

**TITLE: SLEEP DRIVING KNOWLEDGE IN NSW ADOLESCENTS**

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**SUMMARY**

Driver fatigue and sleepiness is a major cause of motor vehicle accidents in Australia especially in young drivers. We surveyed 1387 NSW adolescents (ages 13-17) about a range of health behaviours, resiliency and included a 5 point knowledge quiz on sleep and driving. Depending on the questions, 35-65% of respondents answered incorrectly or didn't know. Females were more likely to answer correctly. Older females demonstrated better knowledge on some questions than younger females but in males, there was no relationship between age and knowledge in males. Adolescents, particularly males, have poor knowledge about basic facts relevant to the risk of fatigue/sleep related accidents.

**INTRODUCTION**

Human error due to sleep loss is endemic in modern society (1). One consequence of this is fatigue or drowsy driver motor vehicle accidents (2). Road statistics in NSW suggest that 18% of all fatal accidents and 30% of fatal accidents in rural areas are attributable to driver fatigue.(3). The US National Highway Traffic safety Administration estimates that over 1 million crashes each year result from driver inattention (6). Although all of these do not involve sleepiness or fatigue, "sleep deprivation and fatigue make such lapses of attention more likely to occur" (6-7).

Driver fatigue and sleepiness is a major problem at all driving ages but particularly in young drivers (8-10). Data from a 1995 study conducted in North Carolina (10), indicated that 55% of fall asleep MVA's occurred among those under age 26. The vast majority of these were in young male drivers. The driver is often alone, and is especially likely to be young and male (2,6,10).

Sleep loss causes a wide range of neurobehavioural impairment including sleepiness, perception of fatigue, impaired mood, poor reaction times, decrements in visuo-spatial processing and increased risk taking (1,11). Adolescents and young adults are particularly vulnerable to the neurobehavioural impairment related to sleep loss (12-14). Major sleep developmental trends occur during adolescence, including (i) a decrease in the amount of sleep obtained, (ii) a delay in the timing of sleep (going to bed later), and (iii) an increase in the school night/weekend night discrepancy in the sleep schedule (12-14). In part, this has a biological basis with an innate circadian sleep phase delay at this age. As well, the parental role in bedtime is withdrawn, peers and social activities influence sleep length and there is often an increasing demand in hours of education and extra-curricular activities (12-14). Adolescents and young adults often combine education and part-time employment and recent trends in the electronic communication eg chat lines further reduce sleep hours. These changes have been paralleled with the increased marketing and sales of high caffeine containing beverages to this age group. As well other data shows that the neurobehavioural impairment of sleep loss and alcohol is additive (15) and particularly affects younger subjects.

A recent NIH workshop (14) identified the need to develop health promotion strategies aimed at reducing sleep-related accidents in young drivers. The workshop identified the lack of data on sleep knowledge in adolescents that would be needed to design and target sleep health promotion strategies. As part of a larger study involving measuring resiliency characteristics and health behaviours in adolescents we asked 5 questions related to sleep knowledge and driving.

**METHODS**

i) Subjects

The study group consisted all students involved in a prospective survey of the influence of the Rock

Eisteddfod Challenge (REC) on health behaviours and modifiable resiliency characteristics which included such characteristics as sense of purpose, problem solving skills and social competence in high school students. The data presented were obtained as part of a baseline questionnaire for participants. REC participating schools were selected across a range of geographical regions within 200km of Sydney and matched with similarly located non-participating schools. The subjects lived in more than 20 different suburbs in and around Sydney, south as far as the Illawara region to Wallsend in the north, Vaucluse in the Eastern Suburbs of Sydney to Katoomba in the Blue Mountains. This represents a wide variety of geographical and socioeconomic backgrounds.

1387 students from 17 schools in years 8, 9, 10 and 11 completed the survey. The age of the students ranged between 13 and 17 with a mean age of 14.85 (SD=0.92). 31.6 % of participants were male and 63.9 % were female. The preponderance of female participants reflected the higher female participation rate in the REC.

#### ii) The Questionnaire

The questionnaire was part of a larger questionnaire designed to assess factors of resiliency and health behaviours in adolescents. Five questions relating to sleep and driving knowledge were included in the questionnaire. Subjects were given five choices (see Appendix A). Questionnaires were pre-tested in small focus groups and then in a pilot study (n = 210 )

#### iii) Data Collection

The data was collected in the classroom and the survey administered by a researcher. The students were given the surveys and an explanation of what research was about and how to complete the survey. They were assured of confidentiality. Before the data collection, students were informed about the general study-reasons and that their answers would be treated highly confidential. The students were also asked to be absolutely honest, especially in answering the drug and alcohol questions. Only one student refused to complete the survey. During the data collection procedure, most students were very cooperative and concentrated on answering the questions. Students needed between 20 and 35 minutes to answer the survey. A small number of students had a little difficulty answering some questions however, their difficulties were assisted by the administrator. Teachers were asked to leave the room, so students could feel that their answers were highly confidential. Due to discipline and legal issues some teachers preferred to stay, however they were not permitted to collect or see the survey results.

#### iv) Data Analysis

Questionnaire data was “collapsed” into 3 categories either incorrect, don’t know or correct. Data was analysed using SPSS Version 10 and relationships between variables investigated using non-parametric correlation (Spearman’s rho).

## RESULTS

<b>Radio Volume</b>	<b>Frequencies</b>	<b>Percent (cumulative percent)</b>
Incorrect	424	30.6 (30.6)
Don't Know	356	25.7 (56.3)
Correct	605	43.7 (99.9)
Missing data	2	.1 (100.0)
Total	1385	100.0

<b>Sleep Need Younger vs Older</b>	<b>Frequencies</b>	<b>Percent (Cumulative Percent)</b>
Incorrect	257	18.5 (18.5)
Don't Know	323	23.3 (41.8)
Correct	807	58.2 (100.0)
Missing data	0	0
Total	1387	100.0

<b>Incorrect Sleep Need Hours</b>	<b>Frequencies</b>	<b>Percent (cumulative percent)</b>
Incorrect	208	15.0 (15.0)
Don't Know	271	19.6 (34.6)
Correct	907	65.4 (100.0)
Missing data	1	0
Total	1387	100.0

<b>Sleep, Driving, Alcohol</b>	<b>Frequencies</b>	<b>Percent (cumulative Percent)</b>
Incorrect	106	7.7 (7.7)
Don't Know	494	35.7 (43.4)
Correct	785	56.7 (99.9)
Missing data	2	.1 (100.0)
Total	1387	100.0

<b>Age and Fall Asleep Accidents</b>	<b>Frequencies</b>	<b>Percent (cumulative percent)</b>
Incorrect	269	19.5 (19.5)
Don't Know	635	45.9 (65.4)
Correct	479	34.6 (99.7)
Missing data	4	.3 (100.0)
Total	1387	100.0

Subject age was correlated with responses to Question 1 “RADIO” ( $p < .001$ ) and 4 “ALCOHOL” ( $p < .01$ ) only. Older subjects were more likely to be correct with their responses. There was no relationship between age of subject and correct responses for the 3 other questions. When subjects were divided according to gender, there was no relationship between age and correct response to any of the questions in males.

Females were more likely to be correct for questions 2 “AGE” and 5 “OLDER DRIVER”. Males were more correct for question 1 “RADIO” but only at younger ages. Overall, females had fewer incorrect responses but only 7% of subjects answered all questions correctly. Preliminary analysis showed no relationship between other health behaviours and sleep and driving knowledge.

## CONCLUSIONS

These data indicate that sleep and driving knowledge in adolescents is poor. Only 7% of the sample answered all 5 questions correctly. Over 65% of adolescents surveyed did not know that younger drivers were more likely to fall asleep at the wheel than older drivers. Over 40% were not aware that younger people need the same or even more sleep than their elders. Answers to questions revealed a misperception as to the relative risk of younger versus older drivers. Males had more incorrect scores than females and failed to improve scores as they approached the age of eligibility for driver licenses.

Given the frequency of fall asleep accidents in young drivers, the lack of knowledge on sleep and driving demonstrated in this survey is of concern. High school health promotion and young driver education programs need to focus on the risks of falling asleep while driving, particularly in young drivers. The need for proper sleep length and the risks of combining alcohol with sleep loss should be emphasised.

## ACKNOWLEDGEMENTS

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## APPENDIX

### SURVEY QUESTIONS

	Strongly Disagree	Disagree	Neither Agree nor disagree	Agree	Strongly Agree
1. Raising the volume of you radio will help you stay awake whilst driving.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Younger people (aged 17- 25) need less sleep than older people.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Most young adults can get by on 4 or 5 hours sleep per night.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. In young drivers, lack of sleep increases the effect of 2 - 3 glasses of beer (or other alcohol ) on driving.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Older drivers (over 30) are more likely to fall asleep at the wheel than younger drivers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>