

Scottish Household Survey: Methodology and Fieldwork Outcomes 2015



A National Statistics publication for Scotland

PEOPLE, COMMUNITIES AND PLACES

Scottish Household Survey Project Team

Survey Management and Dissemination Branch

Communities Analysis Division

The Scottish Government

February 2017

Acknowledgements

Thanks go to all people in the development, implementation and reporting of the Scottish Household Results.

Primarily, without the goodwill and support of all of the householders who agree to fully participate in the survey, agreeing to both the social interview and the physical inspection of their property, the survey would not be possible. Special thanks are due to the thousands of people who gave their time freely for the SHS. Particular thanks go to Chris Martin and his colleagues at Ipsos MORI for their continued support and advice across all aspects of the survey management. The fieldwork was undertaken by a team of around 100 interviewers and 50 surveyors and managed by a number of Regional Managers. We would like to express our thanks for their commitment and determination. Thanks also to Sarah Martin and Jamie Robertson in the Office of the Chief Statistician and Strategic Analysis (OCSSA), Scottish Government, for their contributions to this report and all of the lead analysts in the Scottish Government for their contributions to the main report.

Comments and Suggestions

We are committed to continual improvement and would welcome any comments or suggestions on how the SHS Methodology and Fieldwork Outcomes report, or any other reports or releases, could be improved or adapted in the future. Similarly, if you have any enquiries on any aspects of the survey development then we would welcome your opinions or questions. Please contact the SHS Project Team.

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1 Survey Overview

The Scottish Household Survey (SHS) is a continuous survey based on a sample of the general population in private residences in Scotland. The survey started in 1999 and up to 2011 followed a fairly consistent survey design. From 2012 onwards, the survey was substantially redesigned to include elements of the Scottish House Condition Survey¹ (SHCS) including the follow-up Physical Survey component. The survey is run through a consortium led by Ipsos MORI.

The SHS is designed to provide reliable and up-to-date information on the composition, characteristics, attitudes and behaviour of Scottish households and individuals, both nationally and at a sub-national level and to examine the physical condition of Scotland's homes. It covers a wide range of topics to allow links to be made between different policy areas. The specific aims of the survey are:

- Meet central and local Government needs for priority policy relevant data across a broad range of topics (including needs for continuing time-series of data collected by the SHS and SHCS previously);
- Be understandable and useful to stakeholders and so lead to a high level of buy-in and use of the SHS;
- Have built in flexibility to respond to different data needs regarding geography and frequency (e.g. to provide some data annually at Local Authority level, and some biennially at national level), and changes to these requirements over time;
- Align with other surveys and data vehicles (in particular the Scottish Health Survey and Scottish Crime and Justice Survey);
- Produce high quality data in accordance with the Code of Practice for Official Statistics² so as to provide data that is suitable for the production of National Statistics publications in a cost effective way;
- To permit disaggregation of information both geographically and in terms of population sub-groups (such as families with children or households in the social rented sector);
- To allow the relationships between social variables within households to be examined. This will support cross-analysis on a range of issues;

¹ <http://www.scotland.gov.uk/SHCS>

² <http://www.statisticsauthority.gov.uk/assessment/code-of-practice/index.html>

- To allow detailed follow-up surveys of sub-samples from the main survey sample, if required.

The survey is funded by the Scottish Government with contracts awarded for the fieldwork periods 1999 to 2002, 2003 to 2006 and 2007 to 2010. The 2007 to 2010 contract made provision for the Government to extend the contract for up to two years. Anticipating major changes to the SHS and other Scottish Government population surveys from 2012, the contract was extended for one year, covering fieldwork in 2011. This would be the last of the original series of surveys that began in 1999.

From 2012 onwards, the survey was substantially redesigned to include elements of the Scottish House Condition Survey (SHCS)³ including the follow-up Physical Survey component. The new SHS went in to the field with a substantially restructured sample design, integrating the previous SHCS.

The new survey uses a fully unclustered core and modular structure with some questions asked of the full sample and others of a one-third sub-sample. The overall sample size has reduced from around 14,000 household interviews to about 11,000 though improvements in efficiency of the survey design mean it will be possible to obtain local authority estimates on an annual basis where sample sizes will produce robust estimates. This also means that any set of years can be combined to create larger samples, where necessary. While the overall sample size of the survey has reduced, the survey design improvements has meant that the precision of estimates have not been affected significantly.

The survey is run through a consortium led by Ipsos MORI.

1.1 Technical reports

Technical Reports have been published for each year of the survey covering the survey methodology, fieldwork outcomes and the questionnaire used. This report covers the methodology and fieldwork outcomes for the 2015 survey.

A second technical publication provides details of the survey questionnaire⁴ used in 2015. This includes a variety of information including the question and subsequently produced variable names along with any notes on handling individual questions.

³ <http://www.scotland.gov.uk/shcs>

⁴ www.scotland.gov.uk/Topics/Statistics/16002/PublicationQuestionnaire

2 Sample Design

2.1 Requirements

The sample for the 2015 Scottish Household Survey (SHS) was designed by the Scottish Government. From 2012 the sample design has been coordinated with the sample designs for the Scottish Health Survey (SHeS) and the Scottish Crime and Justice Survey (SCJS) as part of a survey efficiency project and to allow the samples of the three surveys to be pooled for further analysis⁵.

The SHS sample has been designed to allow annual publication of results at Scotland level and for local authorities. To meet these requirements the target sample size for Scotland was 10,678 household interviews with a minimum local authority target of 258 (West Lothian). From 2012, the physical survey of the Scottish House Condition Survey (SHCS) has been incorporated into the SHS. Around one third subsample of the main SHS sample has been allocated to the physical survey, which has a required sample size of 3,004 for Scotland and a minimum of 80 for each local authority .

2.2 Sample design and assumptions

2.2.1 Main sample

The 2015 Scottish Household Survey has a single-stage unclustered sample design. In order to provide annual local authority results without specifying an excessive overall sample size, the sample was disproportionately stratified by local authority (smaller local authorities have a higher sample proportion relative to their populations than the larger local authorities).

To deliver the required local authority precision the minimum effective sample size for each local authority was set at 250. For local authorities where an effective size sample of 250 would have decreased estimate precision by more than 25 per cent from the previous sweep of the survey the target effective sample size was increased such that the decrease in precision was less than 25 per cent.

⁵ Further information on the sample designs and the methodology uses is available here: <http://scotland.gov.uk/Topics/Statistics/About/SurveyDesigns201215>

In order to estimate the annual target achieved sample size for each local authority, analysis of design effects from the 2007-08 survey was undertaken, since:

$$\text{Effective sample size} = \frac{\text{Achieved sample}}{\text{Design effect}}$$

As rural areas of local authorities were clustered in the 2007-08 survey, for the 2015 unclustered sample the median design effect from a range of variables for the unclustered parts of local authority samples were assumed for the entire areas in 2015. This allowed the calculation of the target achieved sample size for each local authority, as shown in Table 2.1.

2.2.2 Physical survey sub-sample

For the physical survey, the minimum sample size over each rolling three year period for each local authority is 240 giving a minimum of 80 per annum. There is also a minimum annual sample for Scotland of 3,004. An iterative approach was taken to allocate the physical surveys across local authorities. Firstly, the overall sample of 3,004 was allocated to local authorities proportionate to the number of occupied dwellings. Where the allocated number of interviews was below 80, the allocation was increased to 80. The remaining sample was then allocated across the local authorities which had an initial allocation of more than 80.

Completion of the physical survey requires that selected households respond to the main social survey and agree to a follow-up visit for the physical survey to be completed. Therefore, in order to achieve the sample targets a conversion rate from household interview to physical survey is required. Prior to 2012 the Scottish House Condition Survey consisted of a similar structure with social interview followed by the physical survey visit. For each local authority, assumptions for conversion from household interview to physical survey were based on the average conversion rate from the three most recent SHCS with information available. Since the physical survey is a module of the SHS for the first time in 2012, the conversion rate for each local authority was reduced by 2 per cent to be conservative. Additional conditions were added to the conversion rate assumptions setting upper and lower limits of 90 per cent and 70 per cent, respectively.

In order to calculate the total number of addresses in the sample to assign to the physical sample, the number of responding households required to yield the physical survey responses is calculated using the conversion rates. The response rate and ineligible address assumptions cited in section 0 are then applied.

Table 2.1 shows the target sample size and the number of selected addresses for the main sample and physical survey by local authority.

Table 2.1: Target sample sizes and selected addresses

<i>Local Authority</i>	Main sample		Physical survey sub-sample	
	Target interviews	Selected addresses	Target interviews	Selected addresses
Aberdeen City	352	650	91	235
Aberdeenshire	335	525	89	196
Angus	263	412	80	166
Argyll and Bute	263	450	80	191
Clackmannanshire	263	375	80	147
Dumfries and Galloway	264	416	80	146
Dundee City	261	436	80	174
East Ayrshire	266	442	80	160
East Dunbartonshire	273	420	80	154
East Lothian	270	430	80	154
East Renfrewshire	269	462	80	188
Edinburgh City	747	1,362	190	464
Falkirk	261	445	80	152
Fife	553	382	137	147
Glasgow City	982	820	246	271
Highland	335	1,837	88	606
Inverclyde	278	564	80	197
Midlothian	267	445	80	183
Moray	265	437	80	165
Na h-Eileanan Siar	275	426	80	169
North Ayrshire	271	407	80	145
North Lanarkshire	477	788	124	272
Orkney	267	386	80	146
Perth and Kinross	267	439	80	162
Renfrewshire	275	431	80	161
Scottish Borders	263	402	80	152
Shetland	274	400	80	139
South Ayrshire	278	478	80	159
South Lanarkshire	459	723	119	247
Stirling	268	402	80	162
West Dunbartonshire	279	452	80	167
West Lothian	258	398	80	163
Scotland	10,678	17,442	3,004	6,340

2.3 Sample selection

The Royal Mail's small user Postcode Address File (PAF) was used as the sample frame for the address selection. The advantages of using the small user PAF are as follows:

- It has previously been used as the sample frame for Scottish Government surveys so previously recorded levels of ineligible addresses can be used to inform assumptions for 2015 sample design;
- It has excellent coverage of addresses in Scotland; and
- The small user version excludes the majority of businesses

The Assessor's Portal which is the council tax list of all dwellings in Scotland was considered as an alternative sample frame but since it had not previously been used as a sample frame for large scale surveys in Scotland there would have been a greater risk attached to assumptions for response rates and ineligible addresses.

The PAF does still include a number of ineligible addresses, such as small businesses, second homes, holiday rental accommodation and vacant properties. A review of the previous performance of individual surveys found that they each recorded fairly consistent levels of ineligible address for each local authority. This meant that robust assumptions could be made for the expected levels of ineligible addresses in the sample size calculations.

As the samples for the SHS, SHeS and SCJS are all being selected by the Scottish Government from 2012 onwards, addresses selected for any of the surveys are removed from the sample frame so that they cannot be re-sampled for another survey. This will help to reduce respondent burden and facilitate the development of the pooled sample. The addresses are removed from the sample frame for a minimum of 4 years.

The sample design specified above was implemented as follows:

- 1) Systematic random sampling was used to select the addresses from the sample frame with the addresses ordered by urban-rural classification, SIMD rank and postcode.
- 2) Once the overall sample was selected systematic random sampling was used to select the subsample for the physical survey.

2.3.1 Selecting households at addresses with multiple dwellings

A small number of addresses have only one entry in the PAF but contain multiple dwelling units. Such addresses are identified in the PAF by the Multiple Occupancy Indicator (MOI). To ensure that households within MOI addresses had the same probability of selection as other households, the likelihood of selecting the addresses were increased in proportion to the MOI. For addresses which are flagged as having multiple dwellings in the PAF the dwelling to interview was randomly selected as part of the sample selection process.

Where the MOI is correct, this procedure is unproblematic. Sometimes, however, the MOI is incorrect or missing (in about 2 per cent of cases) and the true number of dwellings at an address is only discovered once the survey is in the field.

Where an interviewer finds that the MOI is different from the actual number of dwellings observed (and there is more than one dwelling) he or she contacts the office where the correct details are used to randomly select one of the dwellings.

2.3.2 Selecting individuals within households

As the survey is intended to collect information both about the structure and characteristics of Scottish households and about the people who occupy those households, the interview has a two-part structure. The respondent for the first part of the interview must be a householder – generally the Highest Income Householder or their spouse or partner⁶. For the second part of the interview, one adult (aged 16+) member of the household is selected at random by the CAPI script (see section 3.1). If this person is not available at the time, the interviewer will call back to complete the interview at a later date if necessary⁷.

2.3.3 Allocation of sample to different time periods

Finally, addresses were grouped into batches for effective fieldwork. This was done by minimising the distance required to visit each address in a batch. Batches were then allocated to a particular fieldwork quarter. All quarters had, as far as possible, the same number of batches in each local authority to help ensure that the fieldwork was carried out throughout the year.

2.3.4 Allocation of sample to questionnaire modules

To meet the need for modularisation, all sampled addresses were randomly assigned to one of 12 sub-samples or interview streams, which could be used as the basis for assigning samples of respondents to particular blocks of questions.

⁶ This must be a person in whose name the accommodation is owned or rented or who is otherwise responsible for the accommodation. The Highest Income Householder (HIH) is taken as the household reference person for the first part of the interview. In households with more than one householder, the person with the highest income is taken as the household reference person. If householders have exactly the same income, the older or oldest is taken as the household reference person.

⁷ The selection of the random adult is slightly more complex than this. The random adult needs to be one of the adult household members who is aged 16 years or over, is normally resident during term time (if a student) or has not been living outside of the household for 6 months or more.

For example, the Physical Survey module is intended to provide representative data on the physical condition of Scotland's homes and this is achieved by assigning the module to streams 1 to 4. A series of "social" questions are asked in the Household section of the survey to understand experiences of households, also in streams 1 to 4. This means that the Physical Survey social questions are based on a random sub-sample of 1 in 3 addresses and (assuming no difference in response rates) 1 in 3 interviews will be directed through those questions.

It should be noted that given difficulties in achieving the target number of physical surveys (see section 6.3), a fifth stream (stream nine) was opened up at the start of quarter 3 fieldwork to the physical survey. In other words, households who were in stream nine were asked to participate in the physical survey from July 2015 onwards.

Other smaller blocks of questions are asked of sub-samples at various points in the questionnaire and the published version of the questionnaire indicates where and at what points in time streaming is used.

2.4 Exclusions

Samples of the general population exclude prisons, hospitals and military bases. While prisons and hospitals do not generally have significant numbers of private households, the same may not be true of military bases. These are classified as special enumeration districts (EDs) in the Census and account for just 0.5 per cent of the population. Interviewing on military bases would pose fieldwork problems relating to access and security so they are removed from the PAF before sampling.

The following types of accommodation are excluded from the survey if they are not listed on the Small User file of the PAF:

- nurses' homes;
- student halls of residence;
- other communal establishments (e.g. hostels for the homeless and old people's homes);
- mobile homes; and
- sites for travelling people.

Households in these types of accommodation are included in the survey if they are listed on the Small User file of the PAF and the accommodation represents the sole or main residence of the individuals concerned. People living in bed and breakfast accommodation are similarly included if the accommodation is listed on PAF and represents the sole or main residence of those living there⁸.

Students' term-time addresses are taken as their main residence (in order that they are counted by where they spend most of the year). However, since halls of residence are generally excluded there will be some under-representation of students in the SHS.

⁸ The target population of the old SHCS excludes "dwellings without foundations". So, for example, mobile homes would not be eligible for the physical survey. However, these dwellings are eligible for the social survey. In order to work around this, such dwellings are still included in the social interview but are then streamed past questions on surveyor appointments, thus avoiding surveyors being called out to static caravans or houseboats.

3 Data Collections Methods and Instruments

3.1 Use of Computer Aided Personal Interviewing (CAPI)

In common with many other large-scale government surveys, the SHS social interview is carried out using Computer Aided Personal Interviewing (CAPI). This offers a number of important advantages over traditional pen-and-paper interviewing for a survey of this kind.

CAPI programming is integral to ensuring high quality data. The main parameters of the data are defined within the programme, such as; the acceptable range of responses to a question; the acceptable relationships between questions – or, the routing; and the relationships between responses given at different questions.

Between 2012 and 2015, the SHS script was scripted using Quancept. This was the software used for both the SHS and the SHCS in 2011.

3.2 Questionnaire structure

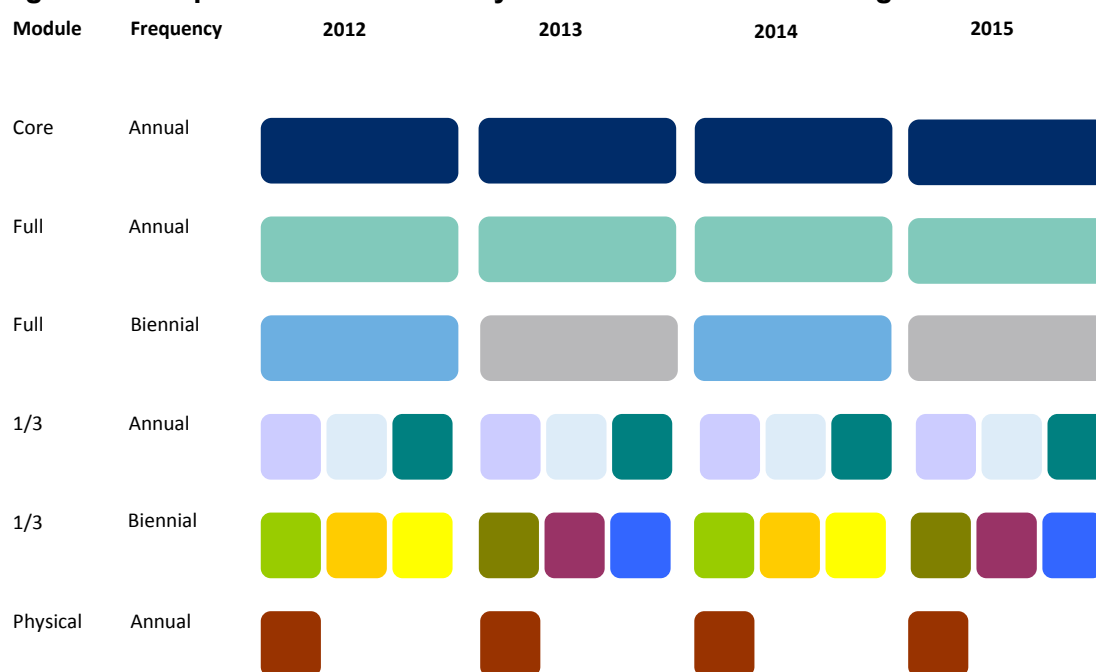
The social questionnaire is in two parts:

- Household – Information is collected about the composition and characteristics of the household from the Highest Income Householder or their spouse/partner – this allows the SHS to produce information representative of Scottish Households;
- Random Adult – Information is collected focusing on the attitudes and experiences of a randomly selected adult member of the household. This produces data which is representative of the Scottish adult population resident in private households.

For reasons of space a handful of ‘household’ questions are also asked of the ‘random adult’. These address household events or characteristics about which any adult member of the household would be likely to know, e.g. age, gender, religion.

Figure 3.1 provides a visual representation of the core and modular design of the SHS (between 2012 and 2015) and how this rotates and replicates across to subsequent years also. This includes a "core" set of 20 questions which have been designed to be asked in consistent ways with other surveys, such as age and gender⁹. The subsequent "modules" of questions have been designed to be flexible in terms of topic, frequency and geography. For example, questions asked of the "full" sample and asked on an "annual" basis would be able to provide local authority level on an annual basis. Similarly, questions might only be asked of "1/3" of the sample on a "biennial" basis (i.e. asked every second year). Such questions could only get national level estimates.

Figure 3.1: Representation of multi-year core and modular design



A simplified version of the questionnaire can be found in the publications section of the SHS website¹⁰. This includes details on how questions are allocated to the different streams. The broad topic areas, however, are as follows.

⁹ Scottish Government Survey Harmonisation (Core Questions): <http://www.scotland.gov.uk/Topics/Statistics/About/SurveyHarm>

¹⁰ www.scotland.gov.uk/SHSPublications

3.2.1. Household

The household reference person, who is the Highest Income Householder (HIH) or their spouse/partner completes part 1 of the interview ('Household'). Details of all members of the household, including children, are collected during the household interview. This includes questions related to the composition and characteristics of the household, and involves capturing basic demographic information of all members of the household, such as gender, age and economic situation at this stage, as well detailed information on dwelling characteristics as captured through the old SHCS. The topics covered in the Household section of the survey are presented in Table 3.1.

Table 3.1: Topics covered in SHS 2015 Household component

Household Composition	People living in household, basic demographics
Accommodation	Tenure, Property type, Number of rooms
Household Services	Number of bedrooms, Internet access, Food waste/recycling
Driving and Transport	Cars, Fuel spend, Bicycles
Young People	Schools and travel
Health and Disability	Disability and type, Caring, Noise
Housing	Aspirations, Repairs, Satisfaction, Water supply
Heating and Energy	Room types, Heating controls, Regimes, Costs, Suitability, Types
Condensation and Damp	Problems
Housing and Health	Adaptations, Services
Household Employment	Householder details

Household Income	Householder/Spouse paid/self-employed/other jobs, Benefits, Other sources
Household Finances	Bank, Savings and investments, Managing financially
Mortgages and Rent	Initial buy, Current, Service charge, Rent costs

Subsequently a child is selected from all household members under 16 (the 'Random Child') and the household respondent is asked questions about childcare for that child. A child who is at school is also selected (the 'Random School Child') and the household respondent answers questions about the school that child attends and the journey they make to go there¹¹.

3.2.2 Random Adult

Once the composition of the household has been established, one of the adults in the household is randomly selected by the computer to complete part 2 ('Random Adult')¹².

This covers the behavioural and attitudinal type questions, such as satisfaction with local services, and captures further demographic information on the random adult. This element also covers the 'Travel Diary' component which asks about travel behaviours on the day previous to that of the interview day. In all households with a single adult the same person completes both the household and the random adult sections. As the number of adults in the household increases, the probability of the random adult being the same as the household respondent declines¹³.

The topics covered in the Random Adult section of the survey are presented in Table 3.2.

¹¹ The random school child may be the same as, or different from, the random child.

¹² Adults who are household members but have been living away for the previous six months are excluded from the selection of the random adult. Children and students living away during term time are counted as household members but are excluded from the random adult and random school child selection.

¹³ Where the same person completes both parts one and two (i.e. they are both the household respondent and selected as the random adult) the CAPI (Computer Assisted Personal Interviewing) script does not repeat the questions common to both sections. This means that these respondents are not asked for the same information twice.

Table 3.2: Topics covered in SHS 2015 Random Adult component

Adult Characteristics	Demographics, Country of birth and date of entry
Accommodation	Current/previous tenure, Homelessness
Neighbourhoods and Communities	Rating, Belonging, Police, Greenspace, Anti-social Behaviour, Feeling safe, Discrimination and Harassment, Involvement with Neighbours
Education and Training	Education
Internet	Use, Methods, Public sector, Non-users
Travel and Transport	Licence, Park and rides, Travel to work/education, Congestion, Car Sharing, Walking, Buses, Trains, Ferry, Crime on public transport, Journey planning, Accidents, Travel Diary

3.2.3 Physical survey

At the end of the Household component of the survey, the HIH is asked if they would be willing to have the follow-up component 'Physical Survey' of the dwelling arranged. Such surveys are conducted by professional surveyors through a visual inspection of the dwelling. The surveyor will assess the condition, design and energy efficiency of the home, with much of their time spent surveying the outside, but they will ask to see all the rooms inside. Results from the Physical Survey will be reported on separately later in the year as the SHCS Key Findings Reports¹⁴.

3.3 Survey fieldwork

Before the first interviewer visit, addresses were sent an advance letter and leaflet outlining the purpose of the survey and the importance of participation. Interviewers were given the advance letters to post themselves in order that the letter would arrive a day or two before their first call. This helped to ensure that householders were likely to be aware of the letter and leaflet when the interviewer first visited.

¹⁴ Scottish House Condition Survey Key Findings:
<http://www.scotland.gov.uk/Topics/Statistics/SHCS/Downloads>

The main fieldwork for the survey has an on-going monthly cycle. Interviewers were required to make up to six calls at an address (an initial visit plus five 'call-backs'). In addition to the immediate reissue of contact sheets that had been wrongly completed or where the required number of call-backs had not been made, there was an on-going programme of reissuing 'non-contacts' in a bid to maximise the response rate.

On occasion, when an interviewer arrived at a sampled address, they would find that an address comprised more than one dwelling or household. In these cases, interviewers were required to select a household/dwelling at random using a Kish grid.

The response rates for the SHS need to take account of the continuous nature of the survey. The data file for each year will contain a small proportion of interviews conducted on sample drawn the previous year. Similarly some of the addresses issued during any year will not be carried out until after the data file has been closed for analysis.

The social survey fieldwork for the 2015 sample began in January 2015, with the aim of completing re-issues and 2015 fieldwork as a whole in February 2016. Unfortunately, fieldwork performance was lower than expected and the response rate target was not met despite extending social survey fieldwork until the end of March 2016 (physical survey fieldwork usually finishes one month after social survey fieldwork and was therefore extended until the end of April 2016).

The final number of social survey interviews achieved was 10,325, a response rate of 64 per cent. This is 353 interviews below the target of 10,678. The impact of this drop in response rate is discussed in section 6.3. The performance of the physical survey is described in section 6.5.

4 Physical Fieldwork and Physical Survey Form

4.1 Physical survey team

The physical survey team comprised 55 surveyors and 6 Regional Managers. The Regional Managers also acted as surveyors. Almost all surveyors and Regional Managers had worked on the SHCS under the previous contract, and many had been with the team since the 2002 survey.

A two-day refresher briefing with all surveyors was undertaken in March 2016. This focused on a number of areas of the physical form including heating systems, ventilation, the Tolerable Standard, and types of stonework and slating.

The role of the Regional Manager was to ensure the quality of the surveyor data. This included: the completion of the physical inspections; the use of the surveyor appointment system; return of all work and expenses; the validation of the physical survey forms; and that the contractual obligations of the surveyors were being met. They oversaw the work of each of their surveyors, provided technical advice, attended surveyor briefings, and ensured that surveyors maintained quality and timeliness of output throughout the period of the survey.

Regional Managers accompanied surveyors on approximately 5 per cent of surveys. The number of accompanied visits per surveyor was based on their assessment of individual surveyors. Programmes of accompaniments were designed so that the least experienced surveyors were accompanied first.

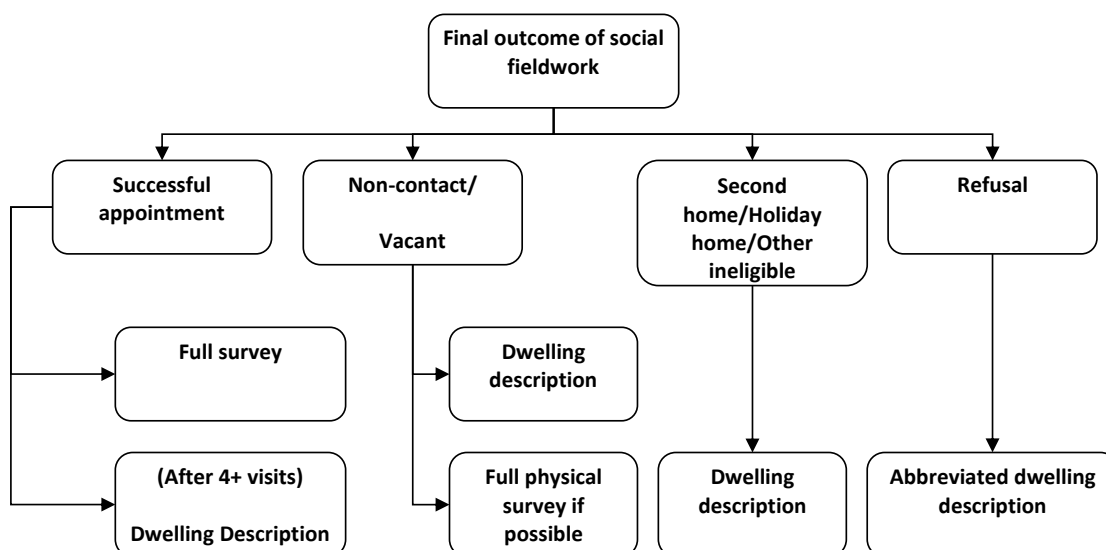
4.2 Types of physical survey

There were three different types of Physical Survey:

- full surveys,
- dwelling descriptions, and
- abbreviated dwelling descriptions.

The type of survey required by the surveyors was determined by the outcome to the social interview (see Figure 4.1).

Figure 4.1: Relationship between social outcomes and type of physical survey required



All surveyor appointments made by interviewers were allocated for a full physical survey. Only a completed social survey interview with a full physical survey constituted a paired case.

A full physical survey is a visual inspection of both the inside and outside of a property. The surveyor is required to complete all parts of the physical survey form. Surveyors were required to take four photographs to accompany each full physical survey: of the front and the back of the property and two of the surrounding area. The photographs were used in the data validation process (see Chapter 5).

In a small percentage of cases, the appointment made for the surveyor visit was broken by a respondent. In these instances, surveyors were required to make a further 3 visits, with at least one visit during a weekend and one in the evening, in order to try to obtain a full survey. After 4 unsuccessful attempts to obtain a full survey, surveyors were required to complete a short dwelling description survey. This was a short physical survey that provides a summary of the property only.

Vacant dwellings and dwellings where an interviewer had not made contact with a householder were allocated to surveyors for a dwelling description. Surveyors were required to take one photograph of the property for a dwelling description and only required to make 1 visit to these addresses. On occasions, however, surveyors would make contact with a householder at these addresses. In these instances, they were asked to attempt to gain agreement for a full physical survey and pass contact information on to the fieldwork department for a social survey to be organised. An interviewer would then return and undertake the social survey, thereby completing a paired case.

Addresses out of scope of the survey, such as second homes and holiday homes, were also allocated for a dwelling description. For these addresses, surveyors were not required to attempt to try to obtain a full physical survey.

For addresses where a respondent had refused to undertake a social interview, surveyors were asked to undertake an abbreviated dwelling description. This type of survey only collected information on the age of the dwelling and the type of dwelling. If this information could not be collected from a public road, they were instructed not to complete any information at all and return a “non-survey”.

4.3 Physical survey administration

The administration of the physical survey was as follows:

- At the end of the social interview, interviewers attempted to arrange a firm appointment for the surveyor inspection. Appointments were generally made for between 7 and 14 days after the interview date. Interviewers were asked to make appointments in batches, as far as possible, at intervals of one hour plus travel time between addresses. Interviewers left an appointment card with respondents that gave the appointment time and the telephone number of CA Design Services in case they wished to reschedule the appointment.
- When a respondent was unable to commit to a firm appointment time, interviewers were instructed to put in a dummy appointment time, collect the respondent’s contact details and indicate that this was not a firm appointment. CA Design Services would then attempt to arrange a surveyor appointment.

- Following download of the CAPI data, details of the appointments were automatically transferred to CA Design Services secure web-based surveyor appointment system. Information sent included the date and time of the appointment, contact details, whether it was a firm appointment, and any other information that the interviewer deemed helpful to the surveyor (such as directions to the property).
- Details of addresses that did not result in a social interview were communicated to the CA Design Services website for allocation for an appropriate type of survey.
- CA Design Services staff then allocated appointments to surveyors. In advance of each of the fieldwork periods, surveyors were required to supply details of their general availability through CA Design Services' web-based surveyor appointment system to help with the allocation.
- In cases where the initial appointment was not met, surveyors were required to make a further three repeat visits.
- Completed surveys were uploaded onto the SHS physical survey validation system, checked by the surveyor, and then sent to their Regional Manager for sign-off (see Chapter 5).

Staff at CA Design Services' Edinburgh office managed the day-to-day fieldwork process for the physical survey. Helpdesk staff managed communication between respondents and surveyors, booking or re-arranging appointments as necessary. Respondents, social survey interviewers and surveyors were able to contact CA Design Services using a dedicated telephone helpline and a SHS survey email address.

The web-based surveyor appointment system was central to organising and monitoring the progress of the physical survey fieldwork. The website was used by surveyors, Regional Managers, CA Design Services staff and Ipsos MORI. All website users had their own password and were given access to different parts of the site, depending on their requirements.

Surveyors used the survey website to check the appointments that had been made for them, record outcomes of each appointment, record mileage, and to calculate payments due. The progress of individual cases could be viewed on the website by entering the unique case identification number. Additionally, the website system provided information on the progress of the fieldwork overall. Most appointments resulted in a full survey at the first surveyor visit.

4.4 Surveyor variability

In order to minimise the effect of variability between surveyors in completing the physical survey form, and to minimise the bias that this may have on estimates at local authority level, the physical survey fieldwork was subject to a set of allocation rules. These were developed by Communities Scotland around 2001 and comprised the following rules relating to full surveys:

- Each surveyor must work in at least 2 local authorities in each year of fieldwork and at least 3 LAs over the three-year fieldwork period.
- No surveyor should complete more than 25 per cent of the surveys issued in a local authority per year, with the exception of Highlands, Orkney, Shetland and Western Isles local authorities. Here the level was set at 33 per cent.
- Each surveyor's allocation should contain a mixture of dwelling types approximate to the profile of the area they are working in, over each year of fieldwork.
- Each surveyor's allocation should contain a balance of urban/rural properties approximate to the profile of the area they are working in, over each year of the fieldwork.
- Each surveyor should conduct no more than a maximum number of surveys over each year of fieldwork. This maximum was set as 1.5 times the average number of full surveys issued each year.

4.4.1 Compliance with surveyor allocation rules

All surveyor allocation rules relating to the physical survey fieldwork during 2014 were met.

Rule 1: Each surveyor must work in at least two local authorities in each year of fieldwork and in at least 3 local authorities over the four-year fieldwork period. All surveyors worked in at least 2 local authorities (LAs) during 2015 and all surveyors have worked in at least 3 local authorities (LAs) over the duration of the four-year fieldwork period. There were no breaches of this rule.

Rule 2: No surveyor should do more than 25 per cent of the (full) surveys issued in any local authority in any one year, with the exception of the Highlands and the three island local authorities, where no one surveyor should exceed 33 per cent of all (full) surveys. There were two breaches of this rule; Shetland (36.1%) and North Ayrshire (26.2%).

Rules 3 and 4: Each surveyor’s allocation should contain a mixture of dwelling types and a balance of urban/rural properties that approximate the profile of the area in which they are working in over each year of fieldwork. Table 4.1 shows the proportion of full surveys conducted by surveyor and property type. It confirms that each surveyor undertook surveys in a mixture of different dwelling types.

Rule 5: Each surveyor should conduct no more than a maximum number of 1.5 times the average number of full surveys issued to each surveyor each year. For 2015, the maximum was set at 83. No surveyor breached this rule. There were two breaches of this rule; one surveyor completed 88 full surveys and the second completed 85 full surveys.

Table 4.1: Full physical surveys by surveyor and dwelling type

Row percentages

Surveyor	Terraced /corner house	Detached	Semi-detached	Tenement flat	Other	Total
1	26%	31%	9%	26%	9%	100%
2	17%	27%	24%	24%	8%	100%
3	33%	24%	18%	14%	12%	100%
4	17%	24%	24%	25%	9%	100%
5	25%	29%	16%	16%	14%	100%
6	19%	22%	19%	28%	12%	100%
7	25%	33%	23%	5%	14%	100%
8	15%	39%	23%	15%	9%	100%
9	22%	29%	27%	14%	8%	100%
10	20%	32%	22%	11%	15%	100%
11	15%	43%	10%	23%	9%	100%
12	20%	20%	12%	38%	11%	100%
13	20%	42%	26%	6%	6%	100%
14	27%	32%	19%	14%	8%	100%
15	25%	32%	24%	11%	9%	100%
16	15%	25%	25%	18%	17%	100%
17	28%	17%	24%	18%	14%	100%
18	20%	32%	23%	15%	10%	100%
19	14%	27%	28%	23%	7%	100%
20	21%	16%	16%	31%	17%	100%
21	18%	36%	20%	13%	13%	100%
22	15%	15%	21%	34%	15%	100%
23	22%	29%	26%	13%	11%	100%
24	34%	14%	21%	15%	16%	100%
25	14%	28%	17%	30%	11%	100%

Surveyor	Terraced /corner house	Detached	Semi-detached	Tenement flat	Other	Total
26	20%	27%	21%	14%	19%	100%
27	15%	29%	18%	25%	13%	100%
28	23%	32%	15%	20%	10%	100%
29	30%	15%	17%	21%	17%	100%
30	18%	22%	20%	24%	16%	100%
31	27%	28%	24%	11%	11%	100%
32	22%	39%	19%	11%	10%	100%
33	15%	8%	19%	41%	17%	100%
34	30%	26%	20%	10%	14%	100%
35	21%	11%	17%	35%	16%	100%
36	13%	9%	21%	45%	12%	100%
37	20%	25%	13%	31%	11%	100%
38	15%	11%	16%	22%	35%	100%
39	26%	35%	16%	12%	11%	100%
40	22%	15%	18%	36%	9%	100%
41	23%	27%	25%	22%	4%	100%
42	12%	14%	22%	34%	18%	100%
43	20%	33%	28%	8%	10%	100%
44	26%	20%	24%	17%	13%	100%
45	30%	24%	16%	19%	11%	100%
46	19%	35%	26%	14%	6%	100%
47	23%	29%	25%	10%	13%	100%
48	14%	10%	12%	44%	19%	100%
49	23%	26%	26%	14%	11%	100%
50	29%	20%	21%	18%	12%	100%
51	32%	25%	21%	16%	6%	100%
52	17%	13%	17%	35%	18%	100%
53	19%	21%	19%	35%	7%	100%
54	17%	14%	22%	31%	16%	100%
55	24%	28%	24%	10%	14%	100%
All	21%	25%	20%	22%	13%	100%

4.5 Physical survey form

The SHS physical survey is a dwelling-based survey of the home and surrounding area and uses a 14 page paper form formatted for use with digital pens. There were no changes to the form in 2015.

The physical survey form can be found in the publications section of the current SHCS website¹⁵. The survey form included sections relating to:

- type and age of the dwelling;
- types of defects;
- types of amenities;
- heating systems and insulation;
- dwelling measurements;
- external construction and materials used;
- external repairs required; and
- Statutory Action and Tolerable Standards.

¹⁵ <http://www.scotland.gov.uk/Topics/Statistics/SHCS/Downloads>

Figure 4.2: Physical survey form example

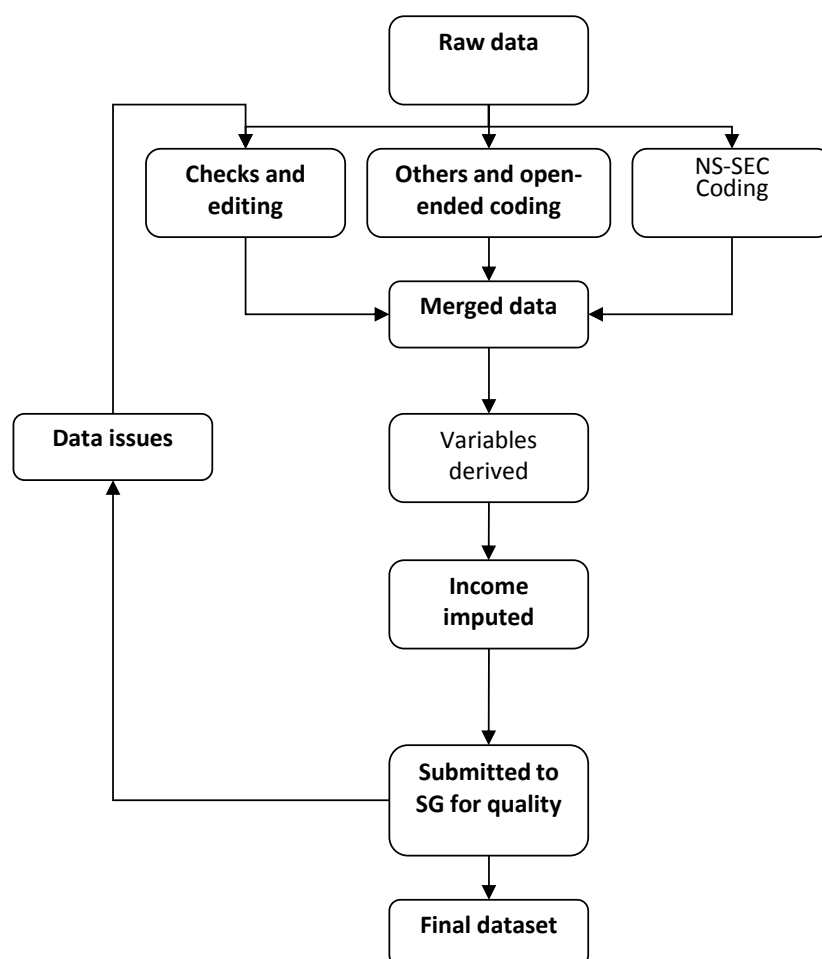
Q. EXTERNAL CONSTRUCTION / MATERIALS											
1. Is more than two thirds of the attached flank wall(s) exposed?	unob.	9	detached	4	yes, both flanks	3	yes, one flank	2	no	1	
2. External wall construction			unob.	9	other	3	cavity	2	solid	1	
3. External wall construction material	unob.	9	other	8	metal	7	concrete	6	timber	5	
							brickwork	4	brick	3	
							whin / granite	2	sandstone	1	
4. Principal external wall finish			other	8	metal	7	concrete panel	6	concrete block	5	
							timber	4	brick	3	
							stone	2	render	1	
5. External wall thickness							unob.	9	>750mm	3	
									450 - 750mm	2	
									<450mm	1	
6. Has additional insulation been added to the external walls since built?			100mm int. or ext.	7	75mm int. or ext.	6	50mm int. or ext.	5	25mm int. or ext.	4	
									filled 75mm cavity	3	
									filled 50mm cavity	2	
									none / partial	1	
7. Principal roof type							unob.	9	half / mansard	5	
									mansard	4	
									mono	3	
									flat	2	
									pitched	1	
8. Extent of principal roof type							unob.	99			
									specify	(briefly)	
9. Principal roof cover			unob.	9	other	7	metal	6	asbestos	5	
									asphalt	4	
									felt	3	
									tiles	2	
									slates	1	
10. Cover to secondary roof type	unob.	9	no secondary roof	8	other	7	metal	6	asbestos	5	
									asphalt	4	
									felt	3	
									tiles	2	
									slates	1	
11. Underground drainage							unob.	9	no drainage	4	
									other	3	
									septic tank / cesspool	2	
									public connection	1	
Dwelling only							unob.	9	other / mixed	5	
12. Principal window type to dwelling									pivot	4	
									tilt & turn	3	
									casement	2	
									slush & case	1	
13. Window frames							u.p.v.c.	4	metal (no thermal break)	3	
									metal (thermal break)	2	
									wood	1	
14. Glazing (if some single and some double select largest area)							unob.	9	double with low 'k' glass	4	
									triple	3	
									double	2	
									single	1	
15. Type of double glazing							unob.	9	no double glazing	5	
									part only	4	
									mixed	3	
									yes, secondary	2	
									yes, sealed units	1	
R. EXTERNAL REPAIRS											
What repairs are required to the following elements of the dwelling or common block?	front only =	1	back only =	4					5	4	6
	front with right =	2	back with right =	5					DWELLING / BLOCK		
	front with left =	3	back with left =	6					3	1	2
	unobtainable =	9	unobtainable =	9							
	VIEWPOINT 1		VIEWPOINT 2		Is the repair urgent?		Residual life				
1. Principal roof structure											Repair score
2. Principal roof covering											00 = no repair
3. Secondary roof structure											05, 01 -10 = disrepair
4. Secondary roof covering											88 = n/a
5. Chimney stacks											99 = unobtainable
6. Flashings											
7. Roof gutters and downpipes											
8. Soil waste and vent pipes											Is the repair urgent?
9. Wall structure (Q2/Q3)											1 = yes
10. Wall finish											2 = no
11. Foundations											8 = n/a
12. DPC											9 = unob.
13. Underground drainage											Residual life for whole element after repair
What repairs are required to the following elements of the dwelling only?											
14. Private balcony to dwelling											1 = 1-5 years
15. External doors to dwelling											2 = 6-10 years
16. Windows to dwelling											3 = 11-30 years
17. External paint to dwelling											4 = 30+ years
18. External stairs to own door (4-in-block & converted houses only)											8 = n/a
											9 = unob.

5 Data Processing

5.1 Social data processing

The social data processing routines are summarised in Figure 5.1.

Figure 5.1: SHS social survey data processing procedures



The raw data was initially split into 3 files. Data from the ‘other (write in)’ variables and open-ended data was extracted for coding separately. Additionally, the variables used to produce NS-SEC variables were extracted into a separate file for coding.¹⁶

¹⁶ NS-SEC can also be automatically assigned to SEG codes, which allow a degree of backward compatibility with Socio-economic Group.

The main data file was subject to checks and editing involving:

- Range checks, confirming that all variables were within the acceptable limits established for the question concerned.
- Simple logic checks ensuring the relationships between questions were logical. For example, that the number of people answering a filtered question is equal to the number of people giving the appropriate response at the filtering question e.g. if 500 people say they smoke then the number of people giving a response to the number of cigarettes they smoke needs to be 500.
- Complex logic checks. These involved examining the relationships between variables and assessing the logic of combinations of responses. Combinations of age and working status, age and relationships to other household members, for example, were checked to assess the logic of someone aged over 60 years and coded as the child of another household member.

The data then underwent two additional processes. Firstly, the calculation of derived variables such as the age and sex of the Highest Income Householder. Secondly, the imputation of household income (see 0). The edited data was delivered to the Scottish Government, who ran further checks on the data. Any data issues identified by Scottish Government were discussed and, where necessary, corrected and the data processing routines were amended.

5.1.1 Imputation of income in social data

Within the SHS, total net annual household income remains the main indicator of household income. This was defined as the total income from earnings, benefits and a variety of miscellaneous sources of the Highest Income Householder and their spouse, where applicable, with each component of income collected separately.

A proportion of respondents either did not know how much they received or refused to say how much they received. In order to rectify this non-response, and produce an accurate measure of total net household income, missing values were imputed. The process used was based on the imputation process developed by Scottish Homes for the 1996 Scottish House Condition Survey, and has been employed on the Scottish Household Survey for a number of years.

Missing income data was imputed for each component of income separately:

- 4 components of earnings (earnings from main jobs and all other jobs of Highest Income Householder and Spouse)
- 26 different benefit components
- 13 different components of miscellaneous income.

Before starting the imputation process, the raw data was fully cleaned. For income from benefits, the upper limit of entitlement for each benefit was calculated. Any cases which were above these thresholds were examined, and edited if necessary. It is possible that respondents over-estimate income from one source of benefit and under-estimate income from another. Therefore, in cases where the benefit level was marginally above the threshold, the amount was not edited, but the case was excluded from use as a donor case in the imputation process.

Unlike benefits, clear rules do not exist regarding upper and lower limits of earnings and sources of miscellaneous income. These were examined against key indicators - such as tenure, NS-SEC, and description of employment - and were either edited or excluded from the imputation process.

Imputation of earnings has the largest effect on total net household income because of the proportion of cases with missing earnings data and the fact that earnings are commonly the main source of household income. For main jobs, imputed values were calculated from a regression model that related earnings to a set of explanatory variables, such as age and sex, full-time or part-time employment, car ownership, tenure, receipt of means tested benefits, and NS-SEC. For imputation of second and subsequent jobs, Hot Deck imputation was used. In Hot Deck imputation, respondents were sorted into imputation groups according to likely determinants. Cases with missing data were donated values from cases with data which were in their imputation groups, according to the characteristics chosen.

Imputation of income from benefits was undertaken for each benefit separately. For benefits which were received by only a few people, no modelling could be undertaken and the median value of receipt for these benefits was imputed. For non-means tested benefits which are received by a significant number of respondents, entitlement levels were approximated using variables collected in the rest of the social survey interview. For example, Child Benefit is dependent on the number of children, and whether the recipient is a lone parent. For these benefits, Hot Deck imputation was used, with the imputation classes reflecting the entitlement rules as closely as possible. For means tested benefits which are received by a significant number of respondents, Hot Deck imputation was used, with the imputation classes reflecting entitlement rules as closely as possible. These were undertaken after imputation of earnings and other sources of income, as they were dependent on the income of the household.

Imputation of income from miscellaneous income was undertaken separately. Most miscellaneous sources of income were received by a small number of respondents and no modelling could be undertaken. The median value of receipt was imputed for these components. For components where modelling could be undertaken – investment income, and income from non-state pensions - Hot Deck imputation was used, with the imputation classes based on the variables in the models that had the most explanatory power.

Following imputation, income from all components were summed to create a total net household income variable. All households with a net total household income were set to 'missing' if the computed figure was less than £25 a week. Although a small proportion of households will have had a lower income than this – and be living off savings or loans – it is likely that some households will have either under-reported receipt of benefits or earnings, or the imputation process has resulted in a low value being given.

Overall, imputation was undertaken for one or more component in 44 per cent of households. After imputation, household income was missing for 3.4 per cent of households.

With imputation, there is a danger that the donor groups may differ from those with missing information. While this factor can be minimised with careful specification, it can never be totally excluded. In order to guard against analyses that might be sensitive to the imputation procedures, a set of flag variables were created in order that analysts could identify cases and components where income had been imputed.

5.2 Physical survey data validation


The data from the physical survey forms were uploaded into the physical survey validation system together with the photographs of each dwelling.

The validation system worked by applying a set of rules (the same rules as used in previous years) provided by the Scottish Government, to the raw data, to ensure the accuracy and validity of each item of data entered. This included range checks on all fields, detailed consistency checks making use of the redundancy built into the survey schedule and plausibility checks on all appropriate items. Rules cross-reference different parts of the survey form (e.g. if the dwelling is a house, then aspects of common dwelling section should not be completed; if the house is a flat, then details for common parts should be present).

Surveyors were shown a list of all the errors picked up by the validation program. Additionally, they were shown a list of all the entered data, with a description of the variable next to each bit of data, and with the data split into representations of each page of the form. The validation system showed the data and the failed edits as well as showing the photographs of the property.

Corrections were then made and each form rechecked until it passed all edits. Changes to the data were made simply by overtyping the incorrect data where it was displayed. Once a surveyor had completed validation, the data was forwarded to their Regional Manager for sign-off. Validation of each form was completed when all errors had been eliminated or a supervisor had determined that the dwelling genuinely falls outside the validation criteria. An audit trail of changes made to the data was kept.

Figure 5.2: Physical data validation screens



SHS 2015

CONTACT INFORMATION

- home
- current surveys
- completed surveys
- upload data
- past uploads
- edit my details
- surveyors
- search surveys
- forum
- documentation
- logout

Survey number : 994001 (Sent to BRE)

Case number: 52007157 - [unassign](#)

Surveyor: [Dave Cormack](#)

Most recent comments

To: BRE

From: George Boag (RM)

Date: 16/2/2015

Comments:

[view all comments](#)

Page	Errors	Warnings	Page opened	Page	Errors	Warnings	Page opened
Summary Page	-	-	-	-	-	-	-
Page 1: A B C	0	1	✓	Page 8: O P	0	0	✓
Page 2: D E	0	0	✓	Page 9: Q(1)	0	0	✓
Page 3: F G H I J	0	0	✓	Page 10: Q(2)	0	0	✓
Page 4: K	0	0	✓	Page 11: R	0	0	✓
Page 5: L	0	0	✓	Page 12: T	0	0	✓
Page 6: M(1)	0	0	✓	Notes - not entered			
Page 7: M(2) N	0	0	✓				

Pictures

- [image 1](#)
- [image 2](#)
- [image 3](#)

2. Is the dwelling occupied?
 No, requires repair
 No, suitable for immediate use
 Yes
 Clear

C. BASE DATA


1. Type of house
 not house
 enclosed mid
 corner / enclosed end
 detached
 semi- detached
 end terrace
 terrace with passage
 mid terrace
 clear

2. Type of flat
 not a flat
 flat from converted house
 tower / slab
 4 in block type
 tenement
 clear

of superior quality
 better than basic
 basic
 clear

1983-2002
 1965-1982
 1945-1964
 1919-1944
 Pre 1919
 Clear

1



6 Survey Response

6.1 Introduction

This section presents the fieldwork outcomes for the sampled addresses. Survey response is an important indicator of survey quality as non-response can introduce bias into survey estimates. Standardised outcome codes (based on an updated version of those published in Lynn et al (2001)¹⁷) for survey fieldwork were applied across the SHS, SHeS and SCJS. The outcome codes paper includes guidance on the appropriate categorisation of interview outcomes. This will allow consistent reporting of fieldwork performance and effective comparison between the performance of the surveys.

6.2 Scotland-Level Summary

Table 6.1 shows a detailed breakdown of the SHS response for all sampled addresses for Scotland. The addresses of unknown eligibility have been allocated as eligible and ineligible proportional to the levels of eligibility for the remainder of the sample. This approach provides a conservative estimate of the response rate as it estimates a high proportion of eligible cases amongst the unknown eligibility addresses.

The table shows that the overall household response rate was 64.0 per cent. This is below the long-term (1999/2000 to 2011) average response rate for the SHS of 67.9 per cent and below the 2012 to 2014 rates. The effects of the drop in response rate are discussed in section 6.3. It should be noted that from 2012 the calculation was changed slightly and a portion of the addresses of unknown eligibility are now considered to be eligible, whereas previously they would all have been classed as ineligible.

¹⁷ Lynn, Peter, Beerten, Roeland, Laiho, Johanna and Martin, Jean (October 2001) 'Recommended Standard Final Outcome Categories and Standard Definitions of Response Rate for Social Surveys', Working Papers of the Institute for Social and Economic Research, paper 2001-23. Colchester: University of Essex.

Table 6.1: Fieldwork outcomes, Scotland

<i>Fieldwork Outcome</i>	Sample	% of issued	% of eligible
Responding households	10,325	59.2%	64.0%
Random adult interview complete	9,408	53.9%	58.3%
Refused			
Office refusal	421	2.4%	2.6%
Refusal at introduction/before interview	3,598	20.6%	22.3%
Broken appointment - no re-contact	214	1.2%	1.3%
Total refused	4,233	24.3%	26.3%
Non-contact			
No contact with anyone at the address	558	3.2%	3.5%
Contact made at address, but not with target respo	287	1.6%	1.8%
Total non-contact	845	4.8%	5.2%
Other non-response			
Ill at home during field period	53	0.3%	0.3%
Away or in hospital throughout field period	142	0.8%	0.9%
Physically or mentally unable/incompetent	208	1.2%	1.3%
Language barrier	86	0.5%	0.5%
Lost interview	8	0.0%	0.0%
Other non-response (not covered by categories abo	25	0.1%	0.2%
Unknown eligibility			
Inaccessible	30	0.2%	
Unable to locate address	43	0.2%	
Unknown if occupied, due to non-contact	137	0.8%	
Other unknown eligibility	5	0.0%	
Total unknown eligibility	215	1.2%	
Estimated eligible addresses in set of unknown eligibility addresses	199	1.1%	1.2%
Total eligible addresses	16,124	92.4%	100%
Not eligible			
Not yet built / under construction	17	0.1%	
Demolished/derelict	59	0.3%	
Vacant/empty	709	4.1%	
Non-residential	265	1.5%	
Address occupied but not resident household	209	1.2%	
Communal establishment / institution	37	0.2%	
Other ineligible	6	0.0%	
Estimated ineligible addresses in set of unknown eligibility addresses	16	0.1%	
Total not eligible	1,318	7.6%	
All issued addresses	17,442	100%	

6.3 Drop in response rate

The reduction in fieldwork performance resulted in a response rate of 64% for 2015, 3 percentage points lower than the 2014 survey response rate of 67%.

Analysis was conducted to investigate the likely impact of this drop in response rates. This was undertaken by modeling the 2014 sample results to examine what the impact of a 3% drop in response rates would have been had a lower number of interviews been achieved, and comparing this against the 67% full sample results.

Analysis showed that the demographic composition of the sample was largely unchanged (age, gender), with only the most deprived SIMD quintile and other urban areas showing a 1 percentage point drop in their respective shares of the total sample.

Analysis of mean differences in the population estimates from the two samples for a basket of full sample questions from the SHS, and full one third sample questions from the SHCS module, were also undertaken.

This showed that the absolute mean differences for the total population estimates across the different basket of questions within the household and random adults part of the survey, including the Scotland Performs National Indicators, were very small, at around 0.10 percentage points.

A few sub-group categories had one or two 'maximum' differences in estimates of around 1 percentage points, including age and social and private-rented sector sub-groups. However, these differences are unlikely to be statistically significant due to small subgroup sample sizes.

Sub-national analysis was not considered. It is expected that there would be a greater impact of this lower response rate for Local Authorities and other sub-national geographies.

6.4 Local authority performance

Table 6.2 shows levels of ineligible addresses, response rate and random adult conversion.

Table 6.2: Response rate and eligibility by local authority

Local Authority	Sampled addresses	Ineligible addresses		Responding households		Random adult interviews	
		n	%	n	% of eligible	n	% of HH ints
Aberdeen City	650	49	8%	321	53%	283	88%
Aberdeenshire	525	38	7%	324	67%	283	87%
Angus	412	13	3%	260	65%	238	92%
Argyll and Bute	450	59	13%	264	68%	254	96%
Clackmannanshire	375	20	5%	252	71%	244	97%
Dumfries and Galloway	416	45	11%	251	68%	233	93%
Dundee City	436	27	6%	288	70%	243	84%
East Ayrshire	442	32	7%	237	58%	218	92%
East Dunbartonshire	420	9	2%	258	63%	235	91%
East Lothian	430	22	5%	249	61%	210	84%
East Renfrewshire	462	12	3%	280	62%	259	93%
Edinburgh City	1,362	110	8%	715	57%	625	87%
Falkirk	382	9	2%	278	75%	258	93%
Fife	820	52	6%	531	69%	469	88%
Glasgow City	1,837	157	9%	907	54%	811	89%
Highlands	564	70	12%	318	64%	295	93%
Inverclyde	445	26	6%	285	68%	270	95%
Midlothian	437	20	5%	218	52%	195	89%
Moray	426	32	8%	267	68%	248	93%
Na h-Eilean Siar	445	75	17%	282	76%	280	99%
North Ayrshire	407	41	10%	261	71%	244	93%
North Lanarkshire	788	45	6%	456	61%	413	91%
Orkney Islands	386	49	13%	282	84%	280	99%
Perth and Kinross	439	33	8%	269	66%	236	88%
Renfrewshire	431	20	5%	294	72%	286	97%
Scottish Borders	402	37	9%	244	67%	215	88%
Shetland Islands	400	58	15%	265	77%	228	86%
South Ayrshire	478	33	7%	283	64%	272	96%
South Lanarkshire	723	35	5%	409	59%	385	94%
Stirling	402	32	8%	264	71%	237	90%
West Dunbartonshire	452	25	6%	263	62%	238	90%
West Lothian	398	17	4%	250	66%	223	89%
Scotland	17,442	1,302	7%	10,325	64%	9,408	91%

As in previous years, the highest levels of ineligible addresses were recorded in Argyll and Bute, Na h-Eileanan Siar, Shetland Islands, Orkney and Highland. For both Na h-Eileanan Siar and Argyll and Bute, high levels of ineligible addresses were expected as both areas contain a high number of holiday and second homes which are not eligible for the survey.

The two lowest household response rates in 2015 were in Midlothian and Aberdeen City, with Midlothian having the lowest household response rate. In addition, East Ayrshire, Edinburgh City, Glasgow City and South Lanarkshire all had a response rate under 60 per cent in 2015.

The conversion from household interview to random adult completion was 91 per cent in 2015 (two percentage points lower than in 2012 and 2013 and one percentage point lower than 2014).

6.5 Physical survey

As described in section 2.2, over one third of the SHS sample was assigned to the physical survey module. For completion of the physical survey, respondents had to agree to make an appointment for a surveyor to make a follow-up visit and to complete the appointment. Table 6.3 shows the number of households assigned to the physical module which responded to the main SHS and the conversion to completion of the physical survey.

There was a target of at least 80 completed physical surveys for each local authority along with a target of 3,004 surveys for Scotland. The result of continuing lower than estimated levels of conversion from household survey to physical survey, combined with the 3 per cent drop in response rate in the social survey, meant that there were fewer than 80 physical survey responses for 17 of the local authorities in 2015. However, the decision to 'open up' an additional stream to the physical survey at the start of the third quarter of 2015 gave a lower shortfall on the minimum target of 80 per local authority than in previous years (24 local authorities in 2014, 21 in 2013 and 20 in 2012). The 2,754 surveys achieved for Scotland in 2015 were 250 below target (decreasing from 322 and 275 in 2014 and 2013, and increasing from 212 in 2012).

Table 6.3: Conversion to full physical survey

<i>Local authority</i>	Conversion rate from household interview to physical survey	Physical survey complete
Aberdeen City	63.9%	85
Aberdeenshire	63.0%	85
Angus	60.2%	68
Argyll and Bute	64.3%	74
Clackmannanshire	74.3%	78
Dumfries and Galloway	69.8%	67
Dundee City	72.2%	83
East Ayrshire	71.8%	74
East Dunbartonshire	60.7%	65
East Lothian	73.9%	65
East Renfrewshire	62.9%	73
Edinburgh City	65.9%	166
Falkirk	70.8%	85
Fife	61.4%	127
Glasgow City	63.6%	213
Highland	69.5%	82
Inverclyde	68.9%	84
Midlothian	64.4%	56
Moray	69.1%	76
Na h-Eileanan Siar	69.1%	67
North Ayrshire	65.1%	71
North Lanarkshire	68.4%	121
Orkney Islands	78.9%	90
Perth and Kinross	62.7%	69
Renfrewshire	69.6%	78
Scottish Borders	68.0%	70
Shetland Islands	83.0%	83
South Ayrshire	77.6%	76
South Lanarkshire	57.6%	87
Stirling	72.4%	84
West Dunbartonshire	67.0%	69
West Lothian	71.6%	83
Scotland	67.5%	2,754

7 Survey Weighting

7.1 Introduction

This section presents information on the weighting procedures applied to the survey data. From the 2012 SHS onwards, the weighting has been undertaken by the Scottish Government rather than the survey contractor (as had previously been the case), but the methodology applied has been largely consistent with that from previous sweeps of the survey. The procedures for the implementation of the weighting methodology were developed by the Scottish Government working with the Methodology Advisory Service at the Office for National Statistics.¹⁸

Weighting procedures for survey data are required to correct for unequal probabilities of selection and variations in response rates from different groups. The weighting procedures for the SHS incorporate a selection weighting stage to address the unequal selection probabilities and calibration weighting to correct for non-response bias. Calibration weighting derives weights such that the weighted survey totals match known population totals. For the 2015 SHS the population totals used were the National Records of Scotland's (NRS) "Mid-2015 Population Estimates Scotland"¹⁹ and for households the NRS "Estimates of Households and Dwellings in Scotland, 2015" were used.²⁰ To undertake the calibration weighting the ReGenesees Package for R was used and, within this to execute the calibration, a linear distance function was implemented.

Three weights were derived for the main section of the 2015 SHS; a household weight; random adult weight; and a random schoolchild weight. Further weights were required for analysis of the travel diary and physical survey sections. The procedures to calculate the weights are described in the following subsections.

¹⁸ A report on the development of the weighting procedures is available here: <http://www.scotland.gov.uk/Topics/Statistics/About/Surveys/WeightingProjectReport>

¹⁹ NRS, Mid-2015 population estimates Scotland: <https://www.nrscotland.gov.uk/statistics-and-data/statistics/statistics-by-theme/population/population-estimates/mid-year-population-estimates/mid-2015-and-corrected-mid-2012-to-mid-2014>

²⁰ NRS, Estimates of Households and Dwellings in Scotland, 2015: <http://www.nrscotland.gov.uk/statistics-and-data/statistics/statistics-by-theme/households/household-estimates/2015/>

7.2 Household weights

This weight is for use with variables that relate to the household. There were three steps to the household weight:

1) Selection weights

The address selection weights were calculated to compensate for unequal probabilities of selection of addresses in different survey strata. For the SHS there were 32 strata – one for each local authority. The address selection weight for each stratum was calculated as the proportion of Scottish households (from NRS estimates) in the stratum divided by the proportion of the sample in the stratum:

$$\text{Stratum selection weight} = \frac{\text{per cent of Scottish households in the stratum}}{\text{per cent of all responding addresses in the stratum}}$$

2) Calibrated household weight

The stratum selection weight was applied to the survey data to act as entry weights for the calibration. The execution of the calibration step then modified the entry weights so that the weighted total of all members of responding households matched NRS population totals for age bands and sex within each local authority.

3) Households adjustment

The calibration step ensured that survey totals matched the population totals for local authorities but not the household totals. To make the sample representative of households at local authority level a scaling factor was applied so that the weighted number of households from the sample matched the NRS local authority household weights.

7.3 Random Adult weights

Within responding households a random adult was selected to answer individual questions. There were three stages to the random adult weights:

1) Stratum selection weight

A new stratum selection weight is required for the random adults as the reference population is all adults within the stratum. Also, not all random adults in households that completed the household section responded to the survey. The stratum selection weight was calculated as:

$$\text{Stratum selection weight} = \frac{\text{per cent of Scottish adults in the stratum}}{\text{per cent of all responding adults in the stratum}}$$

NRS mid-year population estimates were used to calculate the population percentages for each stratum.

2) Adult selection weight

The probability of an adult within a household being selected for the random adult interview was inversely proportional to the number of adults within a household – i.e. in a single adult household the only adult resident must be sampled but in a three adult household each adult only has a one in three chance of being selected. To correct for this unequal probability of selection an adult selection weight equal to the number of adults in the household was applied.

3) Calibrated weight

The stratum selection weight and adult selection weight were multiplied together and applied to the survey data. The execution of the calibration step then modified these combined entry weights so that the weighted total of responding random adults matched NRS adult population totals for age bands and sex within each local authority.

7.4 Random Schoolchild weights

A separate weight was required for information collected about a random schoolchild within responding households. The weighting procedures for the random schoolchild are similar to those for the random adult:

1) Stratum selection weights

Stratum selection weights were calculated as:

$$= \frac{\text{Stratum selection weight per cent of Scottish school age children in the stratum}}{\text{per cent of all responding school children in the stratum}}$$

NRS mid-year population estimates were used to calculate the population percentages for each stratum.

2) Random schoolchild selection weight

As with the random adult weight, only one child was selected within each household so a selection weight equal to the number of eligible children in the household was required.

3) Calibration weight

Population estimates for the number of schoolchildren resident in each local authority are not available. Population estimates only give estimates in terms of ages and the schools census gives the local authority totals for place of schooling rather than residence. Therefore, the population of schoolchildren was estimated using the survey data by applying the household grossing weight to calculate the total number of pupils in each local authority by age group. The selection weights were then combined and applied to the data before the calibration was run to match the random schoolchild totals to the target populations by age group and local authority.

7.5 Travel Diary weight

The travel diary questions were asked as part of the random adult interview. The travel diary collects information on all travel undertaken on the day prior to interview. Over the fieldwork period significantly fewer interviews took place on Fridays, Saturdays and Sundays when compared to other days.

The working status of respondents was also found to vary across day of response, with disproportionately more adults in full-time employment interviewed at the weekend.

These factors resulted in two stages of rescaling the random adult weights for travel diary analysis:

- 1) To ensure the travel diary was representative of travel patterns for the week as a whole, the random adult weights were rescaled so that the weighted number of interviews was equal for each day of the week. The scaling factor was given by:

$$\begin{aligned} & \text{Day } i \text{ scaling factor} \\ & \left(\text{Total interviews} / 7 \right) \\ = & \frac{\hspace{10em}}{\text{Weighted (using rand ad weight) total of interviews on day } i} \end{aligned}$$

To ensure the travel diary was representative of working status across each day a second scaling factor was derived such that the working status breakdown for each day was equal.

$$\begin{aligned} & \text{Status } j \text{ and day } i \text{ scaling factor} \\ & \left(\text{Total responses of status } j / 7 \right) \\ = & \frac{\hspace{10em}}{\text{Weighted (using scaled rand ad weight) total of} \\ & \text{status } j, \text{ day } i \text{ interviews}} \end{aligned}$$

The final travel diary weight was then calculated as:

$$\begin{aligned} & \text{Travel diary weight} \\ = & (\text{Random adult weight}) \times (\text{Day scale factor}) \\ & \times (\text{Day and working status factor}) \end{aligned}$$

7.6 Physical survey weight

A subsample of the total SHS sample was allocated to the physical survey. This subsample completed a specific module of the SHS in the main interview and received a visit from a fieldworker to conduct a physical survey of the property. Not all of the properties which completed the interview resulted in a completed physical survey. Therefore, two weights are required for the physical survey, one for the interview and one for the completed physical survey paired with the interview. The derivation for both weights followed exactly the same steps:

1) Selection weights

The address selection weights were calculated to compensate for unequal probabilities of selection of addresses in different survey strata. For the physical there were 32 strata – one for each local authority. The address selection weight for each stratum was calculated as the proportion of Scottish households (from NRS estimates) in the stratum divided by the proportion of eligible selected addresses in the stratum:

$$\text{Stratum selection weight} = \frac{\text{per cent of Scottish households in the stratum}}{\text{per cent of selected eligible addresses in the stratum}}$$

2) Calibration

The stratum selection weight was applied to the survey data to act as entry weights for the calibration. The execution of the calibration step then modified the entry weights so that the weighted total of responding households matched:

- a) The number of households in each local authority
- b) Dwelling age at Scotland level
- c) Dwelling type at Scotland level
- d) Urban-rural classification at Scotland level

The totals for targets (b) and (c) were generated from the sample itself. For almost all of the addresses in the physical survey sample, even where an interview or physical survey were not completed, a visual inspection of the selected address was conducted to record information on dwelling type and age. The Scotland-level targets were then generated from the frequencies for dwelling age and type from the sample weighted with the selection weight. The following tables show the targets.

Table 7.1: Physical Survey calibration targets

Category	Calibration target
Dwelling type	
Detached	530,848
Semi	479,705
Terrace/corner	522,210
Tenement	579,011
Other flat	322,181
Total	2,433,955
Dwelling age	
Pre-1919	488,067
1919-1944	274,179
1945-1964	524,042
1965-1982	553,931
1983-2002	375,996
Post 2002	217,739
Total	2,433,955
Urban-Rural	
Large urban	978,844
Other urban	733,665
Accessible small towns	208,238
Accessible rural	266,120
Small remote towns	94,719
Remote rural	152,368
Total	2,433,955

7.7 Summary of weighting variables to apply in analysis

In the SHS, there are seven weights that can be used but two of these – LA_WT and IND_WT – are used for most analyses, with the others used for smaller specific subsets of the sample. The table below shows the different types of weights available for the survey.

Table 7.2: Survey weighting variables

	Calibrated weights	Grossing to population estimates
Main sample		
Household	LA_WT	LA_GRWT
Random Adult	IND_WT	IND_GRWT
Random Schoolchild	KID_WT	KID_GRWT
Travel Diary	TRAV_WT	-
Physical Survey		
Social survey	SWGHT12_N	SWGHT12
Paired social and physical survey	PWGTH12_N	PWGHT12
Household scaling weight	SHSWGHT12_N	

- LA_WT is used for analysis of data about the household and data collected from or about the HHH and spouse in the main SHS sample. This includes all variables asked in the first part of the interview, apart from the questions about the random schoolchild and the random child receiving childcare.
- IND_WT which is used for analysis of data in derived variables about the random adult or collected from the random adult. This includes all variables in the second part of the interview.
- KID_WT which is used for analysis of questions related to the random schoolchild – HE10N to HE17 inclusive (see separate Questionnaire publication).
- TRAV_WT, contained in the Travel Diary data, which is used for analysing that data.

8 Limitations of the Data

There are a number of important methodological and data issues that users need to be aware of when using the SHS data.

Like all sample surveys, the SHS can only produce estimates and these estimates are limited by a number of factors.

- Sample coverage – although there are no geographical exclusions to the survey, the sampling frame does not cover the whole population because of a combination of inherent limitations and administrative errors and delays.
- Sampling variability – all samples can differ from the population by chance. This is often referred to as sampling error.
- The number of cases that analysis is based on – estimates based on large samples are more accurate than those based on small samples.
- Bias in the achieved sample – if a sample under-represents sections of the population or if a large proportion of people do not answer some questions, the estimates may differ substantially from the population for reasons that are not a result of chance. For example, in 2015, the unweighted sample of adults is 55 per cent female and after basic weighting 52 per cent of the sample is female which is in line with the 2015 population estimate of 52 per cent.²¹ This is an example of bias caused by young males, in particular, being difficult to contact or refusing to take part in the survey.

Although the use of calibration weighting addresses the disparity between the age/sex composition of the sample and the known composition of the population, it does so on the assumption that respondents do not differ in terms of survey measures that do not form part of the weighting. The review of the weighting strategy generally found that calibration brought the survey estimates closer to census estimates but like all surveys, the potential for bias remains a limitation that should be considered.

The SHS is also limited in the amount of detail it can collect about some topics. For example, it was not designed to provide reliable "economic" statistics (e.g. employment/unemployment rates and average earnings).

²¹ Mid-2015 Population Estimates in Scotland: <https://www.nrscotland.gov.uk/statistics-and-data/statistics/statistics-by-theme/population/population-estimates/mid-year-population-estimates/mid-2015-and-corrected-mid-2012-to-mid-2014/list-of-tables>

The SHS's information about the **economic status** of members of the household reflects the view of the respondent to the "household" part of the interview, and so may not conform to official definitions of employment and unemployment, for example. As a result, the SHS cannot provide estimates of unemployment that are comparable to official statistics of unemployment.

There are several reasons why the SHS data on **income** may not be completely accurate.

- The SHS only collects information from, or about, the Highest Income Householder and, if there is one, their spouse or partner.
- Information is provided "off the top of the head" as part of an interview on many other topics. There is no requirement to refer to pay slips or bank statements to check the figures.
- Some people may not know the correct figure (particularly in the case of the income of a spouse/partner), and may just provide a guess, perhaps based on a level that they remember from some time ago.
- Other interviewees may under-state their income because they do not want to reveal how much they really earn.
- Because about a third of the households in the sample are unwilling or unable to provide income information, values for some or all of the main components of income have to be imputed.

As a multi-purpose survey of households, the SHS is not designed to provide the kinds of information about economic activity and household income that can be obtained from more specialised surveys such as the Labour Force Survey and the Family Resources Survey, which have questions and procedures which are designed to obtain much more reliable information on those matters than the SHS can collect. The SHS has questions on such topics only for selecting the data for particular groups of people (such as the unemployed or the low-paid) for further analysis, or for use as "background" variables when analysing other topics (such as the means of travel or the frequency of driving).

Although the SHS has a large sample that covers the whole of Scotland, it has some geographical limitations because of the sample sizes in small local authorities and because it is designed to be representative only at national and local authority level.

This means:

- users need to be mindful of the sampling errors for analysis but especially when this is based on breakdowns within a single local authority
- it is not appropriate to undertake geographical analysis below local authority level since the sampling techniques used in some local authorities cannot guarantee representativeness in smaller areas.

9 Bias and Data Quality

The issue of bias arises in every sample survey. There are a number of sources of bias, some of which reflect aspects of the survey design (such as the sampling frame or who is deemed eligible for interview). However, bias is also a reflection of those aspects of fieldwork outcomes mentioned previously:

- the quality of survey administration procedures;
- whether potential respondents can be found at home at times when interviewers call;
- whether they are able to participate i.e. not restricted by ill health, disability or communication barriers; and
- the willingness of members of the public to participate in the survey.

A high response rate is generally viewed as one of the key measures of data quality and, all other things being equal, a high response rate and a large sample should ensure accurate estimates. However, if non-response to the survey is not spread evenly, either geographically or between sub-groups of the population, the resulting bias will limit the accuracy of the survey's estimates.

The weighting strategy employed by the survey (described in section 7) is intended to minimise the extent of bias. The issue of residual bias is considered by comparing key results from the SHS with comparator data. The publication of the 2011 Census is the most accurate source of population data which is used by National Records of Scotland (with other sources of data on migration) to produce mid-year population estimates. While the 2011 Census figures are four years behind the 2015 SHS data, they ought to be comparable as changes in the distribution of age and household types are relatively small year to year.

9.1 Comparisons with Scotland's Census 2011 and mid-2014 Population Estimates

Comparisons with Scotland's Census 2011²² and the mid-year population estimates shows that the weighted SHS sample appears to be generally robust in terms of variables associated with accommodation/property characteristics. Table 9.1 shows that outright ownership appears to be over-represented whilst social rented accommodation is under-represented. The survey weighting reduces the difference between the unweighted SHS survey results and the Census 2011 estimates, though differences do still remain.

This may reflect the difficulties in obtaining interviews with particular sub-groups of the population.

Table 9.1: Comparison of tenure of household between Census 2011 and SHS 2015 estimates

<i>Households</i>	Census 2011	SHS 2015 unweighted	SHS 2015 weighted
Owned	62.0	63.0	60.9
Owned outright	27.8	34.3	31.2
Buying with help of loan/mortgage ¹	34.2	28.7	29.7
Social rented	24.3	22.8	23.4
Council (Local Authority)	13.2	13.1	13.3
Other social rented	11.1	9.7	10.0
Private rented	11.1	12.9	14.4
Other ²	2.6	1.3	1.4
<i>Base</i>	<i>2,372,777</i>	<i>10,325</i>	<i>10,325</i>

Notes: 1 includes shared ownership (part owned and part rented);

2 includes living rent free

²² Scotland's Census 2011: Census Data Explorer (Data warehouse)
<http://www.scotlandscensus.gov.uk/ods-web/home.html>

When a single adult is randomly selected within households, the unweighted sample of adults always under-represents those living in multi-adult households, since each has a smaller chance of selection for interview. Table 9.2 shows the differences in the unweighted sample and how the weighting has reduced the differences from other estimates. For instance, the unweighted SHS sample contained only 8 per cent of adults aged 16 to 24 and the weighting increases this proportion to 13.8 per cent - much closer to both the 2011 Census and the mid-2015 population estimates. The result is that the age/sex distribution of the weighted sample is much closer aligned to the 2011 Census and the mid-2015 population estimates.

Table 9.2: Comparison of age of adults between Census 2011, mid-2015 population estimates and SHS 2015 estimates

Adults	Census 2011	Mid-2015 population estimates	SHS 2015 unweighted	SHS 2015 weighted
All	100	100	100	100
16-24	14.4	13.8	8	13.8
25-64	65.2	64.2	62	64.2
65 plus	20.3	22.0	30.0	22.0
Male	47.9	48.1	45.1	48.1
16-24	7.2	6.9	3.6	6.9
25-64	31.9	31.4	28.6	31.4
65 plus	8.8	9.8	13.0	9.8
Female	52.1	51.9	54.9	51.9
16-24	7.2	6.8	4.4	6.8
25-64	33.3	32.8	33.4	32.8
65 plus	11.6	12.3	17.0	12.3
<i>Base</i>	<i>4,379,072</i>	<i>4,460,738</i>	<i>10,325</i>	<i>10,325</i>