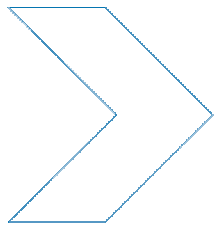


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South Australian primary schools bicycle helmet usage survey

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South Australian primary schools bicycle helmet usage survey

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ABSTRACT

This was a school-based survey that was conducted to assess bicycle helmet compliance rates amongst South Australian primary school students riding to school. 32% of South Australian primary schools chose to participate in the survey. The total number of students surveyed in the participating schools accounted for approximately 42% of all primary school children. It was estimated that 4% of primary school children ride their bicycle to school. Of the students riding a bicycle to school, 92% wore a helmet. The highest rate of helmet-compliance was reported in Catholic and independent primary schools (100%). Geographically, the lowest rate was reported in the metropolitan Adelaide region (89%).

KEYWORDS

Child, Bicycle, Cyclist, Helmet usage, School, Field study

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Summary

This was a school-based survey that was conducted to assess bicycle helmet compliance rates amongst South Australian primary school students riding to school. 32% of South Australian primary schools chose to participate in the survey. The total number of students surveyed in the participating schools accounted for approximately 42% of all primary school children. It was estimated that 4% of primary school children ride their bicycle to school. Of the students riding a bicycle to school, 92% wore a helmet. The highest rate of helmet-compliance was reported in Catholic and independent primary schools (100%). Geographically, the lowest rate was reported in the metropolitan Adelaide region (89%).

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1 Background

In July of 1991 legislation was passed in South Australia requiring bicyclists to wear helmets. Because of the new legislation, and an enforcement campaign by police, compliance with the legislation appeared initially to be high. However, in recent years anecdotal reports have suggested that the compliance with bicycle-helmet legislation is waning.

The Department of Transport and Urban Planning (DTUP) expressed an interest in the issue of compliance with bicycle-helmet legislation. DTUP requested the Centre for Automotive Safety Research (CASR) to include in their research program, a school-based survey to assess bicycle helmet compliance. CASR commissioned the Department of Health to undertake the survey.

2 Methods

In October 2003 every primary school in South Australia received a letter of invitation to participate in the South Australian Primary Schools Bicycle Helmet Usage Survey (see Appendix A). The survey was conducted both in metropolitan and country South Australia, and across all public, Catholic and independent primary schools.

The survey was conducted from the 3rd -7th November 2003. Participation in the survey involved each school nominating an observer who spent one hour, on one designated morning of the survey week, standing at the school's bicycle racks recording whether students that arrived at school by bicycle were wearing a helmet. The study population was primary school students from Reception to Year 7 (R-7) aged approximately from 5 to 12 years. A short survey form and complete instructions were provided to each school with a reply paid self-addressed envelope for returning the survey results (see Appendix B). Schools were requested, in the survey instructions, not to forewarn students of the upcoming survey, so that the survey results would be representative of regular helmet wearing activity.

Participation in the bicycle helmet survey did not require any other action to be taken, other than completing and returning the brief survey form. However, schools were given the opportunity to inform students about bicycle safety (*after* the survey) through a free educational kit that was made available to participating schools (see Appendix C). The educational kit provided a useful method of encouraging school participation through the provision of resources for teachers.

Two weeks after the Bicycle Helmet Survey had concluded an appointed study-observer visited a random sample of all public, Catholic and independent primary schools in the metropolitan Adelaide area *that chose not to participate* in the survey to conduct site observations and obtain the survey data. This second part of the study was conducted as a validation exercise – to determine whether helmet wearing among responding primary schools was the same as that for non-responding primary schools. The validation observations could only be conducted in non-participating schools, and only in the metropolitan Adelaide area, due to the financial constraints of the study. In these site observations of non-respondent schools, the survey data were obtained by the study-observer standing at the school's entrance gate and recording whether students that arrived to school by bicycle were wearing a helmet. This different technique was used to collect the data because the study-observer was not authorised to be within the school grounds.

Estimates of the total enrolment of students were obtained from the Department of Education, Training and Employment Services (DETE), the Catholic Education Office, and the Association of Independent Schools of SA. In a small number of cases, enrolment information was sought directly from the schools themselves.

This survey was conducted with the assistance of DETE. Throughout the project, contact with the schools was made particularly easy by using existing channels of communication that DETE has established. Contacting schools through DETE was found to be very cost-effective and timely. Similar methods of communication should be considered for future work in road safety, where collaborative projects with DETE, and school communities are feasible.

3 Response

There were 683 invitations sent to schools, with 217 (31.8%) agreeing to participate. Of the 217 schools that participated 34 (15.7%) completed the survey outside the designated survey week. These responses were considered to be representative of those conducted during the survey week and were included as survey results.

The 217 participating schools have a total enrolment of 48,347 primary school students. Although the overall response rate for the survey was 31.8%, the responding schools accounted for approximately¹ 42.3% of all primary school students in years R-7 (48,347/114,287) in South Australia.

The response rate varied across educational sectors: public schools had the highest response rate of 37.0% (187/505) followed by Catholic schools 26.9% (25/93). Independent schools had a very low response rate of 5.9% (5/85). Table 3.1 shows the response rates by educational sector and school type.

Table 3.1
Response rates for the South Australian Bicycle Helmet Usage Survey, 2003

	Schools invited	Schools responding	Response rate
Public schools			
Aboriginal schools	18	5	27.8%
Area schools	51	23	45.1%
Junior primary schools	35	3	8.6%
Primary schools	386	151	39.1%
Primary/secondary schools	13	3	23.1%
Rural schools	2	2	100.0%
Public schools total	505	187	31.8%
Catholic schools			
Primary schools	74	23	31.1%
Primary/secondary schools	19	2	10.5%
Catholic schools total	93	25	26.9%
Independent schools			
Primary schools	47	3	6.4%
Primary/secondary schools	38	2	5.3%
Independent schools total	85	5	5.9%
All Primary Schools Total	683	217	31.8%
All Primary Students Total	48,347	114,287	42.3%

¹ Based on 2001 mid-year figures (DETE 2001 Statistical Bulletin, Strategic Planning and Information, 2002).

4 Survey results

The proportion of primary school students riding a bicycle to school was 4.1% (1,984/48,347). Of the students riding a bicycle to school, 92.3% (1,832/1,984) were wearing a helmet. Previous studies in Australia have reported bicycle helmet rates among primary school children to be between 85² and 97³ percent. Table 4.1 shows the survey results by educational sector and school location.

Table 4.1
Survey results for the South Australian Bicycle Helmet Usage Survey, 2003

	Total schools	Total enrolments	Number students observed	Number of students wearing helmet	Proportion of students riding to school	Helmet wearing rate
All Primary Schools	217	48,347	1,984	1,832	4.1%	92.3%
Educational Sector						
Public schools	187	40,980	1,830	1,678	4.5%	91.7%
Catholic schools	25	6,601	136	136	2.1%	100.0%
Independent schools	5	766	18	18	2.3%	100.0%
School location						
Rural schools	115	17,427	1,029	980	5.9%	95.2%
Metropolitan schools	102	30,920	955	852	3.1%	89.2%
Other schools						
Non-respondent schools	40	11,285	133	111	1.2%	83.5%
Aboriginal schools	5	292	18	0	6.2%	0.0%

4.1 Public Schools

A total of 187 public schools participated in the survey, with a total enrolment of 40,980 primary school students. The rate of bicycle riding to school was slightly higher than for all schools at 4.5% (1,830/40,980). Of the students riding a bicycle to school, 91.7% were observed wearing a helmet (1,678/1,830). Although this rate of helmet wearing for public schools was quite high, it was slightly below the rate of helmet wearing for all schools.

4.2 Catholic schools

A total of 25 Catholic schools participated in the survey, with a total enrolment of 6,601 primary school students. The rate of bicycle riding to school among Catholic school students was much lower in comparison with all schools at 2.1% (136/6,601). Of the students riding a bicycle to school, all were recorded as wearing a helmet (136/136), a reported compliance of 100%. The reliability of this rate of compliance is unknown, as the validation exercise was not conducted for participating schools.

² Bicycle helmet wearing survey, Royal Automobile Club of Queensland, Brisbane, 2001.

³ Ratcliffe P, *Bicycling in the ACT: A survey of bicycle riding and helmet wearing in 1992*, Department of Urban Services, Canberra, 1993.

4.3 Independent schools

A total of 5 independent schools participated in the survey, with a total enrolment of 766 primary school students. The rate of bicycle riding to school among independent school students was again much lower in comparison with all schools at 2.3% (18/766). Of the students riding a bicycle to school, all were recorded as wearing a helmet (18/18), with a reported 100.0% compliance. Again, the reliability of this reported 100% compliance is unknown, as validation of participating schools was not conducted.

4.4 Rural schools

A total of 115 rural schools participated in the survey, with a total enrolment of 17,427 primary school students. The rate of bicycle riding to school among rural school students was higher in comparison with all schools at 5.9% (1,029/17,427). Of the students riding a bicycle to school, 95.2% were wearing a helmet (980/1,029), which was above the rate of helmet wearing for all schools.

4.5 Metropolitan schools

A total of 102 metropolitan schools participated in the survey, with a total enrolment of 30,920 primary school students. The rate of bicycle riding to school among metropolitan school students was lower in comparison with all schools at 3.1% (955/30,920). Of the students riding a bicycle to school, 89.2% were wearing a helmet (852/955), which was below the rate of helmet wearing for all schools.

4.6 Non-respondent schools

With the permission of the DETE, the second part of the study was to conduct site observations and obtain the survey data for a random sample of metropolitan primary schools that chose not to participate in the survey. One in every seven non-responding schools was selected, resulting in a total of 40 validation observations being conducted at schools with a total enrolment 11,285 primary school students.

The results showed that non-respondent schools were different to responding schools with only 1.2% of students riding a bicycle to school (133/11,285), and only 83.5% of bicycle riders wearing a helmet (111/133). This rate of compliance with bicycle helmets was lower than the rate for all schools, and these differences were statistically significant ($p < 0.001$ for both measures).

4.7 Aboriginal schools

A total of 5 aboriginal schools participated in the survey, with a total of 292 primary school students. While the proportion of students riding a bicycle to school was higher in comparison with all schools (6.2%, 18/292) no students were observed wearing a helmet.

4.8 Schools with bicycle education programs

In the survey questionnaire, schools were asked whether in the last 6 months they had been involved in any bicycle education programs (eg BikeEd). Of the respondents, 32 schools had been involved in a bicycle safety education program. Comparison of these schools with primary schools who *did not* recently have a bicycle education program showed little difference in bicycle riding (4.4% versus 4.0%) and a slightly lower rate of helmet wearing (90.0% versus 92.8%).

4.9 Socio-economic disadvantage

An analysis was conducted to determine the helmet-compliance rates among primary school students riding to school, by level of socio-economic disadvantage. The Socio-Economic Indexes for Areas (SEIFA) are four summary measures derived from the Australian Bureau of Statistics Census of Population and Housing to measure different aspects of socio-economic conditions by geographic area. For this analysis, geographic area was defined by the postcode of the school. Note that while each school was allocated one SEIFA score according to postcode, that does not mean that all students at their normal place of residence would necessarily have the same score.

The SEIFA index selected was the Index of Disadvantage. The SEIFA Index of Disadvantage allocates each postcode a score of disadvantage that is derived from levels of income, educational attainment and unemployment within that postcode. For ease of analysis the index of disadvantage was categorised into the following four groups:

- Very high level of disadvantage
- High level of disadvantage
- Low level of disadvantage
- Very low level of disadvantage

Although the rate of helmet-compliance was quite high, there were statistically significant differences across the four groups ($p < 0.001$). Schools located in postcodes of very high disadvantage had the lowest rates of helmet-compliance, and schools located in postcodes of very low disadvantage had the highest rates of helmet compliance. Therefore, the trend was for increased helmet-compliance with decreasing levels of disadvantage, as outlined in Table 4.2.

Table 4.2
Helmet-compliance rates by level of socio-economic disadvantage,
South Australian Bicycle Helmet Usage Survey, 2003

Level of Disadvantage	Number of Bicyclists Wearing Helmet	Total Number of Bicyclists	Helmet-Compliance Rate
Very high level of disadvantage	169	204	82.8%
High level of disadvantage	344	379	90.8%
Low level of disadvantage	780	831	93.9%
Very low level of disadvantage	539	570	94.6%

4.10 Other results

Schools were asked in the survey questionnaire about the weather conditions when the survey was conducted. A total of 99.1% (215/217) of schools reported that the survey was conducted in dry weather. Therefore, weather conditions would not have influenced the survey results, and particularly the number of children that rode to school.

Of the schools that participated in the survey, 81.1% (176/217) requested to receive the bicycle safety educational kit that was offered.

5 Discussion

Generally the helmet-compliance among primary school children riding to school was high. The survey results showed the highest rates of helmet-compliance among Catholic and independent primary schools. Geographically, the lowest rate was reported in the metropolitan Adelaide region. The reported helmet-compliance among Catholic and independent primary school children was 100%. One possible explanation for this complete compliance could be a well-implemented “no helmet – no ride” school policy. As mentioned previously, the validation exercise was not conducted for participating schools, so the reliability of the 100% reported compliance is unknown.

Given that the response rate for the survey was low (31.8%) calculations were made to determine what affect the non-responding schools (68.2%), with a lower rate of helmet-compliance, would have on an estimate of helmet-compliance among all primary school students in South Australia. For the responding schools, the helmet-compliance rate is known (92.3%). Assuming that all non-responding schools were similar to those observed in the study follow-up (compliance rate 83.5%) the estimate for helmet-compliance for all primary school students in South Australia would be 89.0%, which is in concordance with other surveys conducted in Australia.

Rates of bicycle riding and helmet wearing were lower in non-respondent schools. This finding could suggest that the non-respondent schools were less likely to participate in the bicycle helmet study because the proportion of their students involved in bicycle riding is lower. The different collection method used to collect data from non-respondent schools might have introduced a bias into the reported lower rate of bicycle riding, because there might have been more than one entrance gate to the school through which bicyclists could enter, and the study-observer collected data at the main entrance gate only. However, it is unlikely that this difference in collection method biased the rate of helmet wearing found among non-respondent schools as the cyclists entering through the main gate should be representative of all cyclists arriving at the school.

Given that the survey relied on school staff conducting observations it was considered unfeasible to collect information on the appropriate fit, type or size of the helmet, because such judgments would require a sufficient level of training. Therefore, observers were instructed only to record whether the helmet was being worn, or not. In addition, comment cannot be made on whether the helmet was worn for the entire duration of the journey to school.

Note that primary school children are one of the most compliant groups in wearing a helmet whilst bicycling. High school children and adults (particularly during casual, recreational cycling) have been shown to have a much lower level of helmet-compliance. Previous studies which demonstrated helmet-compliance among primary students to be 97% found that adult and secondary student helmet-compliance were 88% and 75%⁴.

⁴ Ratcliffe P, *Bicycling in the ACT: A survey of bicycle riding and helmet wearing in 1992*, Department of Urban Services, Canberra, 1993.

6 Conclusions and recommendations

Generally, the helmet-compliance among primary school students was high. However, it is important that current education programs and initiatives receive continued funding and development so that the current level of helmet-compliance is maintained, or increased.

Due to the very low rate of helmet-compliance among Aboriginal school students it may be appropriate for some action be taken to raise helmet-compliance in this group.

In addition, there is a need for future studies to address not only helmet-compliance but also the appropriateness of helmet wearing, such as correct fitting and size. Such a study would require personnel trained in this area.

Acknowledgements

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The Centre for Automotive Safety Research receives core funding from both DTEI and South Australia's Motor Accident Commission.

The views expressed in this report are those of the authors and do not necessarily represent those of the University of Adelaide or the sponsoring organisations.

Appendix A. Letter of invitation to schools to participate in the South Australian Primary Schools Bicycle Helmet Usage Survey



ABN 97 643 356 590
162 Grenfell Street
Adelaide SA 5000

PO Box 6, Rundle Mall
Adelaide SA 5000

Telephone (08) 8226 6337
Facsimile (08) 8226 6291
DX243

Epidemiology Branch

7th October 2003

Dear Principal,

Re: South Australian Primary Schools Bicycle Helmet Usage Survey

The state government has expressed an interest in the issue of compliance with bicycle-helmet legislation. The Department of Transport, in partnership with the University of Adelaide and the Department of Human Services, has designed a school-based survey to gain an impression of compliance rates among primary school students riding to school. **I am writing to invite your school to participate in this survey.**

To participate in the survey your school will need to record whether students that arrive to school by bicycle, on a nominated morning, were wearing a helmet. A short survey form and complete instructions are provided, together with a reply paid self-addressed envelope for returning the survey results. If you wish to participate in the survey, please return your survey results in the envelope provided by **Friday, 14th of November.**

Participation in the bicycle helmet survey does not require any other action to be taken other than completing and returning the brief survey form. However, if your school wishes to use this survey as an opportunity to educate students about bicycle safety (*after* the survey, of course) we can provide a free educational kit to assist this effort.

If you have any queries regarding the survey, please feel free to contact me on 8226 6220 or Helen.Thomas@dhs.sa.gov.au. I look forward to your school's participation in the South Australian Primary Schools Bicycle Helmet Usage Survey.

Sincerely

Helen Thomas
Department of Human Services



Appendix B. Instructions and survey form

SOUTH AUSTRALIAN PRIMARY SCHOOLS BICYCLE HELMET USAGE SURVEY

INSTRUCTIONS

1. The survey must be completed **unannounced** to the students on any nominated day of **WEEK 4 of TERM 4**, for **ONE morning only**.
2. The survey is to be conducted for **one hour**, prior to lessons commencing for the day. For example, if your school's lessons begin at 9.00am then the survey should be conducted between 8.00am and 9.00am.
3. One staff member needs to be assigned as the 'Observer' for the survey. The Observer must **not** be the teacher already rostered for yard duty.
4. For the one hour that the survey is conducted, the Observer will need to be located near the school's bicycle racks.
5. The survey Observer will need to record whether each primary school student riding a bicycle is wearing a helmet. The survey question "Was the student riding the bicycle wearing a helmet?" has two options:

Yes The student was wearing a bicycle helmet (carrying the helmet does not count)
No The student was NOT wearing a bicycle helmet

WAS THE STUDENT RIDING THE BICYCLE WEARING A HELMET?

YES	NO

The survey Observer needs to record in the grey box on the blue survey sheet, whether or not each student was wearing a helmet. A simple counting scheme to record the numbers in each category, such as the example illustrated above, is sufficient.

NOTE: This survey concerns primary school children in Years R-7 ONLY. The Observers in Primary/Secondary combined schools should record the helmet wearing behaviour of Year R-7 students ONLY.

6. The survey needs to be returned in the Reply Paid envelope provided by **Friday, 14th of November**.

**SOUTH AUSTRALIAN PRIMARY SCHOOLS
BICYCLE HELMET USAGE SURVEY**

TO BE CONDUCTED IN WEEK 4 TERM 4 (3RD – 7TH NOV)

SCHOOL DETAILS

Name of School: _____

Address of School: _____

_____ Post Code: _____

Name of Observer: _____ Observer Contact Number: _____

Total number of students attending school, in years R-7: _____

School location: Metro Country

School system: Public Catholic Independent

School type: Aboriginal School Area School Junior Primary School
Primary School Rural School Primary/Secondary School

Has your school been involved in any bicycle education programs (ie BikeEd) in either Term 3 or Term 4, this year? Yes No

SURVEY DETAILS

Survey Date: _____ Day of Week: _____

Survey Start Time: _____ Survey Finish Time: _____

Weather Conditions during Survey Dry Weather Wet Weather/Raining

For students in years R-7 only...

WAS THE STUDENT RIDING THE BICYCLE WEARING A HELMET?

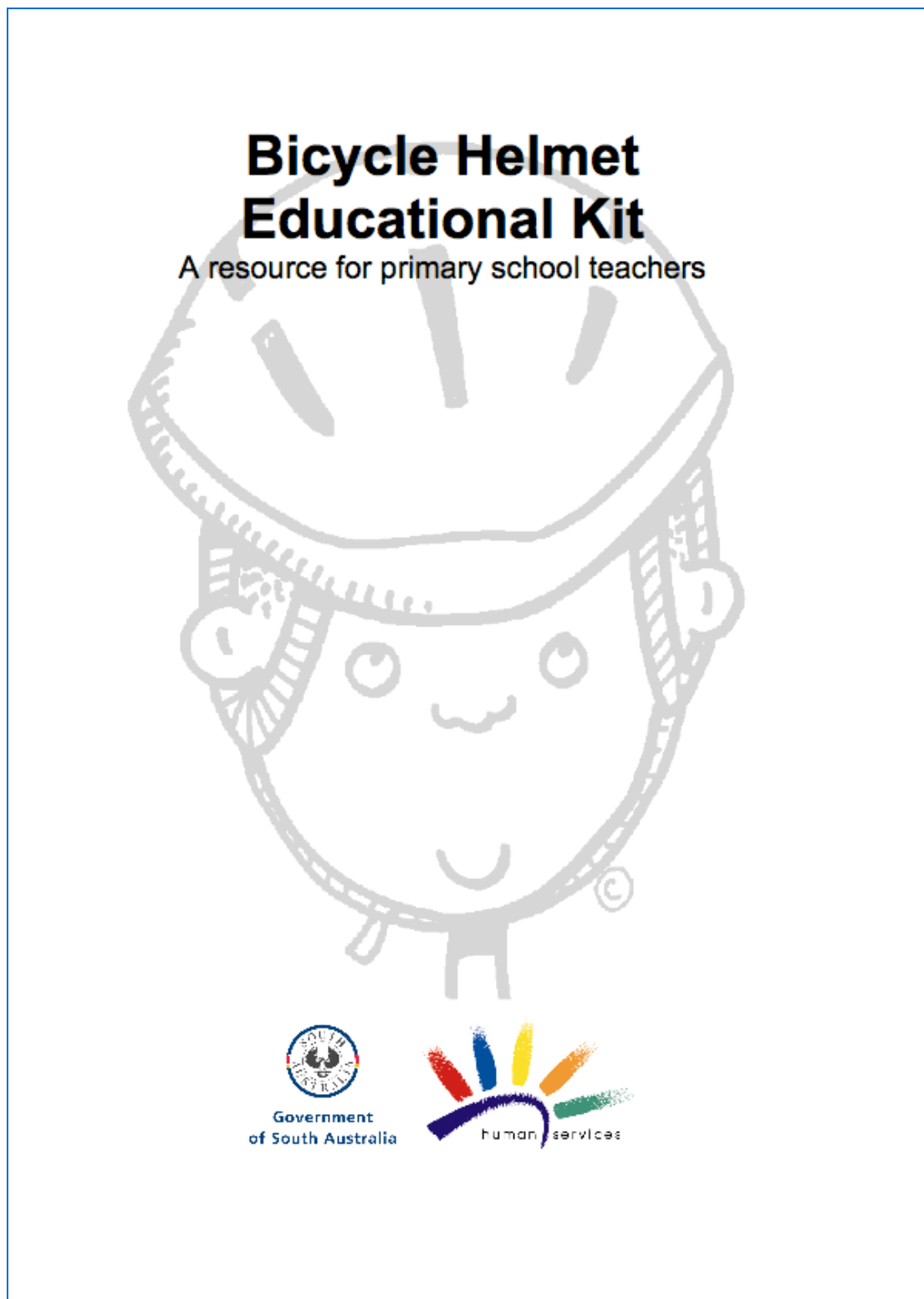
YES	NO
Total:	Total:

Does your school wish to receive a bicycle safety educational kit, for educating students about bicycle safety after the survey? Yes No

**Please return this survey sheet in the Reply Paid envelope provided by Friday 14th of November.
Thank you for your cooperation!**



Appendix C. Bicycle helmet educational kit



Bicycle Helmet Educational Kit

A resource for primary school teachers

Up to 80% of deaths and 33% of non-fatal injuries among bicyclists are due to severe head injury. There is good evidence that bicycle helmets are effective in preventing severe head injuries. Therefore, it is not surprising that much of the preventive effort in reducing bicycle injuries concentrates on increasing helmet-wearing rates.

What does the law say?

In South Australia it is compulsory for bicyclists to wear an approved helmet at all times. The Australian Road Rules (Rule 256 for bicycle helmets) state the following "The rider of a bicycle must wear an approved bicycle helmet securely fitted and fastened on the rider's head".

Why should a bicyclist wear a helmet?

Bicycle helmets substantially reduce the risk of head injury in a crash, because they are designed to protect the brain and the skull during an impact. There are two ways to determine the effectiveness of bicycle helmets – firstly, by conducting biomechanical tests in a laboratory and secondly, through by investigating real crashes.

Biomechanical testing

Biomechanical laboratory testing is used to assess helmet performance and determine the relative effectiveness of different helmet designs. Helmets are tested for:

- ✓ the amount of impact protection they provide
- ✓ strap-system strength
- ✓ stability
- ✓ peripheral vision clearance

to ensure that they comply with the mandatory Australian Standard for bicycle helmets.

The most important aspect of a bicycle helmet's performance is the amount of impact protection it provides. In biomechanical testing, this is determined by using a helmet drop test. The bicycle helmet being tested is secured to a headform (like a head of a crash-test dummy) and dropped onto a rigid surface. A device inside the headform measures the amount of force the headform experiences from the impact, and subsequently the amount of force absorbed by the helmet can be calculated. The more of the force absorbed by the helmet the better, as it lowers the risk of the rider getting a head injury.

The results of biomechanical tests predict that without a helmet a 1-metre fall onto a rigid surface would cause a serious head injury to between 70-99% of the population. In contrast, the same fall protected by a tested bicycle helmet would cause a serious head injury to less than 1% of the population¹.

Crash studies

¹ Impact, skid and retention tests on a representative group of bicycle helmets to determine their head-neck protective characteristics, Hodgson VR. Department of Neurosurgery, Wayne State University, February 1990.

Several crash studies have now been conducted into the effectiveness of bicycle helmets. These studies have shown that helmets can reduce the risk of severe head injury by up to 85%. A case-control study conducted in Seattle in 1989 indicated that the use of bicycle helmets reduced the risk of bicycle-related head injury by 74%-85%².

In other words, riders who do not wear helmets are several times more likely to sustain an injury to the brain than riders who do wear a helmet.

What are helmets made of?

Helmets basically consist of a foam shell which is designed to absorb the impact forces, and a retention system (the straps) which are designed to hold the helmet on the head in the event of an accident.

There are three types of helmets:

- **Soft shell**, which consist of a foam shell with a fabric cover
- **Micro shell**, which has a thin plastic cover over the foam
- **Hard shell**, which has a thicker plastic cover over the foam. This type of helmet, being of a more sturdy construction, is useful for children as the helmet can take a bit more day-to-day knocking around than the other types

Selecting a helmet

- ✓ **The impact protection provided by different brands of bicycle helmets can vary. Ensure that you choose a helmet that has been approved by Standards Australia. It will have a sticker "Australian Standard AS/NZS 2063: 1999"**
- ✓ It is essential to buy a helmet that is a correct fit. Helmets should never be bought for children to 'grow into'
- ✓ Ensure that the helmet is not too heavy for young children so they can wear it comfortably for hours
- ✓ Choose a bright coloured helmet to make the rider more visible to other road users

Correct fitting of a helmet

- ✓ **Make sure the chin strap fits securely and that the helmet is fastened**
- ✓ Wear the helmet flat atop your head, not tilted back at an angle (see picture below)



Correct fitting of a helmet (cont'd)...

² Thompson RS, Rivara FP, Thompson DC. A case-control study of the effectiveness of bicycle safety helmets. N Engl J Med, 1989; 320: 1361-7.

- ✓ **Make sure the helmet fits snugly and does not obstruct your field of vision.**
- ✓ **The straps should not be twisted and should not cover the ears.**

A helmet that is not secured correctly does not provide maximum protection for your head if you are involved in an accident

When should a helmet be replaced?

A bicycle helmet should be replaced if:

- It has been involved in an accident
- Any cracks appear in the foam
- The straps begin to fray

Some useful internet links

<http://www.bhsi.org/toolkit.htm>


Source: US Bicycle Helmet Safety Institute (BHSI)

A toolkit for helmet promotion programs – includes list of activities for primary school children, school poster contest ideas, consumer guides, helmet fitting guides and lots more. Definitely worth checking out!!

<http://www.schoolroadsafety.wa.edu.au/Bicycle.pdf>

Source: Department of Education and Training, Western Australia

A guide to integrating bicycle safety into a curriculum framework



**Definitely worth
checking out this
site!**