Sydney Cycling Survey 2012
Methods and Findings

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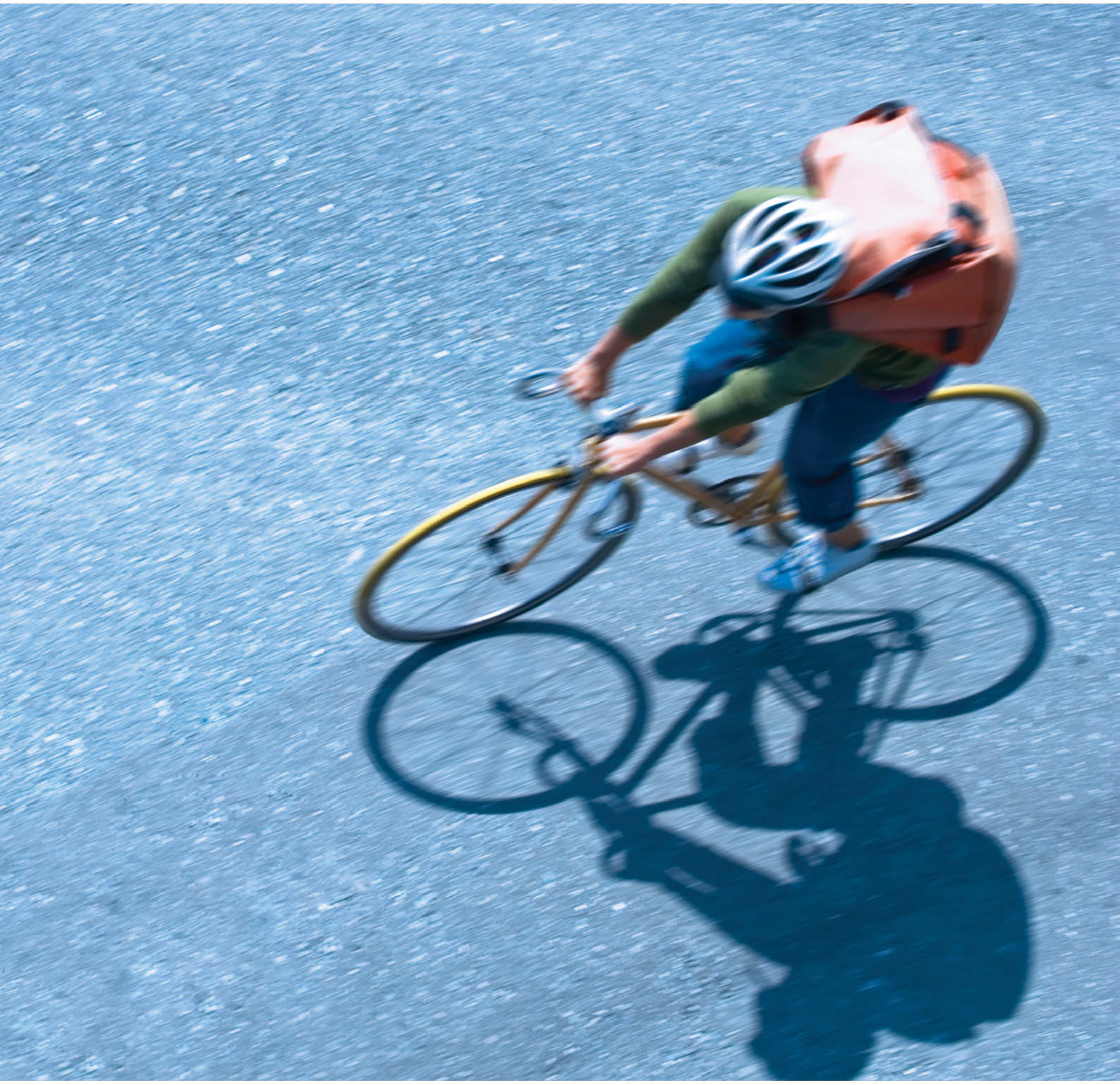

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Foreword

The Bureau of Transport Statistics (BTS) commissioned AMR to undertake the Sydney Cycling Survey 2012. The survey collected data suitable for the analysis of the incidence and nature of cycling, the characteristics of cyclists and cycling participation.

This report documents the survey methodology and estimation process, and presents the main findings. This report was prepared by AMR for the BTS.

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Contents

1. Executive Summary

The Bureau of Transport Statistics (BTS) commissioned AMR to implement a survey to monitor the mode share of bicycle trips and cycling participation rates in the Sydney Greater Metropolitan Area. Similar surveys were previously undertaken in 2010 and 2011.

A key objective of the survey was to measure the cycling mode share of all trips of up to 10 km. BTS's Household Travel Survey was used to provide measures of non-cycling trip modes for the calculation of cycling mode share.

The Sydney Cycling Survey (SCS) 2012 was conducted using computer assisted telephone interviews (CATI) of a stratified sample of households in 17 statistical subdivisions (SSDs) in the Greater Metropolitan Area from 13 November to 3 December 2012. A total of 11,660 individuals from 4,227 households were measured in the survey. Data on individual and household demographics were obtained, as well as information on cycling participation.

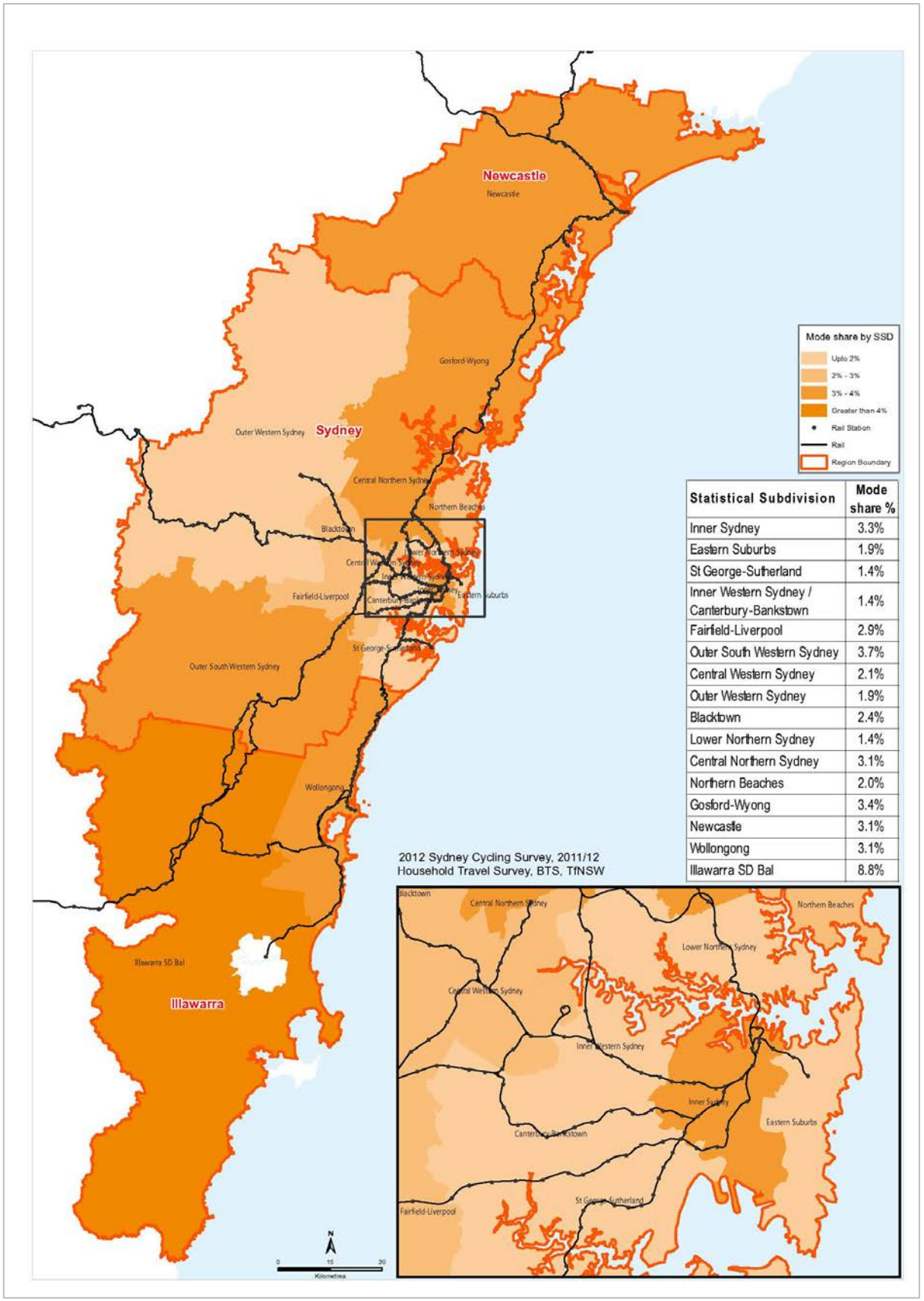
Population statistics were provided by BTS, from ABS estimates of resident population in each SSD by age and gender, for the weighting of the survey data. It was estimated that 3.85% of the population had cycled on the previous day on a public road, footpath or park in the Greater Metropolitan Area, with 3.37% having cycled on trips of up to 10 km in distance.

The key findings on cycling from the survey are shown below:

- 3.37% (CI[1]:3.06–3.71%) of the population cycled on the previous day on a public road, footpath or park in the Greater Metropolitan Area, on a trip of up to 10 km;
- males (4.69%) were more likely to have ridden than females (2.08%);
- children aged up to 14 (7.40%) were more likely to have ridden than those aged 15-49 (2.94%) and those aged 50 and over (1.66%);
- based on the survey results, it was estimated that on a typical day around 187,000 residents of the Sydney Greater Metropolitan Area ride a bicycle in a public area on trips of up to 10 km, making a total of around 393,000 trips.2 About two thirds (64%) of these trips were for social, exercise or recreation purposes. When considering trips of any distance, around 213,000 residents make cycling trips in public areas, equating to a total of around 448,000 trips per day; and
- the cycling mode share estimate for trips of up to 10 km was 2.51% (CI: 2.24%–2.81%), which was not statistically significantly different from 2.17% (1.87–2.47%) measured in 2011, but was higher than 1.91% (CI: 1.72-2.10%) reported in 2010 (see figure E1 below). There was substantial variation in 2012 across gender and age groups:
  - females aged 50 or over had the lowest cycling mode share (0.65%, CI: 0.40–1.06%); and
  - males aged under 15 had the highest (7.39%, CI: 5.95%–9.16%).

[1] 95% confidence interval.

Figure E2. Mode share of cycling trips up to 10km by Statistical Subdivision (SSD)



Statistical Subdivision	Mode share %
Inner Sydney	3.3%
Eastern Suburbs	1.9%
St George-Sutherland	1.4%
Inner Western Sydney / Canterbury-Bankstown	1.4%
Fairfield-Liverpool	2.9%
Outer South Western Sydney	3.7%
Central Western Sydney	2.1%
Outer Western Sydney	1.9%
Blacktown	2.4%
Lower Northern Sydney	1.4%
Central Northern Sydney	3.1%
Northern Beaches	2.0%
Gosford-Wyong	3.4%
Newcastle	3.1%
Wollongong	3.1%
Illawarra SD Bal	8.8%

NB: Care should be taken when looking at statistics by Statistical Subdivision (SSD) due to small sample sizes. Mode share data for Nowra not available in 2012.

2. Introduction

2.1 Report Structure

This report on the Sydney Cycling Survey (SCS) 2012 is presented in four sections:

- **Section 1** introduces the survey objectives and rationale;
- **Section 2** describes the design of the survey instrument, including the sampling methods;
- **Section 3** describes the survey processing and provides summary statistics; and
- **Section 4** provides the main survey analysis and results.

2.2 The Sydney Cycling Survey

AMR was commissioned by the Bureau of Transport Statistics (BTS) to set up and field a survey to monitor the mode share of bicycle trips made in the Greater Sydney region, at a local and district level.

Local trips are defined in the plan as trips of up to 5 km, while district trips are defined as trips of up to 10 km. The objective of this study was to design and field a survey instrument to allow monitoring of this target on an annual basis.

2.3 Defining the Bicycle Mode Share

In designing the survey method, the following definitions were used:

- the **proportion** of bicycle trips, compared to walking, using a car or travelling by bus, rail, ferry and other modes that are equal to or under 10 km in length (using BTS's Household Travel Survey as a reference for non-cycling trips);
- '**Greater Sydney'**: the Sydney and Illawarra Statistical Divisions, and the Newcastle Statistical Subdivision (referred to here as the Sydney Greater Metropolitan Area (GMA));
- **unlinked trips**: trips broken down into stages where a change of mode is involved (e.g. a bicycle ride to a station, followed by a train trip and walk at the other end would be three unlinked trips); these are referred to in the report simply as 'trips';
- **all purposes** of travel are included;
- persons of **all ages** are included;
- trips made by residents by bicycle that **start or finish** in the Greater Sydney area are included;
- only trips which are **10 km or under** in length are included; and
- an average of **all days in the week** including weekend days.

The objective was to measure a mode share for cycling, out of all trip modes of up to 10 km in length for all modes of travel, using measures of non-cycling trip modes from the BTS's Household Travel Survey (HTS).

3. Survey Design

3.1 Overview of Method

The survey method is designed to satisfy two key requirements:

1. to produce estimates which are **sufficiently reliable** to measure annual changes in a mode-share that has a very small absolute size; and
2. to be **cost effective** in producing these sufficiently reliable estimates.

The method used replicated the main elements of SCS 2011:

- administer a cross-sectional computer-assisted telephone interview (CATI) survey over a three week period primarily in November;
- conduct the initial interview with a person in the household aged 18 or older who is available;
- ask that person to provide basic demographic characteristics of all members of the household and when those individuals last rode a bicycle;
- ask all household members aged 15 years and over who had ridden yesterday (defined as midnight to midnight) for the details of their cycling trips, and allow proxy reporting (a) where a household member aged 15 years and over is unavailable, and another person can provide information, and (b) for children under 15 years who had ridden yesterday;
- expand the cycling survey data to population estimates using benchmarks consistent with the 2011/12 HTS (derived from ABS estimates of resident population);
- determine non-cycling-mode trip rates for trips up to 10 km from the HTS (2011/12[2]); and
- estimate the 2012 cycling mode share for trips up to 10 km.

3.2 Changes from SCS 2011

Changes from SCS 2011 were primarily around the inclusion of mobile phone-only households in the sampling and additional questions. An important issue in conducting telephone survey research is the shift of segments of the population away from landlines to *only* having a mobile phone. A study conducted by the Social Research Centre in 2010 suggested that about 15% of adults lived in 'mobile-only' households.[3] While this result would almost certainly be biased by focusing on an online research panel, ACMA reported in 2010 that the proportion of households without a landline had been increasing.[4]

[2] Trips for all modes are based on unlinked trips except for walking.

[3] Pennay, D. Profiling the mobile phone only population. Results for a dual-frame telephone survey using landline and mobile phone sample frame. Paper presented at the ACSPRI Social Science Methodology Conference, December 2010 (http://www.biomedcentral.com/1471-2288/8/71)

[4] ACMA, 2009-10 Communications report series: Report 2 – Take-up and use of voice services by Australia consumers. November 2010.

Table 1. Changes in the method and questionnaire in SCS 2012 compared with SCS 2011

Change in 2012	Rationale
Inclusion of mobile-only households	Better coverage of households, owing to increasing incidence of households with no land line
Collecting more detailed information about start and destination locations of cycling trips, when they were not a private dwelling	Better discriminate locations particularly in Sydney CBD vs. other parts of Sydney City
Collecting information on whether a passenger was being carried on the trip	Improve understanding of characteristics of bicycle trips
Where a respondent could not provide the distance travelled in metres/kilometres, an additional estimate of distance of trip to categorise as up to 5 km, up to 10 km and more than 10 km	Provide a more complete identification of trips up to 10 kilometres in length
Expansion and reporting of results reverted to three age bands (0-14 years, 15-49 years and 50+ years)	SCS 2011 had used four age bands (0-10, 10-29, 30-49 and 50+), but consistency was required with the HTS, which uses the three age bands

3.3 Survey Method

3.3.1 Telephone Interviewing

Computer-assisted telephone interviewing (CATI) was retained as a cost effective survey method, offering the best opportunity to obtain timely data and control sampling biases. Telephone interviews were conducted by AMR's in-house fieldroom. The following quality assurance activities were undertaken:

- all interviewers were given a training session before working on the project;
- interviewers were provided with a briefing document to help them understand the definitions and interpretations of questions and answers;
- supervisors were present during interview shifts to answer questions of clarification from interviewers and to listen in to interviews in real-time;
- daily summary targets were provided to the fieldwork manager to guide fieldwork for that day; and
- five attempts at recontacting non-responding telephone numbers, at different times of the day and days of the week, to help reduce the likelihood of contact loss and non-response bias.

3.3.2 Survey Fieldwork

The survey was conducted over a three week period from 13 November to 3 December 2012. Calls were made during the evening on weekdays (4.30 pm to 8.00 pm), and during the day on weekends (10.00 am to 4.00 pm).

3.4 Sampling

3.4.1 Sampling Frame

The sampling unit for the survey was *households* in the GMA. The sampling frame for the research was a commercially available database of established landline telephone numbers (both listed and unlisted), supplemented by random generated numbers[5] and mobile numbers from mobile-only households.[6]

The sample pool for the survey, broken down by source of numbers, is shown in Table 2.

Table 2. Distribution of sources of telephone numbers in the sample pool

Source	Number	%
Listed and established landlines	14,394	55%
Random generated landlines	7,562	29%
Mobile-only households	4,232	16%
Total	*24,689*	*100%*

3.4.2 Sampling Strata

The representativeness of a survey sample can be improved by identifying, and surveying within, strata. Stratification was based on 17 statistical subdivisions (SSDs) in the GMA. The number of private dwellings in each SSD was provided by BTS, based on estimates provided by the ABS. This distribution defined the share of households to be sampled in each SSD (Table 3).

For sampling, SSDs were defined by postcodes, based on concordances published by the ABS.[7] The concordance included the percentage of the population in each postcode falling into each SSD. A postcode was assigned to a SSD if more than 50% of the population of that postcode fell into the SSD.

[5] These numbers were generated using number prefixes within the GMA, to provide a fuller pool of numbers, to potentially capture numbers not previously identified.

[6] The sample provider identified households which had only a mobile number listed.

[7] http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/2905.0.55.001Aug%202006?OpenDocument.

Table 3. Distribution of households (private dwellings) in the statistical subdivisions, and target sample sizes for the survey

Statistical Subdivision	Households[8] *Number*	*%*	Target sample size on survey of 4,200 households
Inner Sydney	171,113	8.08%	339
Eastern Sydney	110,817	5.23%	220
St George-Sutherland	176,897	8.35%	351
Canterbury-Bankstown	116,575	5.50%	231
Fairfield-Liverpool	123,761	5.84%	245
Outer South Western Sydney	89,121	4.21%	177
Inner Western Sydney	74,993	3.54%	149
Central Western Sydney	129,074	6.09%	256
Outer Western Sydney	117,948	5.57%	234
Blacktown	102,260	4.83%	203
Lower Northern Sydney	136,578	6.45%	271
Central Northern Sydney	155,239	7.33%	308
Northern Beaches	96,250	4.54%	191
Central Coast	129,802	6.13%	257
Newcastle	215,621	10.18%	428
Wollongong	112,245	5.30%	223
Illawarra SD (Balance)	46,049	2.17%	91
Total	**2,117,801**	**100.0%**	**4,200**

3.4.3 Qualifiers

Qualification for the survey was based on the following requirements:

- the household was located within the Sydney GMA;
- the initial respondent was aged 18 or over; and
- the initial respondent was able to conduct the interview in English.

Given these qualifiers, the large majority of households telephoned qualified for the survey.

[8] From estimates of private dwellings for 2011 (source: BTS).

3.5 Survey instrument

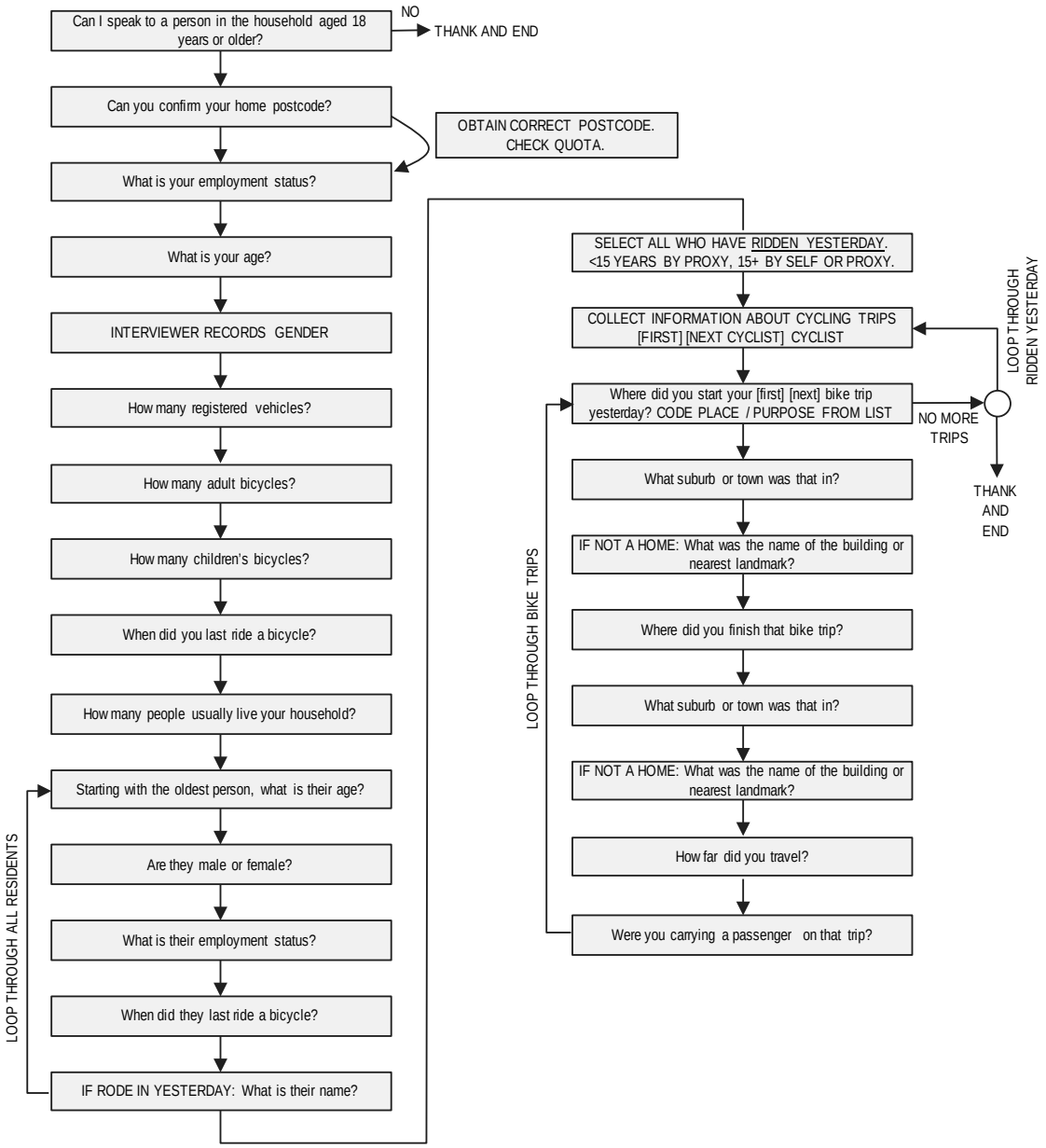
3.5.1 Structure

The survey instrument is provided as Appendix A. The instrument contained the following sections:

- identify an individual in the household who is aged 18 or older and speak to that person;
- confirm that the postcode is in the GMA;
- identify demographic characteristics (gender, age, and employment status) of that primary individual;
- identify household characteristics (vehicle and bicycle ownership, and number of residents);
- identify demographic characteristics (gender, age, and employment status) of all other household members;
- identify all household members who rode a bicycle yesterday (defined as midnight to midnight);
- collect information on cycling travel yesterday
  - if aged under 15, ask a proxy to report travel on their behalf;
  - if aged 15 or over, speak to the individual; and
  - if aged 15 or over and not currently unavailable, ask for another household member who is available to respond on their behalf.

The flowchart in Figure 1 illustrates the interview structure.

Figure 1. Survey flowchart



3.5.2 Cycling Trip Recall

Reporting of cycling trips on the previous day focused on:

- the number of trips;
- the purpose of the trip;
- the suburbs in which the trip started and finished; and
- the distance travelled.

A diary method is typically considered best practice for recording travel, in particular to avoid under-reporting of low incidence types of travel. Such an approach, however, was not feasible for the SCS.

The interview approach taken in the SCS was intended to reduce the limitation of data collection through a single interview by:

- focusing only on the travel mode of cycling, not all travel modes; and
- asking for only limited, place-based information about trips, including the suburb and type of place where the trip started and finished (which also helped classify purpose), and not more detailed information about every location.

4. Data Processing

4.1 Overview

This section of the report includes:

- the basic survey statistics and response rates;
- cleaning of the data;
- weighting and expansion to population targets;
- calculation of confidence intervals for estimating population statistics.

4.2 Survey Sample

4.2.1 Response Rates

A total of 23,643 telephone numbers were used in the main fieldwork phase,[9] of which 13,026 (55.1%) were in-scope for the survey (Table 4). A total of 4,227 interviews were completed (17.9% of numbers dialled, and 32.5% of in-scope numbers). About half (51.9%) of the in-scope numbers were to respondents who declined to participate in the survey.

Table 4: Completion rate summary – each count represents a telephone number

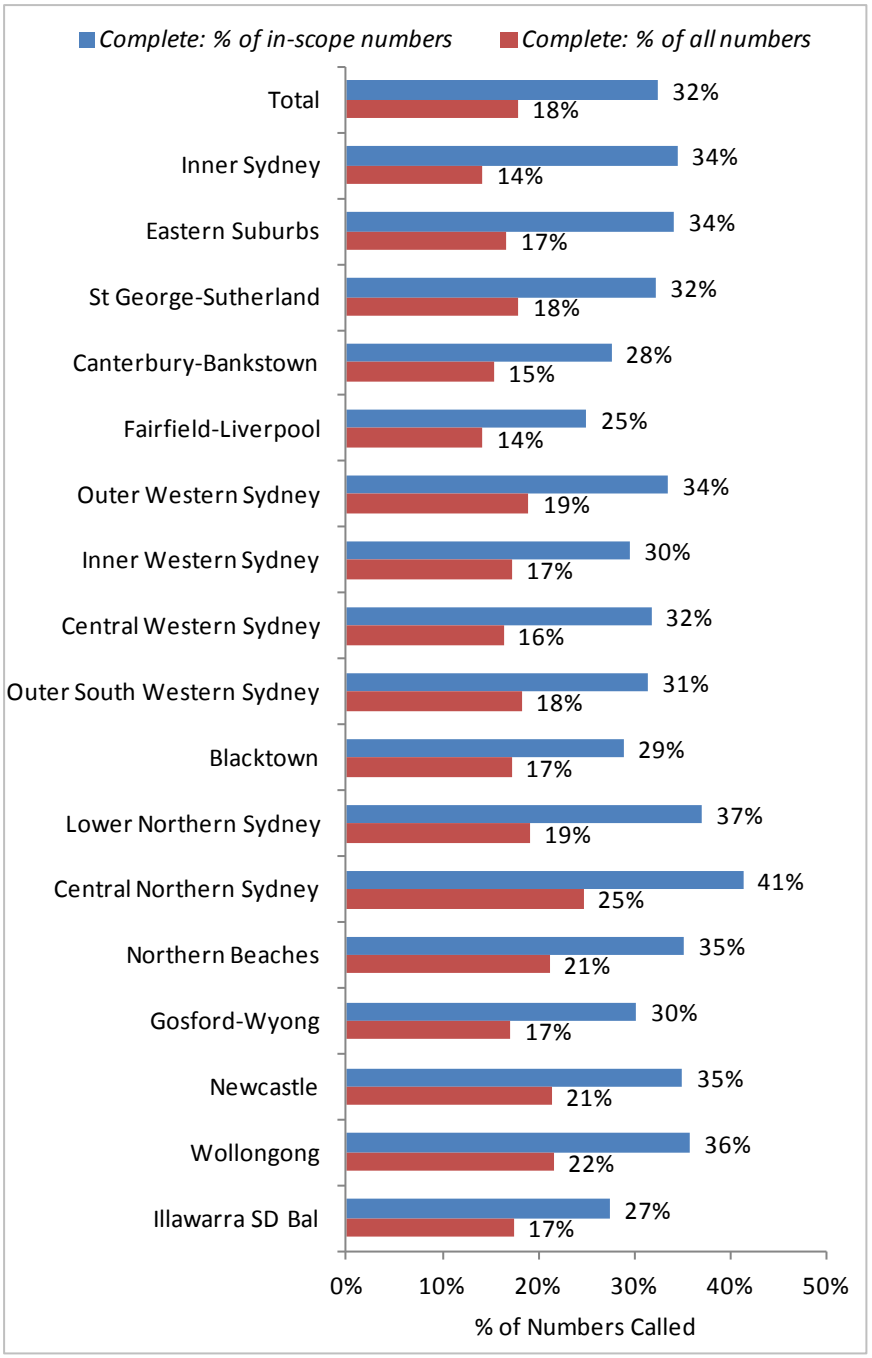
Outcome	In-scope contacts	% of dialled numbers	% of in-scope contacts
In Scope			
Completed interviews	4,227	17.9%	32.5%
Appointment/no answer[10]	1,643	6.9%	12.6%
Declined to participate	6,765	28.6%	51.9%
Communication difficulties	391	1.7%	3.0%
Total of in-scope numbers	*13,026*	*55.1%*	*100.0%*
Other contacts			
Non-qualifying respondents	292	1.2%	
Over-quota	6	0.0%	
Non-contacts			
'Dead' numbers (called 5 times)	4,317	18.3%	
Non-working number	6,002	25.4%	
Total of all numbers	**23,643**	**100.0%**	

[9] 1,046 numbers found to be business numbers have not been included.

[10] Includes 1,389 numbers that were not answered, but had not yet been called 5 times.

The response rates by SSD are shown in Figure 2. The proportion of in-scope telephone numbers that were completed varied from 25% in Fairfield-Liverpool to 41% in Central Northern Sydney.

Figure 2: Completion rates by statistical subdivision



4.3 Data Cleaning

Data cleaning involved a number of checks of the raw survey data. The issues addressed, and the resolution of the issues, are summarised in Table 5. The main change was to split trips that started and finished in the same place into two trips, each having half of the reported trip length. For example, a significant number of trips were reported as starting and finishing at home, and these were recoded as two recreational trips. This process is consistent with that used in the HTS and in SCS 2011.

Table 5. Data cleaning

Issue	Resolution
Missing household size	The number of people in the household was not provided in 42 cases. These households were treated as 'single person' households for the purpose of the survey, retaining information about the respondent.
Missing age	Age was not provided for 151 people. These were removed from the data file.
Cycling trip distances	Trip lengths were checked for overall accuracy in recording metres and kilometres. For purposes of measuring average distances travelled, trips where the respondent had only given a range of 'less than 5 km' were recorded as 2.5 km, and trips where a respondent had given a trip distance of '5 km to less than 10 km' were recorded as 7.5 km (i.e., taking the mid-point. Trip lengths of less than 100 metres were removed.
Cycling trips with same origin-destination are reported as two trips.	Where a cycling trip with the same origin and destination suburb and same origin and destination purpose is coded as one trip, it was divided into two trips, each of half the reported travel distance.
Within GMA	Trips that were outside the GMA were removed as out of scope for the study.
Missing cycling information	Cycling information was missing for 28 people (15 aged 0-14 years, 12 aged 15-49 years, and 2 aged 50+ years). A method was used to *impute* the missing number of trips by matching to the nearest cyclist based on gender, age group, geographic area and type of day (weekday and weekend).

4.3.1 Distribution by Time

The fieldwork was conducted over a three week period to provide a broader coverage of cycling and weather conditions (Table 6). Approximately equal numbers of interviews were conducted on each day of the week, with a nominal target of 600 per day on a total sample size of 4,200.

Targets were also set for households in each SSD overall (for a total of 4,200), and separately for weekdays (for a total of 3,000) and weekends (for a total of 1,200), based on the share of households shown in Table 3.

The targets were met overall for each SSD, and to within one less for covering weekday cycling (interviews conducted on Tuesday to Saturday about the previous day) and weekend cycling (interviews conducted on Sunday and Monday) (Table 7).

Table 6. Date and day of week of interviews

Date	Day of week	Interviews
13/11/2012	Tue	145
14/11/2012	Wed	141
15/11/2012	Thu	137
16/11/2012	Fri	171
17/11/2012	Sat	222
18/11/2012	Sun	222
19/11/2012	Mon	159
20/11/2012	Tue	210
21/11/2012	Wed	239
22/11/2012	Thu	235
23/11/2012	Fri	214
24/11/2012	Sat	194
25/11/2012	Sun	188
26/11/2012	Mon	222
27/11/2012	Tue	244
28/11/2012	Wed	223
29/11/2012	Thu	232
30/11/2012	Fri	222
1/12/2012	Sat	187
2/12/2012	Sun	191
3/12/2012	Mon	229
Total		*4,227*

Day of week summary	Interviews	%
Sun	601	14.2%
Mon	610	14.4%
Tue	599	14.2%
Wed	603	14.3%
Thu	604	14.3%
Fri	607	14.4%
Sat	603	14.3%
Total	*4,227*	*100.0*

Table 7. Number of target and achieved interviews overall, for weekday and weekend cycling, by SSD[11]

	OVERALL		WEEKDAY CYCLING		WEEKEND CYCLING	
Statistical Subdivision	**Target**	**Achieved**	**Target**	**Achieved**	**Target**	**Achieved**
Inner Sydney	342	342	244	245	98	97
Eastern Sydney	221	221	158	159	63	62
St George-Sutherland	353	356	252	252	101	104
Canterbury-Bankstown	233	237	166	169	66	68
Fairfield-Liverpool	247	247	176	176	71	71
Outer South Western Sydney	178	182	127	127	51	55
Inner Western Sydney	150	150	107	107	43	43
Central Western Sydney	258	258	184	184	74	74
Outer Western Sydney	235	235	168	169	67	66
Blacktown	204	207	146	147	58	60
Lower Northern Sydney	273	275	195	194	78	81
Central Northern Sydney	310	312	221	224	88	88
Northern Beaches	192	194	137	140	55	54
Central Coast	259	259	185	186	74	73
Newcastle	430	433	308	309	123	124
Wollongong	224	225	160	161	64	64
Illawarra SD (Balance)	92	94	66	67	26	27
Total	*4,200*	*4,227*	*3,000*	*3,016*	*1200*	*1,211*

4.4 Weather and Seasonal Variation

Incidence of cycling is influenced by weather conditions, including rain, temperature, and amount of sunshine. The survey covered a relatively large geographic area and weather conditions can of course vary across the area. In SCS 2011, weather measurements for Sydney were reported for the survey and the longer term period. These measurements are provided on the Bureau of Meteorology website, from observations mainly at Observatory Hill.[12] There are a number of other observation points in the GMA, and taking into account additional points provides a broader picture of the typicality of the survey period. Conditions have therefore been obtained for Sydney, Parramatta, Newcastle and Wollongong for this purpose,

Table 8 shows daily results for maximum temperature, rainfall and hours of sunshine for each survey day. Table 9 shows the daily average results for the survey period and for 2012 (with hours of sunshine only available for Sydney). The maximum temperature was slightly higher in the survey period in all areas, ranging from 0.7°C higher in Wollongong to 3.0°C higher in Parramatta. Rainfall was on average lower during the survey period in all areas, ranging from 1.1 mm lower in Parramatta to 2.1 mm lower in Wollongong. However, there were more days with at least some rainfall in all areas. The average hours of sunshine was also lower in Sydney in the survey period (-1.7 hours).

[11] Care should be taken when looking at statistics by Statistical Subdivision (SSD) due to small sample sizes.

[12] http://www.bom.gov.au/climate/dwo/IDCJDW2124.latest.shtml

Another consideration around the typicality of the survey period which could potentially impact the incidence of cycling is the overall hours of daylight. The hours between sunrise and sunset during the survey period were on average 2 hours longer than for the full year.[13]

Table 8. Weather in Sydney for survey days[14]

Date	Day of week	Max Temperature (°C)	Rainfall (mm)	Hours of Sunshine (hrs)
13/11/2012	Tue	23.9	0	9.9
14/11/2012	Wed	20.7	0	0.3
15/11/2012	Thu	24.7	0.2	7.2
16/11/2012	Fri	18	0.4	0
17/11/2012	Sat	21.3	10.4	7
18/11/2012	Sun	23.1	0	12.2
19/11/2012	Mon	21.1	0	6.9
20/11/2012	Tue	23.2	1.6	7.6
21/11/2012	Wed	24.5	0.4	10.6
22/11/2012	Thu	20.7	0	0.3
23/11/2012	Fri	22	0	5.2
24/11/2012	Sat	25.4	0	10.8
25/11/2012	Sun	31	0	12.7
26/11/2012	Mon	27.2	0	2.9
27/11/2012	Tue	24.1	3.6	1
28/11/2012	Wed	24.5	10.2	0
29/11/2012	Thu	27	1.2	8.3
30/11/2012	Fri	29.5	0	6.7
1/12/2012	Sat	31.1	1.6	5.8
2/12/2012	Sun	24.2	0	3.1
3/12/2012	Mon	22.4	1.4	0.2
Daily average		*24.3*	*1.5*	*5.7*

[13] http://www.timeanddate.com/worldclock/astronomy.html?n=240&month=1&year=2012&obj=sun&afl=-11&day=1.

[14] Most observations are from Observatory Hill, with some from Fort Denison and Sydney Airport. The results refer to: maximum temperature in the 24 hours from 9am, rainfall in the 24 hours to 9am (i.e., mostly the previous day, but indicating how much water might remain on roads and pathways), and bright sunshine in the 24 hours to midnight.

Table 9. Weather in Sydney, Parramatta, Newcastle and Wollongong during the survey period, and across 2012

	TEMPERATURE	RAINFALL		SUNSHINE
	Average Max Temp (°C)	Average (mm)	Days with Rain (%)	Average (hours)
Sydney				
Survey	24.3	1.5	48%	5.7
2012	22.7	3.3	39%	7.3
Survey vs. 2012	*+1.6*	*-1.8*	*+10%*	*-1.7*
Parramatta				
Survey	26.0	1.8	52%	—
2012	23.0	3.0	35%	—
Survey vs. 2012	*+3.0*	*-1.1*	*+17%*	—
Newcastle				
Survey	23.1	1.0	48%	—
2012	21.9	2.4	37%	—
Survey vs. 2012	*+1.2*	*-1.3*	*+10%*	—
Wollongong				
Survey	21.6	1.4	38%	—
2012	20.8	3.5	36%	—
Survey vs. 2012	*+0.7*	*-2.1*	*+3%*	—

Note: In showing the difference between the survey period and the annual average, there may be a rounding error of ±0.1 or ±1%

4.5 Demographic Characteristics and Weighting

4.5.1 Demographics

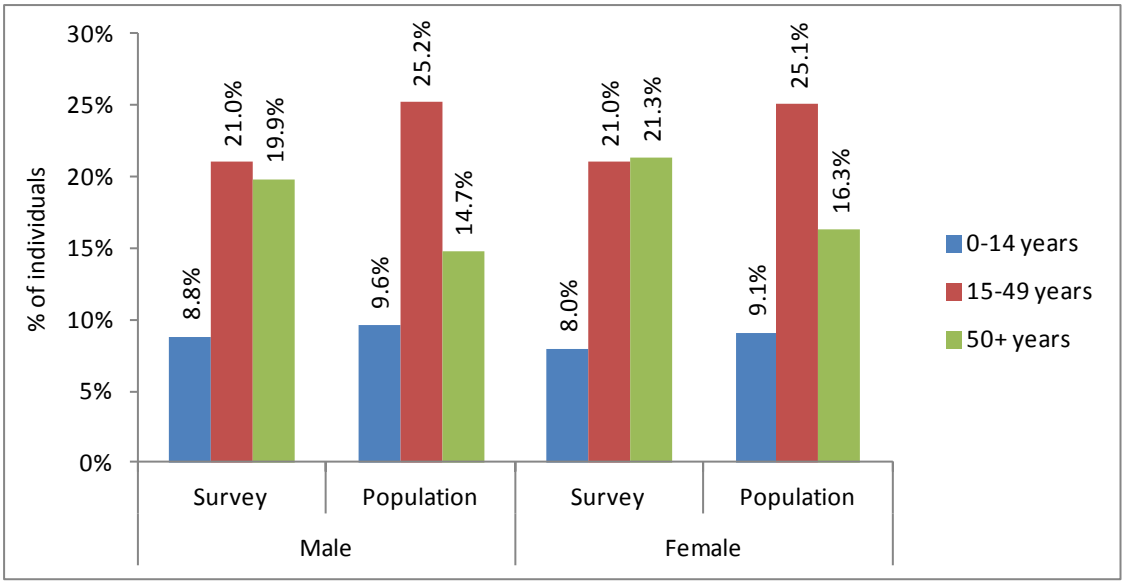
The survey results were weighted and reported for three age groups (consistent with the HTS):

- 0-14 years;
- 15-49 years; and
- 50+ years.

People aged 50 years and over were over-represented in the survey, among both males and females, while people aged 15-49 years were under-represented (needing weights of about 1.2) (Figure 3).

The weights for the 17 SSDs ranged between 0.91 and 1.10.

Figure 3: Distribution of interviews by age and gender of residents in the survey sample and in the population (using estimates provided by BTS)



4.5.2 Weighting and Expansion

The primary objective in weighting the survey sample was to equate the distribution of the residents covered in the survey sample with estimates of the residential population provided to BTS by the ABS. The final weighting procedure was more complicated, interlocking cells based on four variables:

- statistical subdivision (17 levels);
- gender (male, female);
- age group (0–14, 15-49, 50+); and
- period of week (weighted separately over *weekdays* and over *weekends*).

This approach produced 204 cells for weighting. Of the 11,660 residents represented in the survey, only 5 weights were greater than 2.1 (3 of a weight of 2.97 and 2 with a weight of 4.73). The effective sample size (ESS) for the survey was 10,842, representing 93.0% of the original sample size.

4.5.3 Confidence Intervals

The results from a survey of the population are estimates of the true population results, with a level of precision related to the size of the survey sample. There is, in addition, respondent bias, related to availability and willingness to take part in a survey. Respondent bias is to some extent addressed by weighting the coverage of people in the survey to the population based on location, age and gender.

The level of precision of a result is represented by a confidence interval of a given level. Confidence intervals for results in the survey are reported at the 95% level, meaning that 95% of observed confidence intervals of a survey of the population of the sample size measured will hold the true population result. Confidence intervals for percentages have been calculated using the Wilson interval.[15]

[15] Wilson, E.B. (1927). Probable inference, the law of succession, and statistical inference, *Journal of the American Statistical Association*, 22: 209–212. JSTOR 2276774

5. Main Findings

5.1 Summary Statistics

The summary statistics for the survey are as follows:

- 4,227 households containing 11,660 individuals;
- The sample sizes in the key groups assessed in the survey:

Group		Sample
Male	0-14 years	1,026
	15-49 years	2,450
	50+ years	2,315
	Total	5,791
Female	0-14 years	931
	15-49 years	2452
	50+ years	2486
	Total	5,869

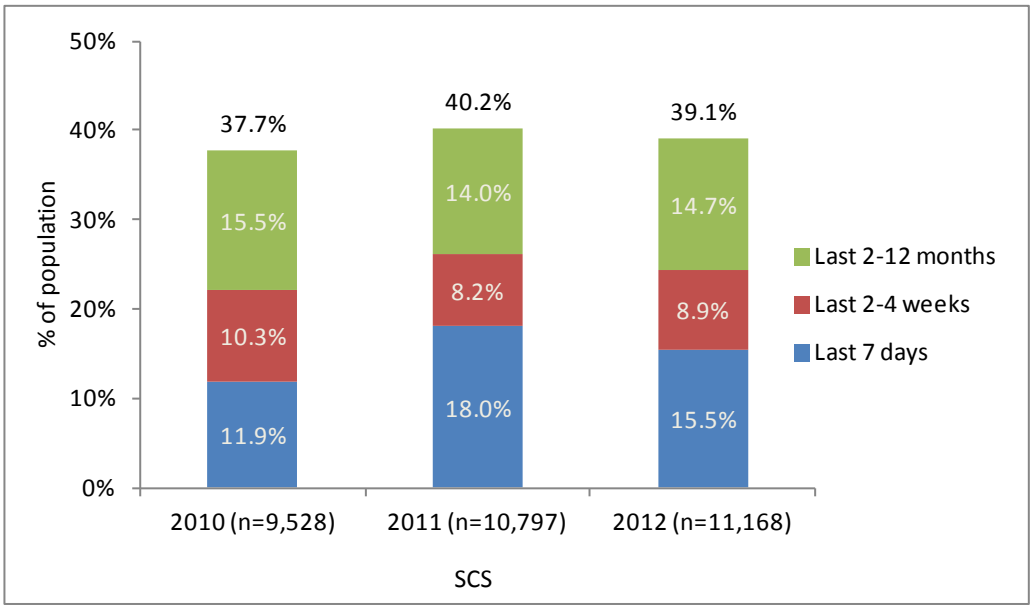
- a total of 674 individuals had ridden in the previous day:
  - 425 individuals had ridden a bicycle yesterday in a public place on a trip of more than 100m;
  - a further 249 individuals had ridden only in the backyard, on trips of less than 100m, or out of area;
- of the 425 individuals making bicycle trips meeting the initial criteria, 278 were aged 15 years and over, and 147 were aged under 15 years:
  - of the older cyclists, 164 (59%) were interviewed in person for the cycling activity, 100 (36%) were interviewed by proxy, and 14 (5%) were unavailable for interview and no other household member was available to report on their behalf; and
  - of the younger cyclists, an adult was available to be interviewed about their cycling activity for 133 (91%);
- for the 28 individuals for which cycling activity was not obtained, trips were imputed by matching to the nearest cyclist based on gender, age group, geographic area and type of day (weekday and weekend);
- after imputation, a total of 896 recorded bicycle trips were made on the previous day, of which 783 (87%) were up to 10 km in length (from 370 individuals).

5.2 Cycling Participation

Of the 11,660 individuals in the sample the cycling participation information was obtained for 11,168 (95.8%) individuals (i.e. not having a 'don't know' response[16]). Based on the weighted results, 15.5% (CI: 14.8-16.2%) of the population had ridden sometime in the past week, significantly lower compared with 18.0% (CI: 17.3-18.8%) in 2011 (Figure 4).

A fifth (20%) of males and about one in 10 (11%) females rode over the past week (Figure 5). About two fifths (39%) of children aged under 15 years had ridden in the past week compared with about one in eight (12%) of those aged 15-49 years, and less than one in ten (6%) of those aged 50 years and over (Figure 6).

Figure 4: Cycling in the past year by SCS survey (excluding 'not sure' responses, weighted)



[16] The incidences in this section have been reported taking out the 'don't know' responses for consistency with results reported from SCS 2010 and SCS 2012.

Figure 5: Recency of cycling by gender (weighted)

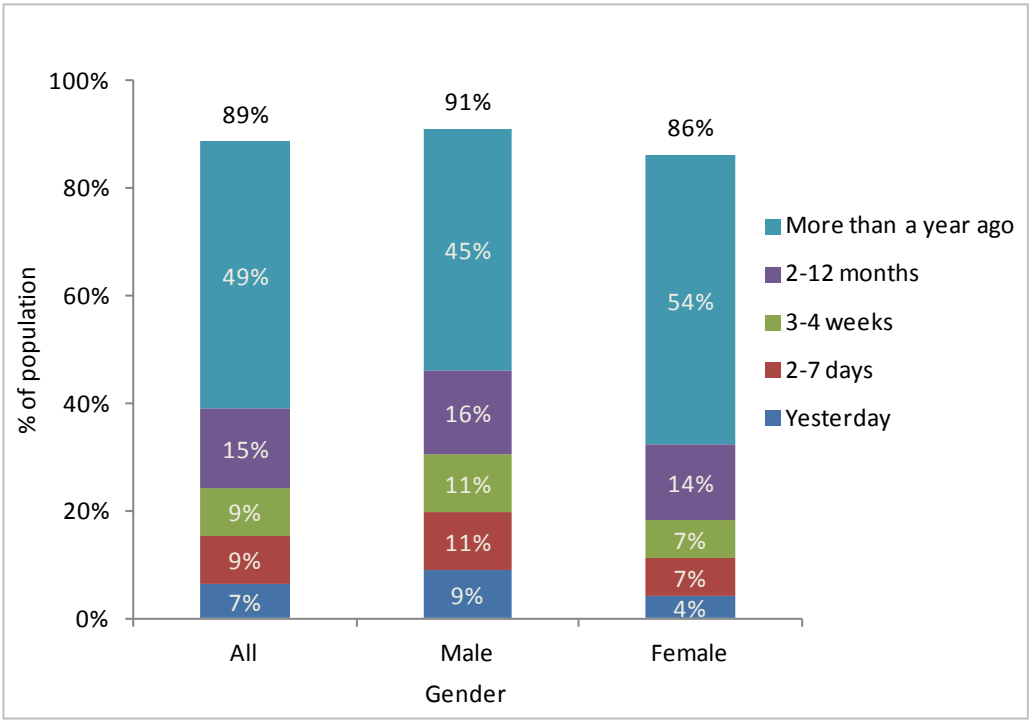
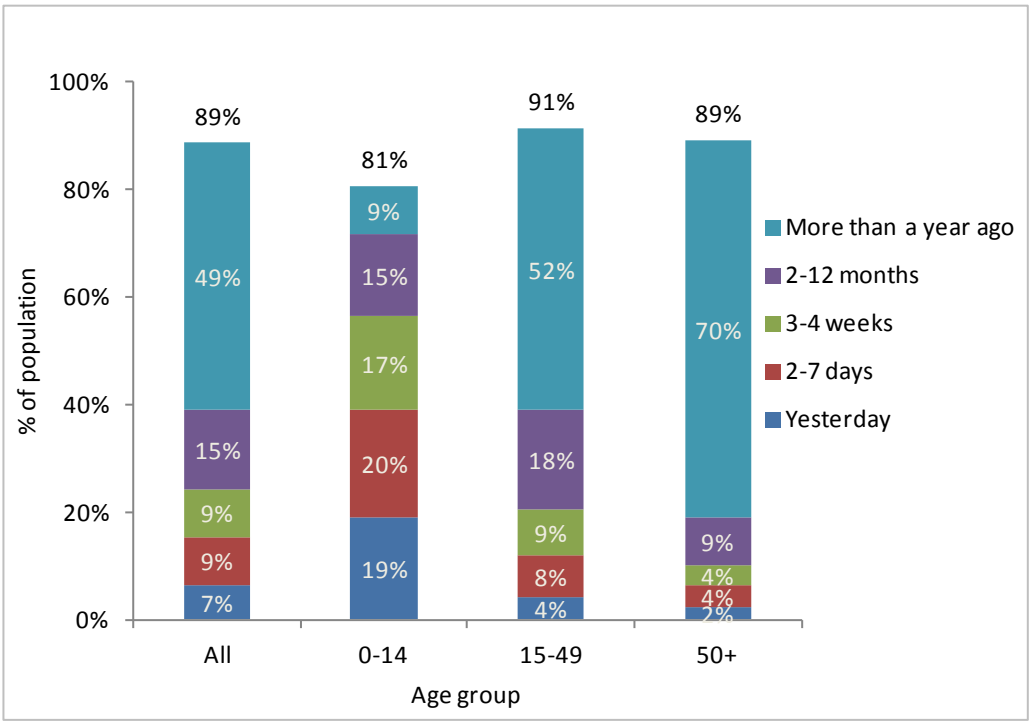


Figure 6: Recency of cycling by age group (weighted)

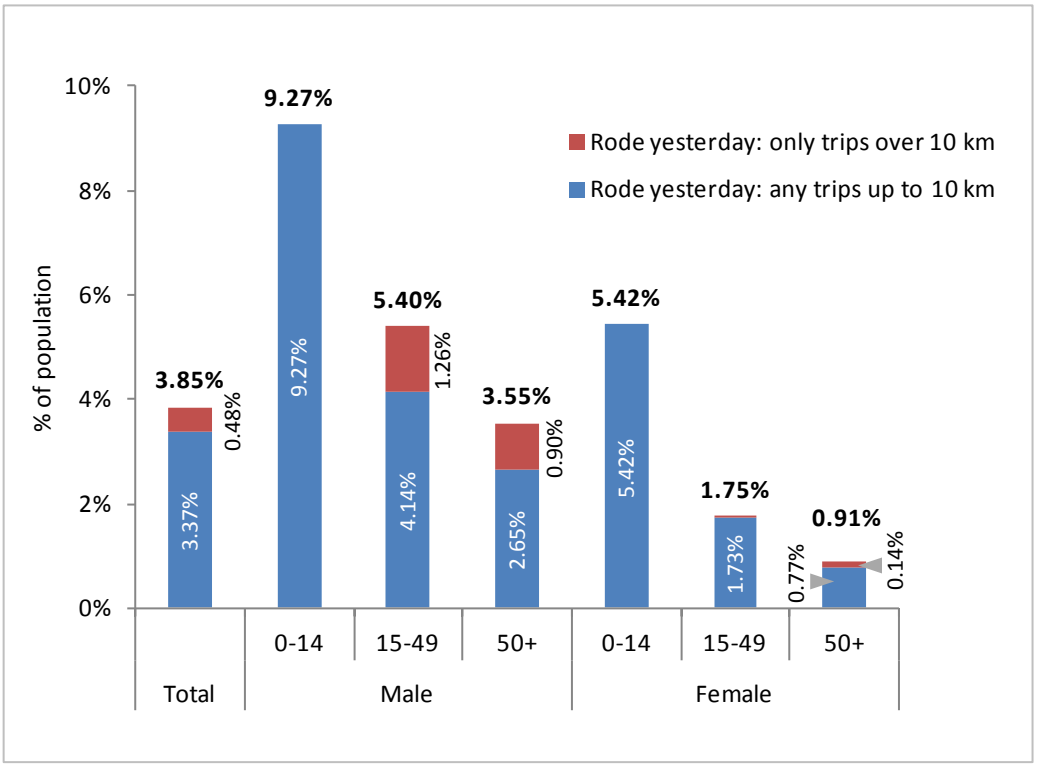


5.3 Cycling Trips

Of the total population, 3.85% (CI: 3.52–4.21%) had ridden on the previous day on a public road, footpath or park within the Sydney GMA, including 3.37% (CI: 3.06–3.71%) only on trips of up to 10 km (Figure 7). An additional 2.46% (CI: 2.19–2.76%) had ridden on very short trips, in a private area, or outside the GMA.

The incidence of riding on a trip up to 10 km was highest for males aged 0-14 years (9.27%) and lowest for females aged 50 years and over (0.77%).

Figure 7: Incidence of cycling in a public area on the previous day by distance by gender/age groups (weighted)



The survey estimated that about 213,000[17] GMA residents ride in a public area on a typical day, making 448,000[11] cycling trip legs per day (of any distance). Focussing only on trips up to 10 km in a public area, the results corresponded to an estimated 187,000 residents riding on a typical day, making about 393,000 cycling trips per day.

[17] Rounded down to the next 1,000.

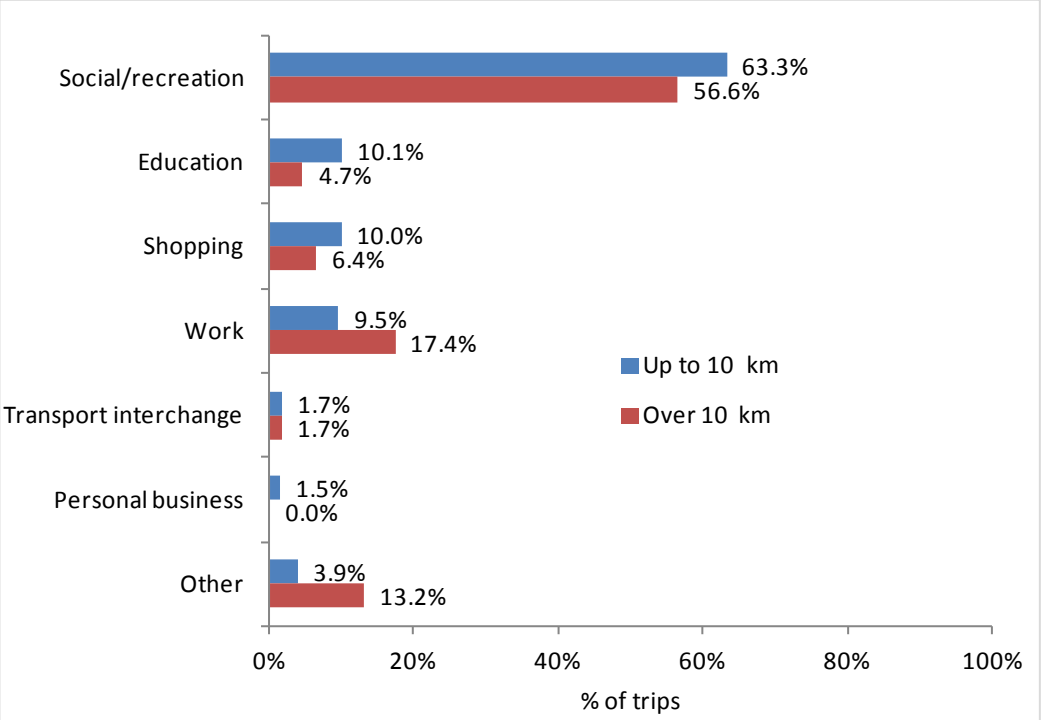
5.4 Trip Purposes

The purpose for cycling trips was obtained from individuals for whom trips were directly reported in the survey (i.e., not including those for whom cycling trips were imputed). The following rules were applied to determine a trip purpose:

1. code as social/recreation for trips where both the origin and destination of the trip were either the cyclist's home or someone else's home;
2. use the destination of the trip as the purpose if the origin is home (and the destination is not home);
2. use of the origin of the trip the purpose if the destination is home (and the origin is not home); and
3. in other cases use the purpose of the destination of the trip.

Over three fifths (63%) of trips up to 10 km were for social or recreation purposes, followed by education (10%), shopping (10%) and work (10%) (Figure 8).

Figure 8: Cycling trip purposes, for trips up to 10 km and trips of over 10 km (weighted)

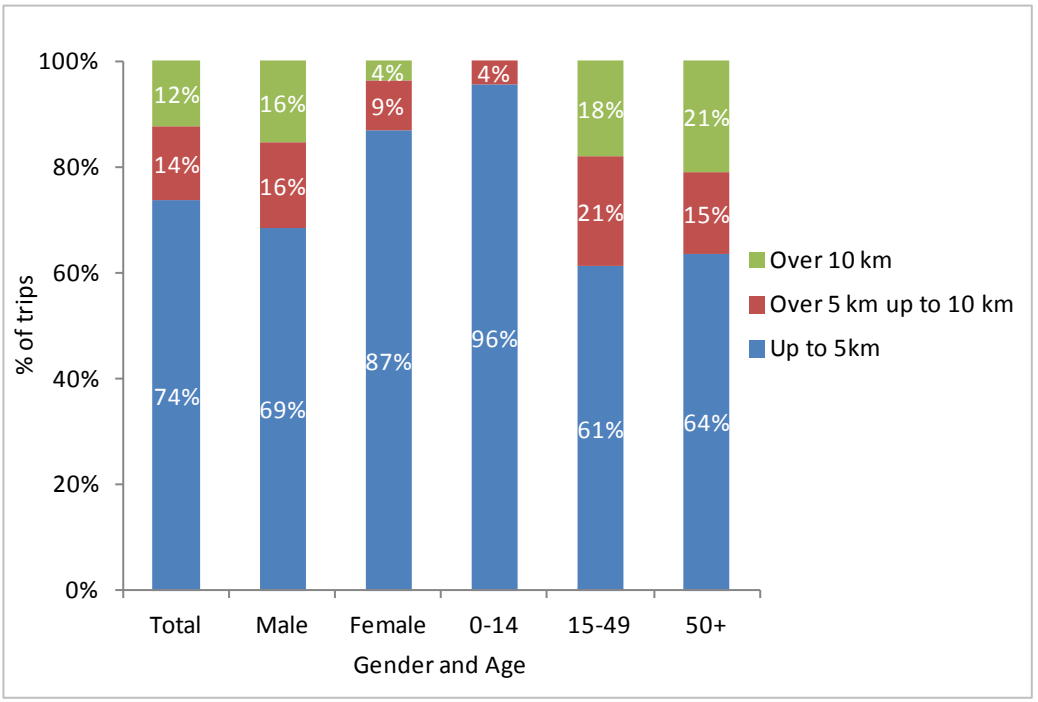


5.5 Trip Distances

Trip distances were self-reported estimates by respondents, either about their own trips or about the trips of others. It is to be expected that there will be some error in the estimation, but within the method this is most feasible approach to take. The approach is broadly consistent with SCS 2011. Respondents were given the opportunity to estimate trip distance as 'up to 5 km' or 'more than 5 km and up to 10 km', to help ensure that an estimate was given.

Of all trips in a public area, about three quarters (74%) were up to 5 km in distance and almost nine in 10 (88%) in total were up to 10 km (Figure 9). Trips by females (87%) were more likely to be up to 5 km distance than trips by males (69%). Similarly, trips by children under 15 years (96%) were much more likely to be up to 5 km distance than trips for those aged 15-49 years (61%) or 50 years and over (64%).

Figure 9: Distribution of trip distance by gender and age, in a public area (weighted data)



Trip distances were on average greatest for cycling to work (8.50 km) and when going to a transport interchange (5.93 km) (Table 10). The average distance for the most common purpose, recreational cycling (4.61 km), contributed substantially to the overall average of 5.01 km.

Table 10. Trip distance by purpose, in a public area (weighted data)

Purpose	Trips (weighted)	Average (km)	Median (km)	Min (km)	Max (km)
All trips	**876**	**5.01**	**2.5**	**0.1**	**50**
Work	92	8.50	5.0	0.5	50
Transport interchange	15	5.93	5.0	0.1	20
Social, recreation, sport	547	4.61	2.0	0.1	50
Personal	11	3.74	2.0	0.2	10
Shopping	84	3.75	2.0	0.5	25
Education	83	3.31	2.0	0.5	18
Other/not provided	44	8.44	3.0	0.5	40

5.6 Cycling Trip Rates

Trip rates per day per person, for trips in a public area up to 10 km, were calculated across the total population in the GMA.

The overall trip rate was estimated at 0.071 trips per person per day (CI: 0.064–0.078) (Table 11). The rate for males (0.099) was over twice that for females (0.043). The rate was higher for children aged 0-14 years (0.152), decreasing with age for those aged 15-49 years (0.062) and again for those aged 50 years and over (0.037).

The highest rate was for males aged 0-14 years (0.193) and the lowest for females aged 50 years and over (0.018).

Table 11. Cycling trip rate estimates for trips up to 10 km in public areas, per capita per day (weighted)

		AGE GROUP			
Gender	**Measure**	**0-14**	**15-49**	**50+**	**All**
Male	Mean	0.193	.088	0.057	0.099
	95% CI	*0.155–0.231*	*0.071–0.105*	*0.042–0.072*	*0.087–0.111*
Female	Mean	0.108	0.036	0.018	0.043
	95% CI	*0.079–0.138*	*0.025–0.048*	*0.01–0.026*	*0.036–0.051*
All	Mean	0.152	0.062	0.037	0.071
	95% CI	*0.128–0.176*	*0.052–0.072*	*0.028–0.045*	*0.064–0.078*

5.7 Cycling Mode Share

The main objective of the study was to calculate cycling trips as a share of all trip modes for trips up to 10 km in length. BTS provided all-purpose trip rates for non-cycling mode trips from the 2011/12 HTS (for trips up to 10 km in length) for the conversion of the trip rates for cycling into trip mode shares. The trip rates were provided for the three age groups (0-14, 15-49, and 50+) within gender. Cycling trips were taken out of the HTS data, and replaced with cycling trips measured in the SCS. This approach was consistent with the rationale of the SCS as being the measure of cycling trips. The non-cycling trip rates from the HTS are shown in Table 12.

Table 12. All-mode, all-purpose trip rates (and 95% confidence intervals[18]) for non-cycling trips up to 10 km using HTS 2011/12, by gender/age groups (weighted)

		AGE GROUP			
Gender	**Measure**	**0-14**	**15-49**	**50+**	**All**
Male	Trip rate	2.418	2.575	2.807	
	95% CI	*2.376–2.460*	*2.541–2.609*	*2.762–2.852*	
Female	Trip rate	2.518	3.175	2.690	
	95% CI	*2.475–2.561*	*3.139–3.211*	*2.650–2.730*	
All	Trip rate				2.758
	95% CI				*2.741–2.774*

The overall trip rate for non-cycling modes in the 2011/12 HTS was 2.758 trips per person per day. The trip rate for cycling in SCS 2012, 0.071, was added to the HTS rate in order to measure the mode share for cycling. The overall cycling mode share was 2.51% (CI: 2.24%–2.81%) (Table 13).

This calculation of mode share was also applied to the six age/gender groups. The highest mode share was for males aged 0-14 years (7.39%, CI: 5.95%–9.16%) and the lowest mode share was for females aged 50 years and over (0.65%, CI: 0.40–1.06%).

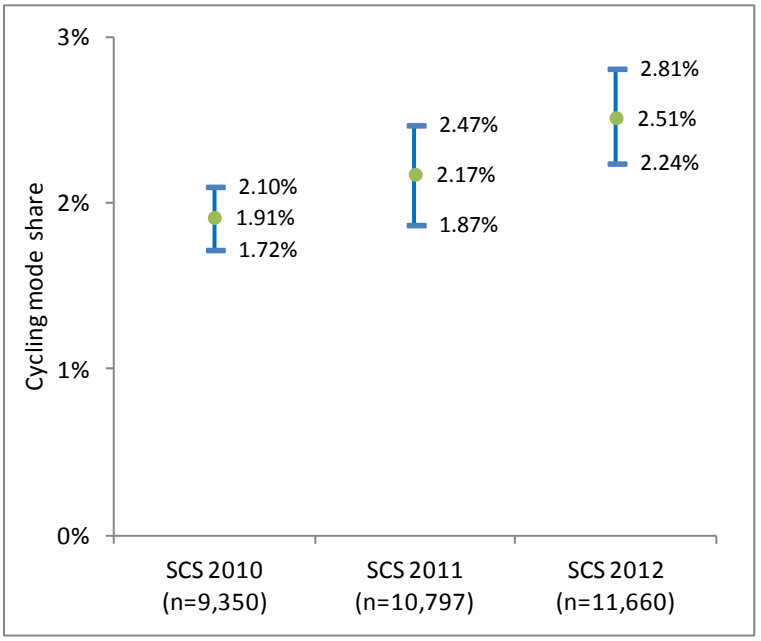
Table 13. Cycle mode share estimates (and 95% confidence interval) for trips up to 10 km in a public area, using SCS 2012 and HTS 2011/12, by age and gender (weighted)

		AGE GROUP			
Gender	**Measure**	**0-14**	**15-49**	**50+**	**All**
Male	Share	7.39%	3.29%	2.00%	
`	*95% CI*	*5.95%–9.16%*	*2.66%–4.07%*	*1.50%–2.65%*	
Female	Share	4.13%	1.13%	0.65%	
	95% CI	*3.03%–5.61%*	*0.78%–1.64%*	*0.40%–1.06%*	
All	Share				2.51%
	95% CI				*2.24%–2.81%*

[18] Calculated from the standard deviation reported for each estimate and using the survey sample sizes

The cycling mode share in 2012 of 2.51% (CI: 2.24%–2.81% was not statistically significantly higher than the share reported in SCS 2011 2.17% (CI: 1.87-2.47%), but was higher than the share reported in SCS 2010 (1.91%, CI: 1.72–2.10%) (Figure 10).

Figure 10: Cycling mode share estimates and 95% confidence intervals for the SCS in 2010, 2011 and 2012 (n = number of individuals)



5.8 Proxy Reporting

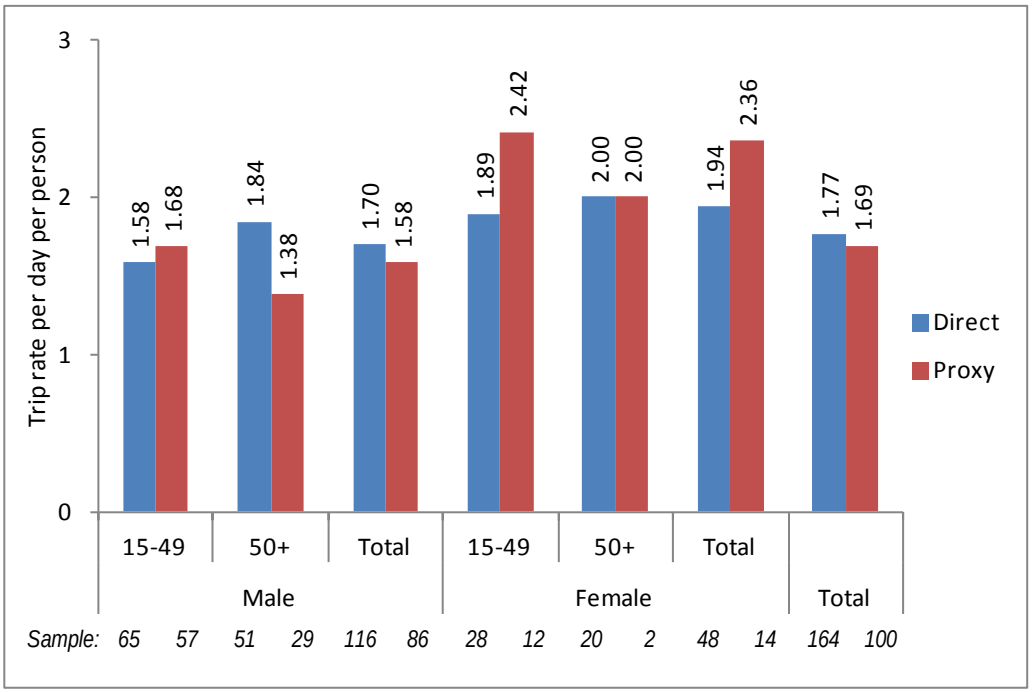
Cyclists under 15 years had cycling activity reported by proxy (n=133), or imputed (n=14) if no one was available to provide the information.

Of the 278 older cyclists, the majority (n=164, 59%) were interviewed in person for the cycling activity, about a third (n=100, 36%) were interviewed by proxy, and a few (n=14, 5%) were unavailable for interview and no other household member was available to report on their activity. The impact of proxy reporting is shown in Figure 11. There was little overall difference between the average trip rates for direct (1.77) and proxy (1.69) reporting. Some differences occurred within the age/gender groups. The main differences were among:

- the 29 male cyclists aged 50 years and over, with proxy reporting (1.38) nearly half a trip lower than for direct reporting (1.84); and
- the 12 female cyclists aged 15-49 years, with proxy reporting (2.42) more than half a trip rate higher than for direct reporting (1.89).

So while proxy reporting did not bias the overall trip rate (0.08 lower overall for cyclists aged 15 years and over), there was some indication of a differential impact on the overall rate, for female cyclists aged 15 years and over, with a trip rate 0.42 higher overall for proxy reporting.

Figure 11: Cycling trip rates by direct and proxy reporting, for cyclists 15 years and over (cycling trips up to 10 km, unweighted)



6. Appendix A: Survey Instrument

Good morning/afternoon/evening, my name is … and I'm calling from {Survey Company name} the market and social research company on behalf of Transport for NSW. We're interested in improving our understanding of people's travel in your area.

AGE CHECK (if unsure of age): We would like to speak to a person in your household aged 18 or older. Is an adult available to talk to us?

If refused – ask if another adult is available. If no one, THANK & CLOSE – RECORD RESPONSE.

If new person...

Good morning/afternoon/evening, my name is … and I'm calling from *AMR* the market and social research company on behalf of Transport for NSW. We're interested in improving our understanding of people's travel in your area. We'll be using the information from this survey to develop transport policies in your area. Your answers will be completely anonymous.

Would you be able to spend a few minutes describing to us the travel you have undertaken recently?

LOCATIONS – TO DEFINE BY POSTCODE

1 Blacktown
2 Canterbury-Bankstown
3 Central Northern Sydney
4 Central Western Sydney
5 Eastern Sydney
6 Fairfield-Liverpool
7 Inner Sydney
8 Inner Western Sydney
9 Lower Northern Sydney
10 Northern Beaches
11 Outer South Western Sydney
12 Outer Western Sydney
13 St George-Sutherland
14 Gosford-Wyong
15 Newcastle
16 Wollongong
17 Illawarra SD (balance)

SEQUENCE

- Q1-Q9: ABOUT THE RESPONDENT AND HOUSEHOLD
- Q10-Q15: ABOUT EACH OTHER PERSON IN HOUSEHOLD
- QR, QH: SUMMARISE CYCLING IN PREVIOUS DAY
- Q16 TO Q19: TO SELECT PERSON TO TALK TO ABOUT TRIPS
- Q20 TO Q27: LOOPED FOR FIRST AND SUBSEQUENT TRIPS

CAPTURE DAY, DATE

SCREENER

Q1. Firstly, what is the postcode where you live?
RECORD ____

ANALYST NOTE – check to see postcode is in SSD quota list – if not, thank and terminate

ABOUT RESPONDENT AND HOUSEHOLD
In order to ensure we speak to a representative part of the population we would like to know a little more about you and your household.

Q2. Which of the following categories apply to you at the moment? (multi-response)

2 Student: Full-time
3 Student: Part-time
4 Work: Full-time (*35 hours per week or more)*
5 Work: Part-time (*less than 35 hours per week)*
6 Work: Casual
7 Work: Unpaid voluntary work

8 Unemployed looking for work
9 Keeping house

10 Aged pensioner
11 Other pensioner
12 Retired

98 Other *PLEASE SPECIFY:*_____
97 Refused

Q3. What is your age?
<numeric 18 – 199>
999=Refuse - Terminate

Q4. INTERVIEWER record gender
Male/Female

Q5. How many *registered* vehicles used by your household are usually parked at your household overnight, whether private or company owned? This should include cars, trucks, motorcycles and mopeds as long as they are registered.
<numeric 0 – 99>
998=Don't know 999=Refused

Q6. We would now like to ask you a little about cycling. How many adult bicycles in working order are in your household?
<enter number 0 - 99>
998=Don't know 999=Refused

Q7. How many children's bicycles in working order are in your household? That is, cycles with 2 wheels that are ONLY used by children up to 14 years. They may have training wheels.
NOTE: Tricycles are not included
<enter number 0 - 99>
998=Don't know 999=Refused

Q8. When did you last ride a bicycle? **READ OUT**
1 Never
2 More than a year ago
3 More than a month ago
4 In the last 4 weeks
5 Sometime in the last 7 days
99 DO NOT READ OUT: Don't remember

IF "Sometime in the last 7 days" in Q8 (code 5)
Q8a. Did you ride yesterday?

If YES - probe for type of trip

Was it only very short trips such as riding around the backyard?
Or did it include cycling on a footpath, road, or in a public park, even if a short trip?

1 Yes, only very short trips such as riding around the backyard
2 Yes, including travel on a road, footpath or in a public park
3 No

Q9. How many people <u>usually</u> live in your household, including you? This is someone who has lived, or will live, in the household for at least 3 months.
<numeric 1 – 20>
99 Refused
998=Don't know 999=Refused

IF Q9=1, 99 go to QR/QH
IF Q9>1 repeat Q10-Q15 for each household member

SUMMARISE OTHERS IN HOUSEHOLD

IF Q9>2: We would now like to understand a little about the other people who usually live in your household. Starting with the oldest person in the household other than yourself and working down, could you tell us...

IF Q9=2: We would now like to understand a little about the other person who usually lives in your household.

Q10. What is their age? Note: Enter whole years, so under 1 year =0
<numeric 0 – 199>
998=Don't know 999=Refused

Q11. Are they male or female?
1 Male
2 Female
99 REFUSED

IF AGE IS 0-3 code as 1 only and go to Q13
IF AGE>3 and <15 codes 1-7 only
IF AGE15+ show all codes

Q12. Which of the following categories apply to that person at the moment? *READ OUT* (multi-response)

1 Not yet at school
2 Student: Full-time
3 Student: Part-time

4 Work: Full-time (*35 hours per week or more)*
5 Work: Part-time (*less than 35 hours per week)*
6 Work: Casual
7 Work: Unpaid voluntary work

8 Unemployed and looking for work
9 Keeping house
10 Aged pensioner
11 Other pensioner
12 Retired
98 Other *PLEASE SPECIFY:*_____
99 DO NOT READ OUT: Refuse

Q13. When did that person last ride a bicycle?
DO NOT READ OUT
1 Never
2 More than a year ago
3 More than a month ago
4 In the last 4 weeks
5 Sometime in the last 7 days
99 Not sure

IF "Sometime in the last 7 days" in Q13 (code 5) ask Q14
Others go to Q10 for the next person, or to QR

Q14. Did that person ride a bicycle yesterday?
If YES - probe for type of trip
Was it only very short trips such as riding around the backyard?
Or did it include cycling on a footpath, road, or in a public park, even if a short trip?

1 Yes, only very short trips such as riding around the backyard
2 Yes, including travel on a road, footpath or in a public park
3 No

Q15. *If rode/travelled yesterday for travel (Q14 code 2)*
Later in the survey we'd like to refer back to this person. To make this easier, could we ask for their first name or their initials?

1 Name/initials given for this person _____
2 Name/initials not given for this person

IF Q9>2, ask Q10-15 for next person
Others continue

SUMMARISE CYCLING IN HOUSEHOLD

ANALYST: QR and QH to fill based on Q8, Q8A and Q14
QR. RESPONDENT

1 *Q8a=2* Rode yesterday

2 *Q8a≠2* Did not ride yesterday

3 *Q8 1-4,99* Not ridden in last 7 days

QH. OTHERS IN HOUSEHOLD RIDING *(from q14=2)*

1 None with *Q14=2* (no riding)

2 Some with *Q14=2* (riding)

ANALYST: If initial respondent and no household members have ridden yesterday (QR=2 or 3, and QH=1), then skip to the end of the survey and file as complete.

CYCLING PARTICIPATION

Q16. So that means the people who travelled on a bike yesterday are:
ANALYST: Bring in based on Q8a=2, Q14=2 for each other household member.

1 *IF Q8a=2* Yourself

IF Q14=2 for others in the household
2 [*IF Q15=1:* NAME] OR [*IF Q15=2:* The [Q10 AGE] year old]
3 *Repeat for others*
4 ...

The next section of the questionnaire is about the bike trips yesterday.

TRIPS

ORDER: Respondent, then youngest to oldest
Q17. Use the name of the cyclist if available, otherwise the age

IF NO FURTHER CYCLISTS, GO TO END OF INTERVIEW
IF SELF: Go to Q20

IF CYCLIST <15 YEARS:
Q18. Would you be able to tell us a little about [NAME] [the AGE year old's] bike trips yesterday?
1 Yes *Go to Q20*
2 No *Ask Q18a*

Q18a. Would someone else be available to tell us about [NAME] [the AGE year old's] bike trips yesterday?
1 Yes *Go to Q20 NEW RESPONDENT INTRO*
2 No *Go to TRIPS for next cyclist*

IF CYCLIST 15 YEARS+:
Q19. Would [NAME] [the AGE year old] be available to talk about their bike trips yesterday?
1 Yes *Go to Q20 NEW RESPONDENT INTRO*
2 No *Ask Q19a*

Q19a. Would you be able to tell us a little bit about [NAME] [the AGE year old's] bike trips yesterday?
1 Yes *Go to Q20*
2 No *Go to Q19b*

Q19b. Would there be someone else who would be able to tell us a little bit about [NAME] [the AGE year old's] bike trips yesterday?
1 Yes *Go to Q20*
2 No *Go to TRIPS for next cyclist*

Q20-Q26 FOR EACH CYCLIST

Q20. ANALYST NOTE: Select based on Q18/Q18a/Q19/Q19a for text substitution and introduction
1 *Q17=SELF, Q19=1:* Answering about OWN TRIPS [you]
2 *Q18=1, Q18a=1, Q19a=1 Q19b=1:* Answering about OTHER PERSON'S TRIPS [they]

Q18a=1 Q19=1 Q19b=1 START HERE

NEW RESPONDENT INTRO
Good morning/afternoon/evening, my name is … and I'm calling from AMR the market and social research company on behalf of Transport for NSW. We're interested in improving our understanding of people's travel in your area. I understand that you rode a bicycle yesterday.

Q17=SELF, Q18=1, Q19a=1
ALL INTRO
We would like you to describe a little about each time you/they used a bicycle yesterday. We are interested in any kind of bike trip from the shortest trip to the corner or round the block to a longer recreational ride or to work or shops.

Q21. Where did you/they start the [first][next] bike trip yesterday?
(see accompanying briefing for assistance)
IF respondent gives a suburb, probe for type of place

1 Home
2 Work
3 School/University/other educational institution
4 Shops/Shopping
5 Personal business/services
6 Social/recreation location
7 Hospital/medical
8 Hotel/motel
9 Transport interchange
10 Other private dwelling
98 Other *PLEASE SPECIFY:*_____
90 AFTER FIRST TRIP: I did not make another bike trip -
*GO to **TRIPS** FOR next person who made bike trip yesterday*
99 DO NOT READ OUT: Refuse

Q22. What suburb or town was that in?
NOTE: Must record suburb
<free text>

IF 2-9, 98 in Q21

Q22a. Can you please tell me the name of the building or the nearest landmark where this place is?
Interviewer: This can be a shopping centre, park, university, train station, bus stop, etc. Prompt based on the answer to the start location
1 (specify)
2 Not relevant
3 Refused
9 Don't know

Q23. Where did you/they finish that bike trip? if you stopped on the way, such as to work, or shop, or eat, that would be the end of the trip
INTERVIEWER: If there was a break/stop, then that would be the destination.
IF respondent gives a suburb, probe for type of place
(see accompanying briefing for assistance)
1 Home
2 Work
3 School/University/other educational institution
4 Shops/Shopping
5 Personal business/services
6 Social/recreation location
7 Hospital/medical
8 Hotel/motel
9 Transport interchange
10 Other private dwelling
98 Other *PLEASE SPECIFY*:_____

Q24. And what suburb or town was that in?
NOTE: Must record suburb
<free text>

IF 2-9, 98 in Q23

Q24a. Can you please tell me the name of the building or the nearest landmark where this place is?
Interviewer: This can be a shopping centre, park, university, train station, bus stop, etc. Prompt based on the answer to the finish location
1 (specify)
2 Not relevant
3 Refused
9 Don't know

Q25. How far did you travel?
INTERVIEWER NOTE: Answer KM or METRES – on what respondent knows. Enter 0 in the other field.
<numeric less than 300 km> km
<numeric> m
999=DON'T KNOW

If don't know in Q25

Q26. Was it... *READ OUT*

1 less than 5 km,
2 5km but less than 10 km
3 10 km or more
9 DO NOT READ OUT: Don't know

Q27. Were you carrying a passenger on that trip, such as in a bike seat or bike trailer?

1 Yes
2 No

GO TO Q21 FOR NEXT TRIP, OR
THANK AND END