SHS 2017 and Beyond Consultation - Sample sizes and confidence intervals - Options A and B

Introduction

This short note provides some illustrative confidence intervals for SHS 2017 Options A and B (section A) for national and local authority level data, and explains how confidence intervals can be calculated for different questions (section B). Annex A provides sample (base sizes) for all local authorities under the current SHS and options A and B.

Option A   Biennial topics, i.e. halving the number of topics covered by the survey every year and collecting data on each topic every second year, with a small reduction in sample size (from 10,700 to 10,100). Maintains full topic coverage albeit every two years.

Local Authority data would be published every year on an annual basis.

Option B   Reduction of the overall survey sample size by around a third, from 10,700 to 7,450, with a small reduction in topics covered by the survey.

Local Authority data would be published every year on a two year rolling average basis.

A. Confidence Intervals

Confidence intervals are a measure of the precision of survey estimates, with smaller/narrower confidence intervals being desirable.[1] Confidence intervals are shown below for full sample questions from both the household and random adult questionnaires, at both Scotland level and for an illustrative local authority (Aberdeenshire). A fictional random adult question is also shown in order to illustrate that confidence intervals widen when estimates are closer to 50 percentage points.

Annex A provides sample (base) sizes for all local authorities for the current SHS and for options A and B (full and one third sample household and random adult questions, based on 2014 data). These estimates can be used in conjunction with the SHS 2014 Local Authority tables to calculate confidence intervals for different questions and base sizes (as explained in section B below).

It should be noted that the confidence interval estimates are a guide and have been calculated on the basis of rounded estimates and/or base sizes. Furthermore, SHS 2017 Options A and B assume the same point estimates as 2014 data to allow a comparison of confidence intervals to be made.

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[1] For further explanation of confidence intervals in the SHS, see 'statistical significance' under the guidance and info tab in the Local Authority tables publication.

Household questionnaire examples

Full sample - Scotland level data

Household access to cars and vans (full sample household question)

	Scotland	Confidence Intervals		
	Current (2014)	Current (2014)	Option A (biennial topics)	Option B (30% reduction in sample size, <u>annual data</u>)
None	31%	+/-1%	+/-1%	+/-1.2%
One or More	69%	+/-1%	+/-1%	+/-1.2%
Base	10630	10630	10100	7450

Full sample - Aberdeenshire data

Household access to cars and vans (full sample household question)

	Aberdeenshire	Confidence Intervals		
	Current (2014)	Current (2014)	Option A (biennial topics)	Option B (30% reduction in sample size, <u>2 year rolling average</u>)
None	15%	+/-4.6	+/-4.6%	+/-3.6%
One or More	85%	+/-4.6	+/-4.6%	+/-3.6%
Base	320	320	310	450

Random adult questionnaire examples

Full sample - Scotland level data

Whether respondent smokes cigarettes (full sample random adult question)

	Scotland	Confidence Intervals		
	Current (2014)	Current (2014)	Option A (biennial topics)	Option B (30% reduction in sample size, <u>annual data</u>)
Yes	80%	+/-0.9%	+/-0.9%	+/-1.1%
No	20%	+/-0.9%	+/-0.9%	+/-1.1%
Base	9800	9800	9300	6850

Whether respondent likes potatoes (full sample random adult question)

	Scotland	Confidence Intervals		
	Current (2014)	Current (2014)	Option A (biennial topics)	Option B (30% reduction in sample size, <u>annual data</u>)
Yes	45%	+/-1.1%	+/-1.2%	+/-1.4%
No	55%	+/-1.1%	+/-1.2%	+/-1.4%
Base	9800	9800	9300	6850

Full sample - Aberdeenshire data

Whether respondent smokes cigarettes (full sample random adult question)

	Aberdeenshire	Confidence Intervals		
	Current (2014)	Current (2014)	Option A (biennial topics)	Option B (30% reduction in sample size, two year rolling average)
Yes	82%	+/-5.2%	+/-5.4%	+/-4.4%
No	18%	+/-5.2%	+/-5.4%	+/-4.4%
Base	300	300	280	420

Whether respondent likes potatoes (full sample random adult question)

	Aberdeenshire	Confidence Intervals		
	Current (2014)	Current (2014)	Option A (biennial topics)	Option B (30% reduction in sample size, two year rolling average)
Yes	45%	+/-6.5%	+/-6.7%	+/-5.5%
No	55%	+/-6.5%	+/-6.7%	+/-5.5%
Base	300	300	280	420

B. Calculating confidence intervals for different questions

Confidence intervals for different questions can be calculated by referencing the 2014 SHS Annual Report and/or the Local Authority tables. This includes questions that have smaller sample/base sizes than the sampled population because a filter has been applied, e.g. people with a driving licence.

As an example, the confidence intervals under options A and B for Aberdeenshire and whether a respondent smokes were calculated as follows:

1. Access the Local Authority tables and the question of interest, in this case whether the respondent smokes or not in the Health section in table 9.1.

2. Select Aberdeenshire from the drop down menu and read off the current sample/base size for 2014 for the particular question, in this case smoking in table 9.1 which has a 300 base size.

3. Calculate the sample sizes for option A and B using the following table. Remember that as option B will publish data on a two year rolling average basis, double the sample size first for option B before applying the figures below, i.e. Option B sample size for Aberdeenshire smoking example is 300 x 2= 600 x 70%=420.

Sample sizes as % of current sample size		
Household	Option A	Option B
Full sample question	95%	70%
1/3 sample question	95%	105%
Random A	Option A	Option B
Full sample question	95%	70%
1/3 sample question	95%	105%

Notes: To work out whether a question is a full sample question or a one third sample question, look at the Scotland level sample size in the national report or LA tables. Full sample questions typically have a base size of at least 9,800 (unless they are a subset of the population, e.g. people with a driving licence) whilst one third sample questions have a base size of at least 3,250 (unless they are a subset of the population).

4. Use the [significance spreadsheet](#) to calculate the confidence intervals for the new sample size. Note you may need to use the nearest percentage point estimate and/or the nearest sample/base size to calculate your confidence interval.

5. Alternatively you can unprotect the spreadsheet and insert a new column of data for your sample size (e.g. insert 420 in the new column N, row 14) and copy the formula from the previous column row M. This will automatically give you the confidence interval for 420 <u>from the table</u> (but <u>not</u> the shaded boxes at the top which default to the nearest sample size which was already in the table, in this case 500) The confidence interval for an 80% estimate can be read off row 30, new column N, for 80%, i.e. +/-4.4%.

ANNEX A Local Authority Sample Sizes – Current SHS and Options A and B

For local authority (LA) estimates, when calculating sample sizes for options A and B, it is assumed that all LA estimates face the same proportionate reduction as at national level.

Option B shows the sample size for two year rolling average estimates, i.e. combining two years' worth of data to publish estimates every year.

Table A1 Sample Sizes for Current SHS and Options A and B - Full Sample Questions

	Household			Random Adult		
	Current	Option A	Option B (two year rolling average)	Current	Option A	Option B (two year rolling average)
Aberdeen City	310	290	430	290	270	400
Aberdeenshire	320	310	450	300	290	420
Angus	270	260	380	260	240	360
Argyll and Bute	290	270	400	270	260	380
Clackmannanshire	270	260	380	250	240	350
Dumfries and Galloway	240	220	330	230	210	310
Dundee City	290	270	400	250	240	350
East Ayrshire	250	230	340	230	220	330
East Dunbartonshire	260	250	360	220	210	310
East Lothian	240	230	330	220	210	300
East Renfrewshire	240	230	340	220	210	310
Edinburgh City	800	760	1,110	710	680	990
Falkirk	290	270	400	260	250	370
Fife	540	510	760	490	460	680
Glasgow City	1,020	970	1,420	950	900	1320
Highlands	350	330	490	320	300	450
Inverclyde	260	250	370	250	240	350
Midlothian	230	210	320	190	180	270
Moray	260	240	360	250	240	350
Na h-Eileanan Siar	280	270	390	270	250	370
North Ayrshire	260	250	360	250	230	340
North Lanarkshire	490	460	680	450	420	620
Orkney Islands	270	260	380	270	260	380
Perth and Kinross	290	270	400	250	230	340
Renfrewshire	260	250	360	250	230	340
Scottish Borders	270	260	380	250	240	350
Shetland Islands	280	270	390	260	250	360
South Ayrshire	270	260	380	250	230	340
South Lanarkshire	440	420	620	410	390	570
Stirling	270	250	370	250	240	350
West Dunbartonshire	290	280	410	280	270	390
West Lothian	230	220	320	200	190	280
Scotland	10,630	10,070	14,820	9,800	9,280	13,650

Table A2 Sample Sizes for Current SHS and Options A and B - "One Third Sample" Questions

	Household			Random Adult		
	Current	Option A	Option B (two year rolling average)	Current	Option A	Option B (two year rolling average)
Aberdeen City	100	90	210	100	90	210
Aberdeenshire	110	100	230	100	90	210
Angus	90	90	190	90	90	190
Argyll and Bute	100	90	210	90	90	190
Clackmannanshire	90	90	190	80	80	170
Dumfries and Galloway	80	80	170	80	80	170
Dundee City	100	90	210	80	80	170
East Ayrshire	80	80	170	80	80	170
East Dunbartonshire	90	90	190	70	70	150
East Lothian	80	80	170	70	70	150
East Renfrewshire	80	80	170	70	70	150
Edinburgh City	270	260	560	240	230	500
Falkirk	100	90	210	90	90	190
Fife	180	170	380	160	150	330
Glasgow City	340	320	710	320	300	670
Highlands	120	110	250	110	100	230
Inverclyde	90	90	190	80	80	170
Midlothian	80	80	170	60	60	130
Moray	90	90	190	80	80	170
Na h-Eileanan Siar	90	90	190	90	90	190
North Ayrshire	90	90	190	80	80	170
North Lanarkshire	160	150	330	150	140	310
Orkney Islands	90	90	190	90	90	190
Perth and Kinross	100	90	210	80	80	170
Renfrewshire	90	90	190	80	80	170
Scottish Borders	90	90	190	80	80	170
Shetland Islands	90	90	190	90	90	190
South Ayrshire	90	90	190	80	80	170
South Lanarkshire	150	140	310	140	130	290
Stirling	90	90	190	80	80	170
West Dunbartonshire	100	90	210	90	90	190
West Lothian	80	80	170	70	70	150
Scotland	3,540	3,350	7,400	3,270	3,090	6,840