

Predicting when declining landline frame coverage will impact on the overall health estimates for the NSW Population Health Survey.

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Introduction

In Australia most statewide health behaviour risk factor surveillance is undertaken using Computer Assisted Telephone Interviewing (CATI) and landline telephone frames. The population covered by landline phone frames was estimated by the Australian Bureau of Statistics (ABS) [1] in 1996 to be 96%, however by 2008 coverage had declined to 90% [1,2].

Australia was following the trends in USA, the UK and other countries; experiencing larger decreases in coverage by their landline telephone frames (80.1% coverage in the US and 87% in the UK) with even lower coverage in some demographic groups such as young people, and people who were renting [3,4].

Although not routinely available in Australia, differences in health behaviour risk factor and health status prevalence estimates between adults covered in a landline frame, and adults who are mobile-only phone users, have been measured in the USA using the National Health Interview Survey (NHIS) since 2003 [3]. This survey found substantial differences for being a current smoker (18.4% and 30.2% - 64% higher), positive health status (60.5% and 66.0% - 9% higher); obese – 20 years and over (27.4% and 25.6% - 7% lower), and ever diagnosed with diabetes (8.7% and 4.5% - 44% decrease) [3].

So as a result of this monitoring in the USA the Centers for Disease Control (CDC) who administer the Behavior Risk Factor Surveillance System (BRFSS) introduced mobile telephone numbers into the sampling frames of the BRFSS in 2008 and at least 250 individuals in 21 state surveys were conducted with people on their mobile phones [5].

So what should we do now in Australia? Should we stop collecting data using CATI survey and landline frames? Before we consider what to do, we firstly need to understand how big the problem is in Australia, and when it is likely to impact on the estimates being produced by ongoing CATI population health surveys such as the New South Wales Population Health Survey (NSWPHS) [6].

Methods

Firstly we estimated the worst case scenario for NSW with regard to landline frame coverage using the latest USA coverage of 79.8% with 68.6% aged 18-24 years covered by the landline frame, 64.3% aged 25-29 years covered; 80.9% aged 30-44 years covered; 90.8% aged 45-64 years covered and 97.2% aged 65 years and over covered by the landline frame [3].

Secondly we estimated that the current landline phone coverage for NSW using the 2008 ABS WA survey which estimated landline coverage to be 89.8% [2]. However there was no age profile reported for this survey, so we used the USA profile, scaled accordingly.

As current smoking had the largest relative difference (64% higher) from NHIS we used the 2008 NSWPHS current smoking estimates of 18% overall and 22% in 18-24 year olds, 27% in 25-29 year olds, 23% in 30-44 year olds, 14% in 45-64 year olds and 6% in 65 year and over to predict the impact.

We then proposed three possible scenarios for the relative difference between adults covered in a landline frame, and adults who were mobile-only phone users: 25% higher; 50% higher and 100% higher to be used with each of the rates of landline frame coverage described previously (see Table 1).

Using the formula below, the adjusted rates were calculated, incorporating the mobile-only phone users for each age group and overall. We also estimated, for the current survey design, if the absolute differences were more than 2% it was likely to be significantly different.

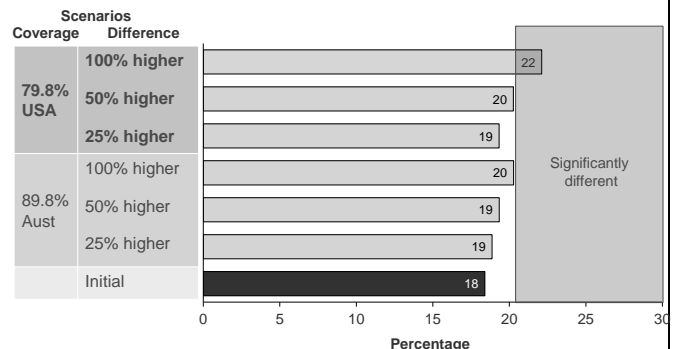
$$P_r = \sum (P_i C + P_i D(1 - C)) / k$$

where P =prevalence; C =coverage; D =difference; i =initial; r _revised; k =age groups

Results

As shown in Table 1 and illustrated in Figure 1, scenario one (89.8% landline coverage), even with a 100% relative estimate difference, it would not significantly impact on the overall NSW current smoking estimates. Estimates for younger age groups however would be impacted. If the coverage did drop to 80% as in scenario two (2008 USA landline coverage) and the relative estimate difference was 50% higher, it would significantly impact on the overall NSW current smoking estimate. Again estimates for younger age groups would be impacted at even lower relative estimate difference.

Figure 1: Current Smoking prevalence estimates, actual and adjusted to incorporate mobile-only phone users, NSW 2008



Summary

Based on the above overseas experience, it was estimated that when the overall landline coverage dropped below 85% in NSW, and the differences between people who were covered in the landline frame and mobile-only phone users, differed by more than 50% it would impact on the overall NSW prevalence estimates.

Table 1: Summary of calculations to estimate impact of landline frame coverage on the current smoking estimates, NSW, 2008.

Scenario 1: Same as Western Australia, Australia in 2008 ie overall 10.2% mobile-only and 89.8% have a landline phone												
Type of phone use by age group			Current Smoking									
			NSWPHS	Scenario 1 - Mobile-only are 25% higher			Scenario 2 – Mobile-only are 50% higher			Scenario 3 – Mobile-only are 100% higher		
Age group	Mobile-only population	Landline population	As estimated %	Mobile-only adjusted %	Overall adjusted %	Difference from NSWPHS %	Mobile-only adjusted %	Overall adjusted %	Difference from NSWPHS %	Mobile-only adjusted %	Overall adjusted %	Difference from NSWPHS %
16-24	0.168	0.841	21.7	27.1	22.6	0.9	32.6	23.4	1.7	43.4	25.1	3.4*
25-34	0.180	0.819	26.5	33.1	27.7	1.2	39.8	28.9	2.4*	53	31.3	4.8*
35-44	0.096	0.903	22.8	28.5	23.3	0.5	34.2	23.9	1.1	45.6	25.0	2.2*
45-54	0.046	0.953	17.6	22.0	17.8	0.2	26.4	18.0	0.4	35.2	18.4	0.8
55-64	0.046	0.953	14.3	17.9	14.5	0.2	21.5	14.6	0.3	28.6	15.0	0.7
65 plus	0.014	0.985	6.2	7.8	6.2	0.0	9.3	6.2	0.0	12.4	6.3	0.1
NSW	0.102	0.898	18.4	23.0	18.9	0.5	27.6	19.3	0.9	36.8	20.3	1.9

Scenario 2: Same as the USA in 2008 ie overall 20.2% mobile-only and 79.8% have a landline phone												
Type of phone use by age group			Current Smoking									
			NSWPHS	Scenario 1 - Mobile-only are 25% higher			Scenario 2 – Mobile-only are 50% higher			Scenario 3 – Mobile-only are 100% higher		
Age group	Mobile-only population	Landline population	As estimated %	Mobile-only adjusted %	Overall adjusted %	Difference from NSWPHS %	Mobile-only adjusted %	Overall adjusted %	Difference from NSWPHS %	Mobile-only adjusted %	Overall adjusted %	Difference from NSWPHS %
16-24	0.314	0.686	21.7	27.1	23.4	1.7	32.6	25.1	3.4*	43.4	28.5	6.8*
25-34	0.357	0.643	26.5	33.1	28.9	2.4*	39.8	31.2	4.7*	53.0	36.0	9.5*
35-44	0.191	0.809	22.8	28.5	23.9	1.1	34.2	25.0	2.2*	45.6	27.2	4.4*
45-54	0.092	0.908	17.6	22.0	18.0	0.4	26.4	18.4	0.8	35.2	19.2	1.6
55-64	0.092	0.908	14.3	17.9	14.6	0.3	21.5	15.0	0.7	28.6	15.6	1.3
65 plus	0.028	0.972	6.2	7.8	6.2	0.0	9.3	6.3	0.1	12.4	6.4	0.2
NSW	0.202	0.798	18.4	23.0	19.3	0.9	27.6	20.3	1.9	36.8	22.1	3.7*

Note: * Likely to be significantly different

References

1. Australian Bureau of Statistics: Population Survey Monitor. Catalogue no 4103.0. Canberra: ABS; 1996.
2. ABS Cat no 1367.5 - Western Australian Statistical Indicators, Sep 2008.
3. Blumberg SJ, Luke JV: Wireless substitution: Estimates from the National Health Interview Survey. January - June 2008, National Centre for Health Statistics. 2008. <http://www.cdc.gov/nchs/data/nhis/earlyrelease/wireless200805>.
4. Ofcom research: Ofcom nations and regions tracker. http://www.ofcom.org.uk/static/marketedataresearch/statistics/main_set.pdf
5. Behavioral Risk Factor Surveillance System (BRFSS). <http://www.cdc.gov/brfss/>
6. NSW Population Health Surveys. <http://www.health.nsw.gov.au/surveys/Pages/default.aspx>