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Summary

High quality health information systems are essential for the provision of high quality population health services. The Computer Assisted Telephone Interview (CATI) health survey is an example of a practical and efficient method to collect health information. To conduct effective CATI surveys it is necessary to have access to representative population samples; typically, this means access to all potential active household telephone numbers. The aim of this electoral roll matching project is to test an alternative sampling frame – the electoral roll – as a starting point for accessing telephone numbers.

The analysis in this report was conducted by the Population Health Unit (PHU) at the Australian Institute of Health and Welfare (AIHW) using de-identified data provided by the AIHW Dental Statistics Research Unit (DSRU) – a collaborating unit of the AIHW located in the Australian Research Centre for Population Oral Health at the University of Adelaide.

The AIHW DSRU requested the Australian Electoral Commission (AEC) to extract a sample from the electoral roll. These data were matched against the Sensis *MacroMatch* database to append a residential telephone number. The most complete matches were used as the sampling frame for the 2008 National Dental Telephone Interview Survey (NDTIS) conducted by the AIHW DSRU. This report contains analysis of the match outcome and survey response outcome.

Key findings

- On average, just over half of the records (51.8%) were adequately matched between the electoral roll records and the Sensis *MacroMatch* database.
- Matching rates were not consistent across all states and territories; for example, the Northern Territory had the lowest match rate for males (33.7%) and Tasmania had the highest match rate for males (59.5%).
- There were no substantial differences in match proportions between males and females nationally or among states and territories.
- Higher proportions of females completed the survey than males.
- Survey completions were influenced by the do not call register (DNCR) status: people who registered were more likely to complete a survey than people who were not registered.
- People living in the non-metropolitan areas completed the survey at a greater rate than their metropolitan counterparts.

The results in this report suggest that it is feasible to access telephone listings for surveys by using the Australian electoral roll databases as a starting point. This report enables states and territories to determine their status on match and response outcomes, which may be useful for planning future survey programs.

1 Introduction

The delivery of quality population health services depends on a high quality health information system – an important component of which is based on Computer Assisted Telephone Interview (CATI) health surveys. To conduct effective CATI surveys it is necessary to have access to representative population samples. Sampling techniques that are used in the CATI surveys must therefore be of the highest standard.

All states and territories undertake CATI health surveys on a regular or periodic basis. These surveys seek to monitor health status and emerging determinants of health within the population. CATI surveys need to provide quality information that represents whole populations. Sampling methods currently vary across states and territories; however, there is a common need for access to all potential active household telephone numbers if significant biases in the information collected are to be avoided. Over recent years there has been a substantial decline in the capacity to sample from a comprehensive and up-to-date list of telephone numbers. Consequently, there is a need for developing alternative sampling techniques that provide secure and sustainable access to representative samples of the population.

This report presents the results of matching a sample of electoral roll records against the Sensis *MacroMatch* database, and response outcomes of the subsequent National Dental Telephone Interview Survey.

Acknowledgments

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2 Methods

Overview

The AIHW DSRU requested the Australian Electoral Commission (AEC) to extract a sample from the electoral roll database. Electoral roll records do not contain telephone numbers, so the records were matched against the Sensis *MacroMatch* database (which uses the same source data as other Sensis products such as the Electronic White Pages and White Pages Online) to append a residential telephone number. Note that only publicly listed telephone numbers (that is, those that would be listed in the White Pages and related products) can be appended under this process. The most complete matches were used as the sample frame for the 2008 National Dental Telephone Interview Survey (NDTIS). After completion of the survey AIHW DSRU provided de-identified electoral roll match outcome data and survey response outcome data to AIHW for further analysis. AIHW analysed these data using the following dimensions:

- sex
- do not call register (DNCR) status
- main phone line type (fixed line or mobile) listed for the record
- region of residence (metro or non-metro).

Statistical software

SPSS software was used to analyse the data, with graphs and tables produced in *Excel*. Analytic methods such as uni-variate analysis (numbers and counts) and bi-variate analysis (cross tabulations) were used to examine the relationship between variables.

Match process

The AEC extracted a sample (64,855 records) from the electoral roll as per the request of AIHW DSRU. Duplicate records (496) were removed from the sample dataset based on surname, street address, suburb, postcode and state. This resulted in 64,359 records being available for matching against the *MacroMatch* database. In this process, 1001 records containing data errors and 30,049 non-matched records were removed from the original sample.

Because NT rest of state, SA rest of state and WA rest of state had high counts of non-matches and data errors that Sensis could not explain, AIHW DSRU decided to add 501 records of lower match quality to ensure large enough strata for those regions. This resulted in 33,810 records being loaded in the WINCATI survey management software as the sampling frame for the 2008 NDTIS. This process is shown in Figure 2.1. The match criteria used by Sensis are shown in Table 2.1, and the match outcomes are summarised in Table 2.2.

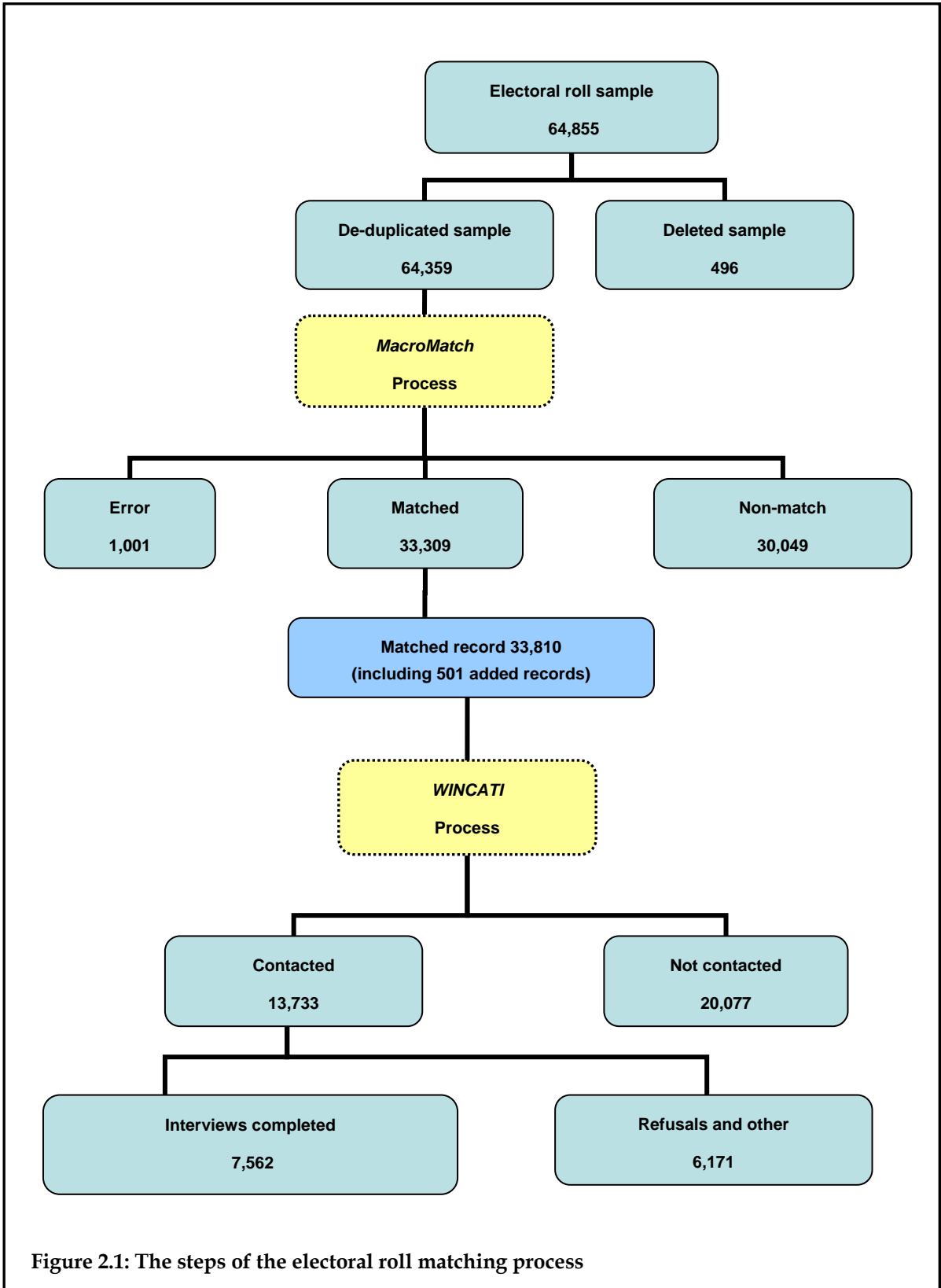


Figure 2.1: The steps of the electoral roll matching process

Table 2.1: MacroMatch match criteria

Match code	Match type	Business name/ Surname	Initials	Street name	Street no.	Postcode
1	Exact match	✓	✓	✓	✓	✓
2	Initials variance	✓	≈	✓	✓	✓
3	Street number variance	✓	✓	✓	≈	✓
4	Initials not used	✓	○	✓	✓	✓
5	Surname and initials variance	≈	≈	✓	✓	✓
6	Street number variance and initials not used	✓	○	✓	≈	✓
7	Street name variance	✓	≈	≈	✓	✓
8	Street name variance & street number not used	✓	≈	≈	○	✓
11	Name and number—Exact match	✓				
12	Name and number Fuzzy match on Business only	≈				
13	Business number	○				
Y	Yellow pages	≈				
NCOA	National change of address					
0	Too many listings	The matches returned did not enable a conclusive match				
9	No match	A match was not found against the data in accordance with <i>MacroMatch</i> matching algorithms				
E	Data errors	Contact name and address data were either missing or incomplete.				

✓ = Exact match; ≈ = Fuzzy; ○ = Ignored.

Table 2.2: MacroMatch match outcome

MacroMatch match code	Count
0	102
1	69
2	24,649
3	2
4	8,591
5	385
6	1,734
7	475
8	1,377
9	25,501
E	1,001
NCOA	473
Total	64,359

0 = data which has too many matches; 9 = unmatched records; E = data errors; NCOA = National change of address summary.

This report used *MacroMatch* match criteria and AIHW DSRU-nominated match codes (see Tables 2.1 and Table 2.2) to define the following sub groups of match outcome.

Match

A match has the highest level of confidence in the matching process. AIHW DSRU nominated match codes 1, 2 and 4 as a match (Table 2.2), which allowed for a variation on, or omission of, the initials from the electoral roll record.

Semi-match

A semi-match is where the surname, initials, street name or street number is slightly different in the electoral roll database than in the *MacroMatch* database, or initials or street numbers were not used in the match process.

Non-match

A non-match is where the electoral roll record returns too many matches, or is not matched at all, or any other data discrepancy is identified.

Survey outcome

Of the 33,810 records that were loaded to the WINCATI survey management software, only 13,733 records were contacted by AIHW DSRU interviewers and hence have a disposition code. The remaining records were not contacted and have no disposition code. The full outcome is shown in Table 2.3 below.

Completed

This consists of the survey disposition for respondents who completed the telephone survey (disposition code 20).

Refused

This consists of the outcomes 'outright refused' (10), or 'mid-terminate refused' (15) or 'mid-terminate call back' (17). Among the 13,733 records contacted by the AIHW DSRU interviewers, 4,381 records were categorised as refused.

Other

This consists of the survey dispositions for respondents where no substantial contact was made. Among the 13,733 records contacted by the AIHW DSRU interviewers, 1,790 records were categorised as other.

Table 2.3: Summary of survey dispositions

Disposition	Code	Record count
Contacted		
Disconnected number	1	536
Business number	2	48
No answer	3	248
Answering machine	4	369
Busy—engaged tone	5	43
Foreign language problem	6	122
Fax/modem	7	83
Out of scope	8	150
Uncontactable	9	177
Outright refusal	10	4,299
Mid-terminate refusals	15	44
Call-back	16	8
Mid terminate call-back	17	38
Call-back made—no answer	19	6
Complete	20	7,562
<i>Total contacted</i>		<i>13,733</i>
Not contacted		20,077
Total loaded		33,810

AEC sample

In requesting the AEC sample, AIHW DSRU specified 15 regions across Australia. Those 15 regions were defined in terms of federal electoral divisions. From each region a random sample of people aged 18 years and over was drawn (Table 2.4).

Table 2.4: Electoral roll sample per region

State	Metropolitan	Non-metropolitan	Total
NSW	9,915	5,674	15,589
Vic	9,039	3,478	12,517
Qld	5,199	5,684	10,883
WA	3,775	2,459	6,234
SA	2,830	2,014	4,844
Tas	1,930	2,170	4,100
NT	2,906	2,707	5,613
ACT	4,579		4,579
Total	40,173	24,186	64,359

3 Findings

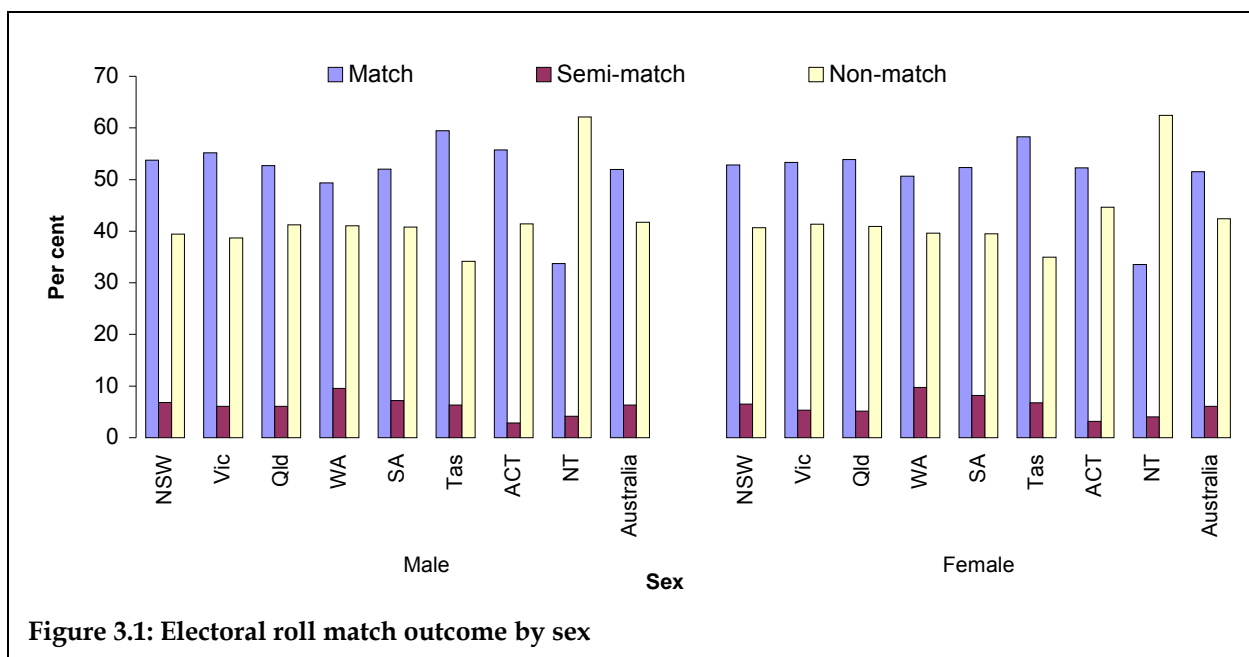
The key findings on the match and response outcome by states and territories and for Australia are presented in tables and figures below.

MacroMatch match outcome

On average, just over half of the sampled records (51.8%; 52.0% males and 51.5% females) were adequately matched against the *MacroMatch* database. Matching was not consistent across all states and territories; for example, the Northern Territory had the lowest match rate for males (33.7%) and Tasmania had the highest match rate for males (59.5%). There were no substantial differences in match percentages between males and females nationally or among states and territories (Table 3.1, Figure 3.1).

Table 3.1: Electoral roll match outcome by sex, states and territories, 2008 (per cent)

Sex	Match status			Total
	Match	Semi-match	Non-match	
Males				
NSW	53.8	6.8	39.4	100.0
Vic	55.2	6.1	38.7	100.0
Qld	52.7	6.0	41.2	100.0
WA	49.4	9.6	41.1	100.0
SA	52.0	7.2	40.8	100.0
Tas	59.5	6.3	34.2	100.0
ACT	55.7	2.8	41.4	100.0
NT	33.7	4.2	62.1	100.0
Australia	52.0	6.3	41.7	100.0
Females				
NSW	52.8	6.5	40.7	100.0
Vic	53.3	5.3	41.3	100.0
Qld	53.9	5.2	41.0	100.0
WA	50.6	9.7	39.6	100.0
SA	52.3	8.2	39.5	100.0
Tas	58.3	6.7	35.0	100.0
ACT	52.3	3.1	44.6	100.0
NT	33.6	4.0	62.4	100.0
Australia	51.5	6.1	42.4	100.0



Overall, no substantial differences were seen in match rates between the metropolitan (Metro) and non-metropolitan (Non-metro) areas (Table 3.2, Figure 3.2).

Table 3.2: Electoral roll match outcome by region, states and territories, 2008 (per cent)

Region	Match status			Total
	Match	Semi-match	Non-match	
Metro				
NSW	51.2	5.7	43.1	100.0
Vic	53.5	4.0	42.5	100.0
Qld	54.4	3.9	41.7	100.0
WA	52.2	8.3	39.6	100.0
SA	57.0	5.3	37.6	100.0
Tas	56.0	6.0	38.1	100.0
ACT	54.0	3.0	43.0	100.0
NT	46.9	3.4	49.7	100.0
Australia	52.9	4.8	42.3	100.0
Non-metro				
NSW	56.8	8.3	34.8	100.0
Vic	56.0	10.1	33.9	100.0
Qld	52.3	7.1	40.6	100.0
WA	46.7	11.8	41.5	100.0
SA	45.3	11.0	43.6	100.0
Tas	61.4	7.1	31.5	100.0
NT	49.9	8.4	41.7	100.0
Australia	49.9	8.4	41.7	100.0

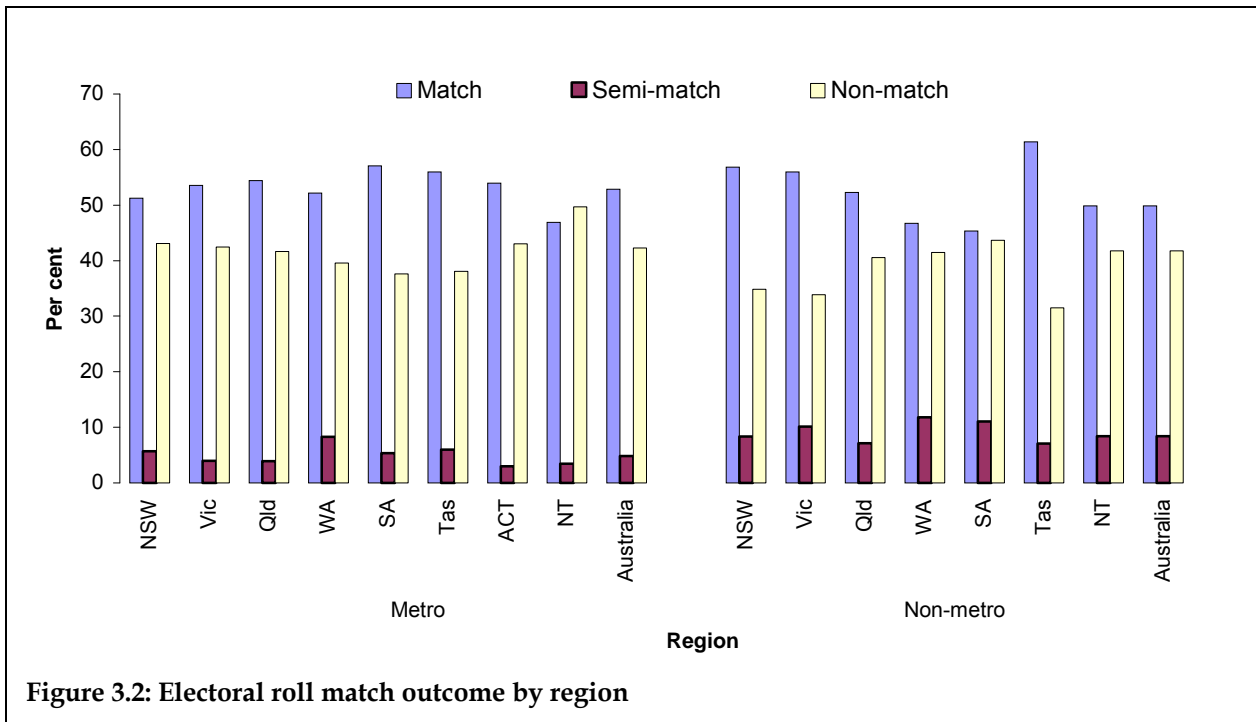


Figure 3.2: Electoral roll match outcome by region

Survey response outcome

Overall, higher proportions of females completed the survey (Table 3.3, Figure 3.3), consistent with outcomes in most population surveys.

The analysis of DNCR status shows that people who registered for the DNCR were more likely to complete a survey than people who were not registered (Table 3.4, Figure 3.4). This is a surprising finding, but could be explained by such respondents having confidence in the legitimacy of a survey process that enabled their number to be dialled.

The analysis of type of phone line shows that fixed line phone owners completed a survey at a greater rate than those with mobile phones (Table 3.5, Figure 3.5), possibly reflecting the fact that taking a survey on a mobile phone is not always convenient or safe. Note that phone line type refers to the primary number listed in the *MacroMatch* database, and does not necessarily imply that that is the main or only phone used by that person.

The analysis of region shows that, with the exception of Tasmania, people living in the non-metropolitan areas completed a survey at a greater rate than people in metropolitan areas (Table 3.6)

Table 3.3: Survey response outcome results by sex, states and territories, 2008 (per cent)

Sex	Survey status			Total
	Completed	Refused	Other	
Males				
NSW	53.3	34.4	12.2	100.0
Vic	51.1	35.3	13.6	100.0
Qld	54.4	33.4	12.1	100.0
WA	52.3	35.8	11.9	100.0
SA	62.8	26.7	10.5	100.0
Tas	60.7	28.0	11.3	100.0
ACT	61.0	24.2	14.8	100.0
NT	49.8	28.0	22.2	100.0
Australia	54.5	32.2	13.3	100.0
Females				
NSW	53.7	33.3	13.0	100.0
Vic	47.9	37.6	14.5	100.0
Qld	55.5	32.8	11.7	100.0
WA	57.4	32.1	10.5	100.0
SA	65.3	28.4	6.3	100.0
Tas	61.3	25.7	13.0	100.0
ACT	63.1	21.5	15.4	100.0
NT	55.0	26.2	18.7	100.0
Australia	55.6	31.6	12.8	100.0

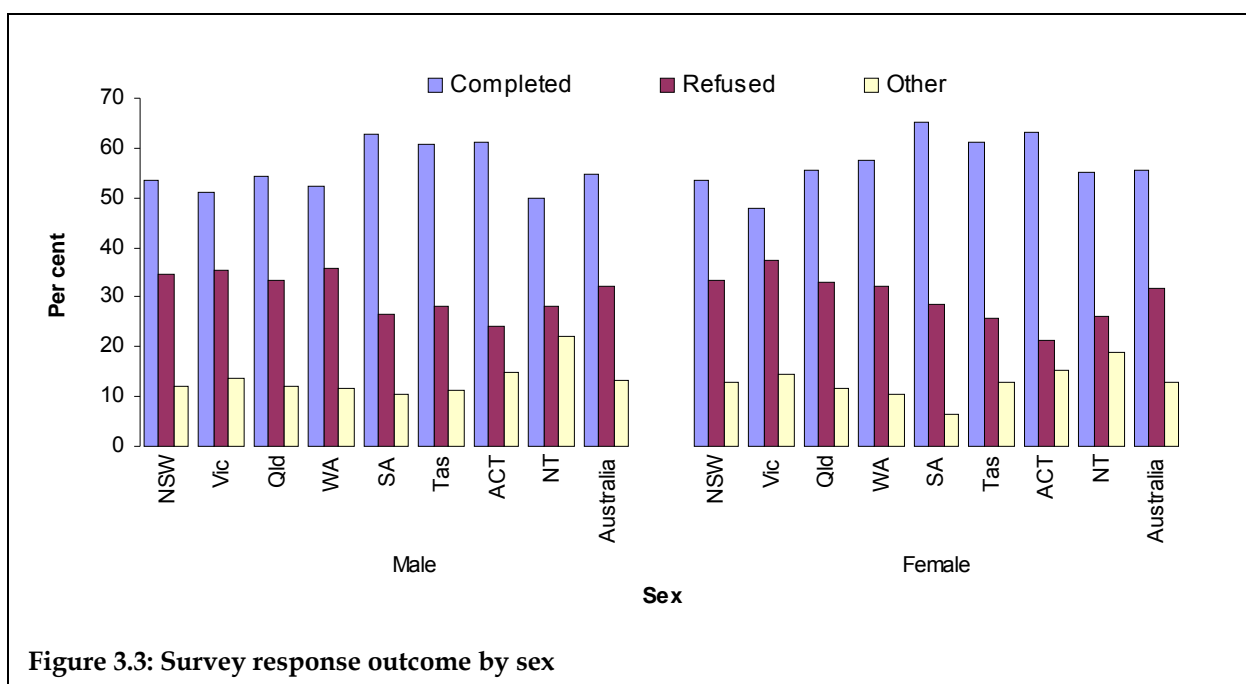


Figure 3.3: Survey response outcome by sex

Table 3.4: Survey response outcome by DNCR (do not call register) status, states and territories, 2008 (per cent)

DNCR status	Survey status			Total
	Completed	Refused	Other	
Yes				
NSW	59.4	33.3	7.3	100.0
Vic	58.7	33.3	8.0	100.0
Qld	61.1	30.8	8.0	100.0
WA	60.5	31.7	7.8	100.0
SA	65.7	32.2	2.1	100.0
Tas	69.8	23.6	6.7	100.0
ACT	68.6	22.2	9.2	100.0
NT	65.9	23.5	10.6	100.0
Australia	62.2	30.3	7.6	100.0
No				
NSW	52.1	34.0	14.0	100.0
Vic	46.4	37.5	16.1	100.0
Qld	52.0	34.2	13.8	100.0
WA	53.4	34.5	12.1	100.0
SA	63.6	26.2	10.1	100.0
Tas	58.4	27.7	13.9	100.0
ACT	59.2	23.1	17.7	100.0
NT	49.1	28.0	22.9	100.0
Australia	52.8	32.4	14.8	100.0

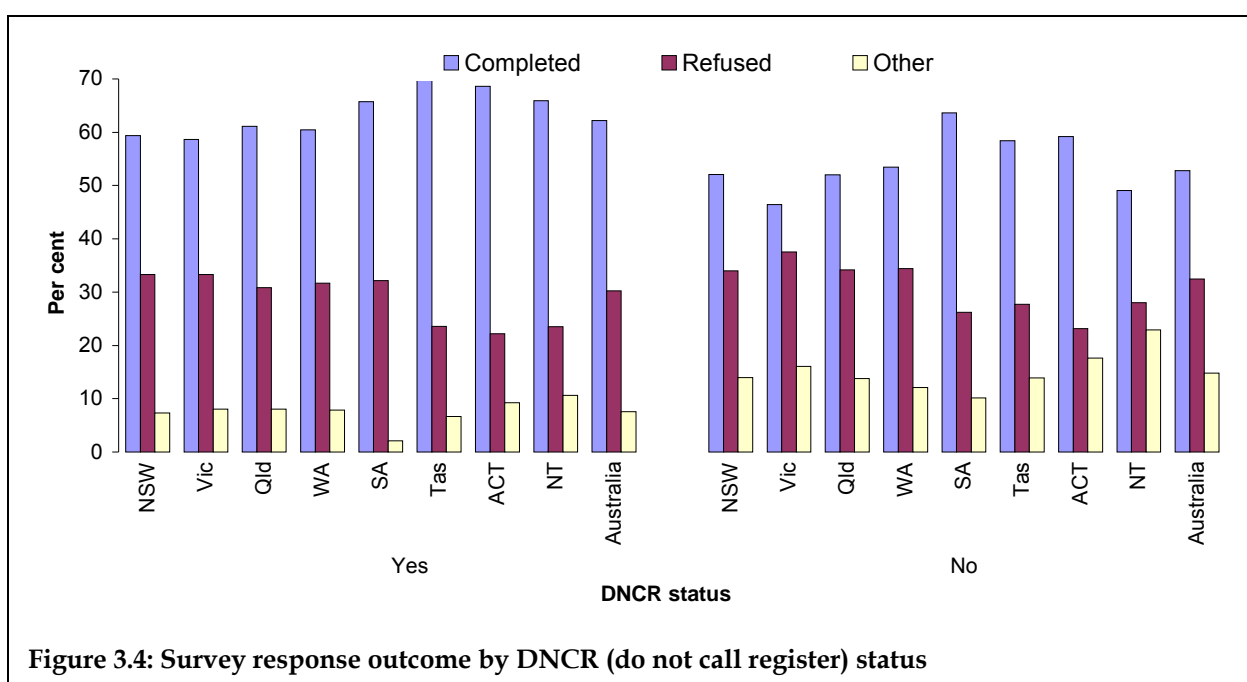


Figure 3.4: Survey response outcome by DNCR (do not call register) status

Table 3.5: Survey response outcome by phone line type, states and territories, 2008 (per cent)

Phone line type	Survey status			Total
	Completed	Refused	Other	
Fixed line				
NSW	53.9	34.2	11.9	100.0
Vic	49.7	36.9	13.5	100.0
Qld	56.1	33.4	10.5	100.0
WA	55.4	34.5	10.1	100.0
SA	65.3	27.2	7.5	100.0
Tas	62.4	27.1	10.5	100.0
ACT	62.5	22.9	14.6	100.0
NT	54.1	27.4	18.4	100.0
Australia	55.8	32.2	12.0	100.0
Mobile				
NSW	46.3	27.2	26.5	100.0
Vic	45.7	30.2	24.1	100.0
Qld	37.3	28.6	34.1	100.0
WA	50.5	24.3	25.2	100.0
SA	43.9	34.8	21.2	100.0
Tas	46.5	23.3	30.2	100.0
ACT	53.1	22.4	24.5	100.0
NT	35.9	24.3	39.8	100.0
Australia	44.3	27.2	28.5	100.0

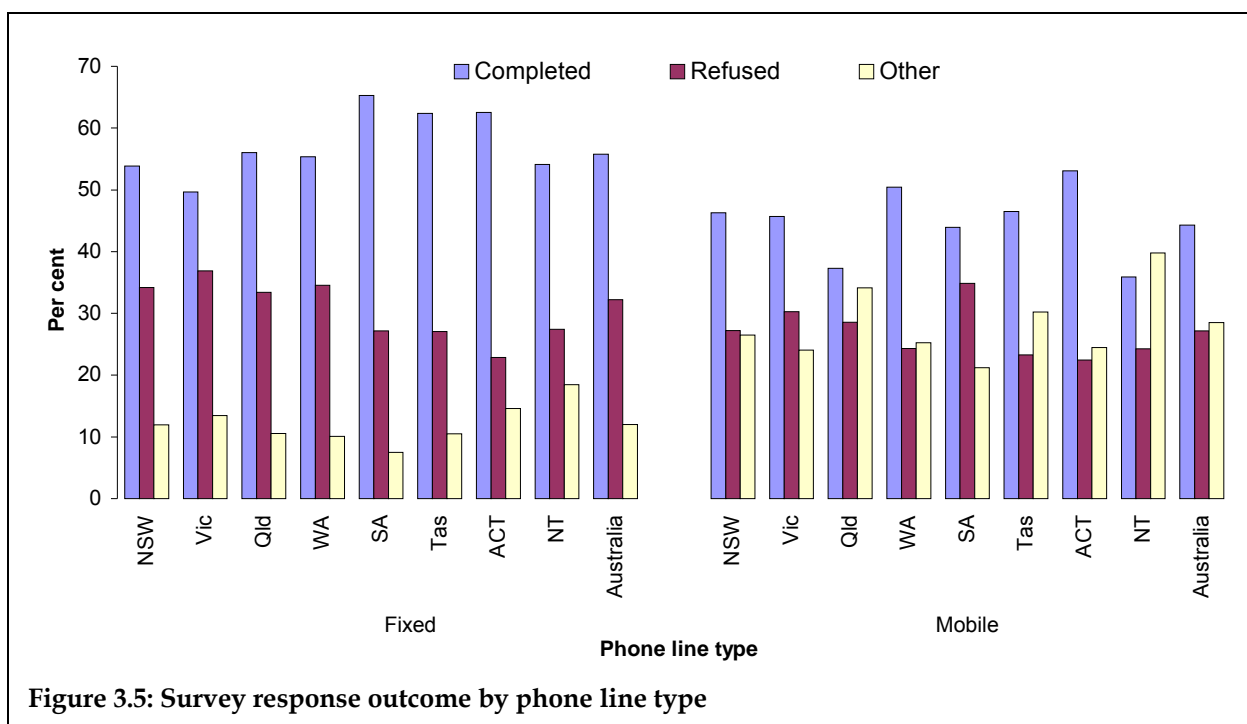


Figure 3.5: Survey response outcome by phone line type

Table 3.6: Survey response outcome by region, states and territories, 2008 (per cent)

Region	Survey status			Total
	Completed	Refused	Other	
Metro				
NSW	51.5	35.8	12.8	100.0
Vic	45.8	37.8	16.5	100.0
Qld	54.0	33.2	12.8	100.0
WA	54.1	34.4	11.5	100.0
SA	61.7	29.4	8.8	100.0
Tas	62.8	28.1	9.2	100.0
ACT	62.0	22.9	15.1	100.0
NT	50.9	29.7	19.4	100.0
Australia	53.2	32.9	13.8	100.0
Non Metro				
NSW	56.3	31.3	12.5	100.0
Vic	57.5	33.7	8.8	100.0
Qld	55.7	33.0	11.3	100.0
WA	56.1	33.2	10.7	100.0
SA	66.7	25.7	7.7	100.0
Tas	60.0	26.0	14.0	100.0
NT	57.5	30.5	12.0	100.0
Australia	57.5	30.5	12.0	100.0

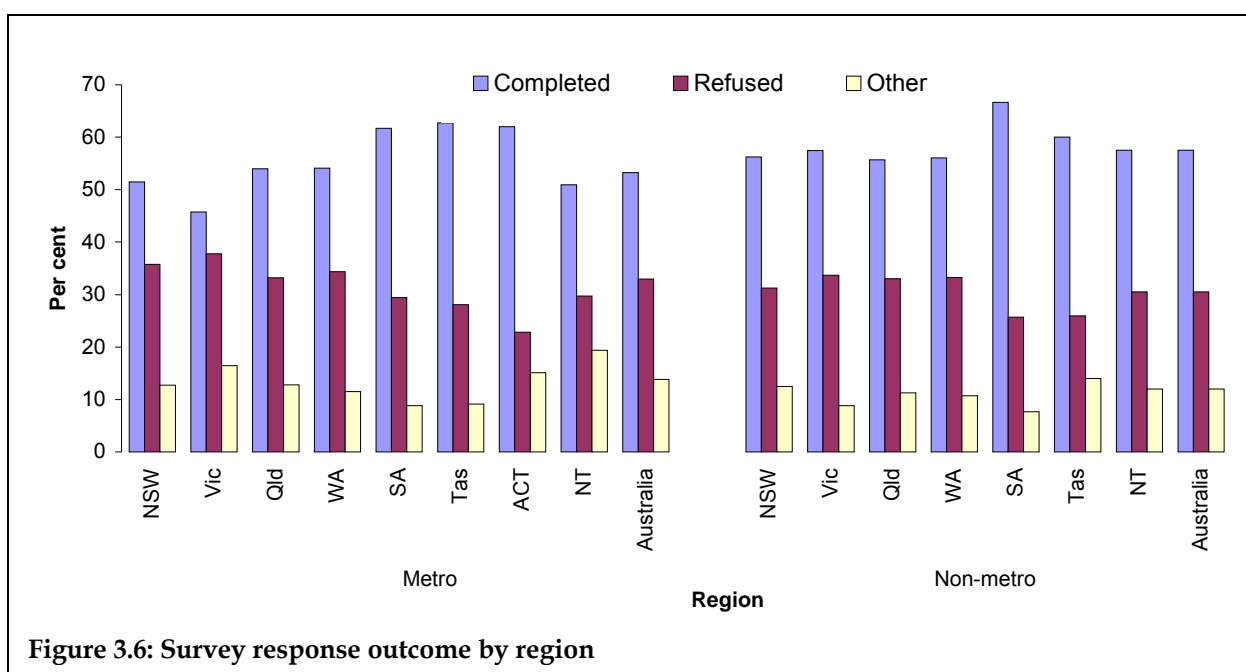


Figure 3.6: Survey response outcome by region

4 Conclusion

The findings in this report provide some insights into the feasibility of using the electoral roll as a starting point for obtaining telephone listings for the purposes of CATI surveys. Even though only half of the names input to the matching process obtained a suitable match, the quality of the name, address and telephone number information would be high and would support response maximisation strategies such as Primary Approach Letters.

In the face of the current telecommunication challenges in CATI-based health surveillance systems, these findings provide some hope for obtaining viable samples for jurisdictions and nationally.