributing factor in only 6% of patient narratives. Overall, the study has found alcohol and illicit drugs are contributing factors in about 37% of fatalities. Other data sources suggest that 15% of serious crashes from 1998 – 2003 were specifically alcohol related (Queensland Transport 2005). Alarmingly, about 70% of male patients interviewed admitted to 'harmful' levels of alcohol consumption as part of their general lifestyle (by contrast, about 25% of female patients interviewed regularly drank alcohol at levels considered harmful). It is expected that some patients are reluctant to admit the possibility of alcohol as a contributing factor. However, those narratives that do disclose over-consumption of alcohol are quite matter-of-fact about it and suggest that, at least for some people, driving under its influence is (still) normal practice. The following two extracts contain multiple themes, but alcohol is arguably the primary contributor in both cases:

*I was standing in the back of the ute (and) we came around a corner that we all know really well and we veered slightly off the road...The driver had to put the car into a slide to correct it but the tray hit the tree and caused it to flip...We had nearly lost it going around that corner on the way to the swimming hole earlier. That particular corner goes around to the right but also dips on the corner so if you turn too quickly too tightly you'll roll. We can usually do it at about 120km. I reckon if the driver had had about 8 less drinks that day he would have made it. He'd been up all night the night before and was really sleepy and really drunk and his reaction times were not what they normally were...we've had head- ons with our mates on bikes out there before – Our entertainment is to fly around like lunatics on those back roads, but the young guys think they're invincible. They laugh at the ad on TV where the bloke hits the woman with the pram saying 'he's stupid' and his braking reflexes were hopeless. They reckon they could have stopped in time and not hit that woman. You have to somehow show these young blokes that it might be their turn next. We all drink and drive and speed out there and get away with it. We take the back roads around the cops and laugh about it and get away with it so many times we think those bad accidents or trouble with the cops will never happen to us.*

*I jumped into the 4wd, I had been drinking since 4 pm that afternoon, me and another young fellow I knew had been drinking but I just thought that I could handle it. I have been drink driving on the job lots of times and never had problems before, I thought I was fine. I felt confident behind the wheel, and I did not wear my seat belt. I switched on the radio and was trying to find a station, I had one eye on the road, I approached a corner going down into a river crossing, a beast was in the middle of the road, I was travelling about 100km an hour and had to make a NASCAR evasive manoeuvre. I turned to the left and went down the incline and because of the angle of the incline the car rolled three times and an old blackwood tree stopped me from going over the incline – I wouldn't have been found for days. One thing I have learned is you should always drive to the conditions.*

Both examples also mention a lack of seatbelts, and in the first case even seats! Indeed some narratives seek to perpetuate the unsubstantiated myth that seatbelts are in fact dangerous:

*I think we hit a kangaroo...the driver tried to swerve to miss it...They reckon I got thrown out of the car. If I had my seatbelt on I would have got squashed easy.*

## **10. Weather condition**

This theme appears in 4.3% of narratives analysed to date. As in the case of road condition, there is evidence that drivers are reluctant to adjust their driving sufficiently to suit prevailing conditions, even if they have prior awareness of associated dangers:

*Currently on the road to (northern town) there is a waterfall on the left of the road – 100 metres or so north of...Beach. This water had come over the road and it was raining hard with 3-4ft visibility. I was on a bending right corner when I hit this water puddle 10ft wide and 10ft long. I aquaplaned through the puddle and next thing I was in the ditch on the left of the road and was travelling at about 60km for about 15 metres in the ditch...*

Although the driver's estimates of visibility and speed may not be entirely accurate, it is arguable that in such conditions the appropriate action is to stop and wait for improvement.

## 11 - 12. Fatigue – Obstacle other than animal

While fatigue has long been recognised as a major contributor in rural crashes, there is increasing evidence that even an awareness of feeling sleepy does not cause drivers to stop and rest (Nabi et al 2006). The following example, which also contains ‘speed’ and ‘seatbelt’ themes, supports this assertion. In this case it even appears that excessive speed was a direct result of driver fatigue:

*I was tired and I remember looking at speedo at 130km and thought shit that's a bit quick. I don't know what I did then but I must have fell off to sleep and woke up and I was off the road still going really fast, dirt and grass flying off the windscreen, next thing I hit a big tree stump. I didn't have the seat belt on...*

The majority of obstacles mentioned were encountered by off-road motorcycle and quad-bike riders and are arguably an inherent danger associated with off-road riding. However, some obstacles were encountered on highways and secondary roads. In either case, the successful negotiation of unexpected obstacles often demands high skill levels on the part of drivers and riders alike:

*One truck...coming from opposite direction, crossing over the causeway when a tyre blew apart on the truck, and threw its retread. This retread part of the tyre hit windscreen, smashed it...lost control of vehicle, as couldn't see anything.*

## IMPLICATIONS/DISCUSSION

Not all road users acknowledge their roles and responsibilities in relation to road crashes in which they have been injured. The top two, and four of the top six, most frequently mentioned themes relate to external agents rather than driver behaviour. The vast majority of crashes are caused by a combination of factors, most of which relate directly to driver behaviour, preparation, awareness and skill. Attention to preparation - checking vehicle roadworthiness, condition of unfamiliar roads, physical fitness and the like – is very rarely acknowledged in patient narratives, arguably reflecting what Rees (2006) calls ‘a culture that does not stress careful preparation for the journey’. It is therefore inferred, from the absence of references to preparation, that many drivers may underestimate its importance.

With the exception of the third-ranked theme, ‘speed’, the ‘fatal four’ fall in the middle to lower ranks of narrative themes. A possible explanation here is a posited tendency among some patients to externalise responsibility, forget or otherwise conceal information. Further analysis regarding the fact that no patients interviewed were involved in fatal crashes might help to clarify the rank distribution of the ‘fatal four’. That is, there remains a question as to whether alcohol, seatbelts and fatigue are factors less likely than others (such as road condition and other vehicles) to be acknowledged by patients, or whether these factors are actually less prevalent in non-fatal crashes than in fatal ones.

Hazard awareness does not necessarily result in modified driver behaviour. Complacency may be the best word to describe this behavioural characteristic. Drivers have been keenly aware of dangers on local roads, of their excessive alcohol consumption, or their tiredness from lack of sleep, yet safety remains a secondary priority to completing the journey. As the vast majority of trips are completed successfully without incident, potentially deadly levels and types of risk become justified and marginalised by and for road users (Lawrence et al. 1988; Natalier 2001).

An embedded culture of alcohol consumption is especially problematic for rural and remote road users given the lack of viable transport and entertainment options and alternatives. In contrast to urban areas where heavy drinkers can generally retain high degrees of mobility without driving, rural and remote residents have very few safe transport options outside of remaining sober in order to drive/ride (or walk/cycle). Surely this is challenging for those individuals with ‘strong lifestyle commitments to social activities involving heavy drinking’ (Snortum 1988: 196). Precise numbers are unimportant, but RRRSS survey data indicates such commitments do exist for some people in North Queensland communities. One might surmise if there is one group of young males such as described above by our ute-riding patient that there are very likely others who are at similar risk of ‘learning the hard way’.



‘Cultural resistance’ (Smith 2005) must be overcome if road safety initiatives are to realise necessary changes in operator behaviour.

Road users need to keep a greater margin for error on all road surfaces and in all conditions – indeed some are likely ‘accidents waiting to happen’. Many narratives suggest that road safety is often not the first priority of drivers – perhaps not even a consideration at all, while others reveal high degrees of complacency regarding risk. In some narratives risk-taking behaviour such as speeding clearly appears to have been motivated by attempts to test skill levels. Unavoidably, nobody can know their absolute limits under a given set of conditions until they have lost control.

## REFERENCES

Austrroads. 2005. *Road Safety in Rural and Remote areas of Australia*. Austrroads Research Report AP-R273/05. Sydney: Austrroads Incorporated.

FORS. 1996. Federal Office of Road Safety, National Road Safety Implementation Task Force. ‘Australia’s rural road safety action plan: focus for the future’. Canberra: Federal Office of Road Safety.

Laurence, M.D., Snortum, J.R. and Zimring, F.E. (Eds.) 1988. *Social Control of the Drinking Driver*. Chicago: University of Chicago Press.

MCNSW. 2002. Motorcycle Council of New South Wales. ‘Crash investigation’ [online]. Available: <http://www.roadsafety.mccofnsw.org.au/cgi-bin/printable.pl?id=44> Accessed: 21/06/2006.

Nabi, H., Guéguen, A., Chiron, M., Lafont, S., Zins, M. and Lagarde, E. 2006. ‘Awareness of driving while sleepy and road traffic accidents: prospective study in GAZEL cohort’ [online]. *BMJ*, doi:10.1136/bmj.38863.638194.AE. Available: <http://bmj.bmjournals.com/cgi/content/full/333/7558/75> Accessed: 13/07/2006.

Natalier, K. 2001. ‘Motorcyclists’ Interpretations of Risk and Hazard’. *Journal of Sociology* 37: 65-80.

NHTSA. 1997. National Highway Traffic Safety Administration (US). Chapter 4: ‘Analysis of police crash report narratives’ in *An Investigation of the Safety Implications of Wireless Communications in Vehicles* [online]. Available: <http://www.nhtsa.dot.gov/people/injury/research/wireless/#exec> Accessed: 10/07/2006.

Parliamentary Travelsafe Committee. 2001. ‘Rural road safety in Queensland: final report.’ Brisbane: Queensland Legislative Assembly.

Queensland Transport. 2005. ‘2003 Road traffic crashes in Queensland’ [online]. Available: <https://www.webcrash.transport.qld.gov.au/webcrash2/> Accessed: 10/07/06.

Queensland Transport. 2006. *Northern Region Road Safety Action Plan 2006-2007*. Queensland Government.

Rees, R. 2006. ‘Driven to destruction’ in *The Age*, 22/04/2006. Melbourne: Fairfax.

Smith, D.B. 2005. ‘Managing the change of cultural resistance’ [online]. Paper presented to the Social Change in the 21st Century Conference, 28 October 2005. Centre for Social Change Research, Queensland University of Technology. Available: [http://www.socialchange.qut.edu.au/conferences/socialchange/docs/conf\\_papers2005/Smith.pdf](http://www.socialchange.qut.edu.au/conferences/socialchange/docs/conf_papers2005/Smith.pdf) Accessed: 13/07/2006.

Snortum, J.R. 1988. 'Deterrence of alcohol-impaired driving: an effect in search of a cause' in M.D. Laurence, J.R. Snortum and F.E. Zimring (Eds.) *Social Control of the Drinking Driver*. Chicago: University of Chicago Press.

TFHRC. 2004. Turner-Fairbank Highway Research Center (US). 'Safety/crash data availability: characteristics of emerging road and trail users and their safety' [online]. Available: <http://www.tfhrc.gov/safety/pubs/04103/04.htm> Accessed: 21/06/2006.

Veitch, C., Sheehan, M., Turner, R., Siskind, V. and Pashen, D. 2005. 'The economic, medical and social costs of road traffic crashes in rural north Queensland: a 5-year multi-phase study' [online]. Paper presented to the National Rural Health Conference 2005. Available: <http://www.abc.net.au/rural/events/ruralhealth/2005/papers/8nrhcfinalpaper00466.pdf> Accessed: 14/07/2006.

Walker, L., Williams, J. and Jamrozik, K. 2006. 'Unsafe driving behaviour and four wheel drive vehicles: observational study'. *BMJ*, doi:10.1136/bmj.38848.627731.2F. Available: <http://bmj.bmjournals.com/cgi/content/full/333/7558/71> Accessed: 13/07/2006.