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Welsh Health Survey 2015

Technical Report

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1 Introduction.

1.1 The Welsh Health Survey

The Welsh Health Survey 2015 was commissioned by the Welsh Government (WG) and carried out by NatCen Social Research (NatCen).

The main aims of the survey are to:

- provide national estimates of health and health-related lifestyle
- examine differences between population sub-groups (e.g. age, sex, social class) and local areas (health boards and local authorities)
- provide evidence to inform and monitor targets, indicators and policies for promoting better health, such as Our Healthy Future and Together for Health.
- provide local authority level information for development of joint local health, social care and wellbeing strategies.

Fieldwork was issued in twelve monthly waves between January and December 2015.

1.2 The development of the Welsh Health Survey

The current Welsh Health Survey (WHS) replaced two previous health surveys in Wales: the Welsh Health Survey (old WHS), carried out in 1995 and 1998, and the Health in Wales Survey (HWS) carried out in 1985, 1988, 1990, 1993 and 1996. In 2002, the Welsh Government commissioned NatCen to undertake a study to explore the feasibility of merging these surveys, using a design that would encompass their policy requirements and also be compatible in methodology and outputs to the old WHS and HWS. Alternative methodological approaches were recommended in that report, including the mixed-mode method adopted for the new WHS, which was launched in October 2003.¹

The first two years of WHS fieldwork were carried out by a consortium of NatCen Social Research (NatCen), formerly known as the National Centre for Social Research, Beaufort Research and the Department of Epidemiology and Public Health at UCL. From 2005, the survey has been carried out by NatCen Social Research.

¹ Nicolaas G, Pickering K, Tipping S (2003) *Feasibility of combining the Welsh Health Survey and the Health in Wales Survey*, National Centre for Social Research, available at http://www.natcen.ac.uk/natcen/pages/publications/combining_welsh.pdf.

1.3 Overview of methodology

The WHS sample comprises addresses randomly selected from the small users' Postcode Address File; the target sample for WHS 2015 was 15,000 adults.

The survey data were collected through a combination of methods. Household data were collected in a face-to-face interview. Individual level data were collected using paper questionnaires. Each adult aged 16 or over in the household was given a questionnaire to complete on their own behalf. In addition, up to two children aged 0 to 15 were randomly selected from each household to participate in the survey.

In WHS 2015, two versions of the adult questionnaire were used to administer different sets of physical activity questions. (See section 2.5 for details and Appendix A for copies of the adult questionnaires).

One of three age-specific questionnaires was used for children selected to participate in the survey. Two questionnaires were designed for parents to complete on behalf of selected children aged 0 to 3, and selected children aged 4 to 12; a third questionnaire was given to selected children aged 13 to 15 to complete on their own behalf.

The survey documents comprised the advance letter, the household questionnaire (administered by an interviewer), a set of showcards, the paper self-completion booklets for adults (23 pages) and children (11 or 12 pages, depending on the version), and the data linkage consent form for adults. All survey documents were available in English and Welsh, and bilingual interviewers were used where required. Interviewers were fully briefed by researchers about survey procedures and materials. Copies of the survey documents for WHS 2015 are shown at Appendix A.

The advance letter was sent to all selected addresses to assist recruitment. Interviewers conducted doorstep recruitment with householders and completed the household questionnaires. The self-completion questionnaires were left with the household members and collected by the interviewers at an agreed time (see Chapter 3).

The household questionnaires were manually keyed. Data from the individual questionnaires were entered into electronic format by scanning. All data were cleaned and edited before tables and other outputs were produced (see Chapter 5).

From 2007 onwards more detailed information was collected in the child elements of WHS.² Child height and weight was measured between 2007 and 2012 in WHS.³

² Welsh Assembly Government. *Welsh Health Survey 2007*. September 2008.

³ Child height and weight is now measured in the Child Measurement Programme for Wales. Ref: <http://www.wales.nhs.uk/sitesplus/888/page/67795>

2 Sampling.

2.1 Overview

The sample for the WHS 2015 was selected from the small user version of the Post Office's Postcode Address File (PAF). The PAF covers more than 99% of private households in Wales. As well as the small number of private households not included, the PAF does not include addresses for institutions. We note that this may exclude a group of people likely to have worse levels of health than people in the general population.

For the 12 month period from January to December 2015, 14,775 addresses were randomly sampled. The sample was stratified by Unitary Authority (UA) to allow for analysis of survey data at this level. An unclustered sample was selected within each UA.

The aim was to achieve interviews with at least 600 adults in each Unitary Authority. In order to achieve this, a minimum of 550 addresses were issued in each UA. The distribution of the sample was adjusted relative to earlier survey years to take account of differing response rates at UA level. Table 2.1 shows the number of addresses that were issued in each UA, along with their selection weights (see Section 6.2.1).

Since the third year of the Welsh Health Survey (2005/6) addresses sampled for the survey have been added to a Historical Database held by the sampling agency, and excluded from future samples for the Welsh Health Survey for at least two years. Addresses sampled for WHS 2013, for example, were not re-sampled in WHS 2014 or 2015.

Unitary Authority	Total number of addresses in UA	Number of addresses selected	Selection weight
Isle of Anglesey	35,699	650	54.9
Gwynedd	63,089	675	93.5
Conwy	57,944	625	92.7
Denbighshire	45,875	600	76.5
Flintshire	69,143	625	110.6
Wrexham	61,386	650	94.4
Powys	66,850	600	111.4
Ceredigion	35,938	550	65.3
Pembrokeshire	62,646	700	89.5
Carmarthenshire	87,813	700	125.4
Swansea	114,565	850	134.8
Neath Port Talbot	66,816	625	106.9
Bridgend	64,203	600	107.0
Vale of Glamorgan	57,411	675	85.1
Rhondda, Cynon, Taff	110,510	850	130.0
Merthyr Tydfil	27,647	625	44.2
Caerphilly	81,203	650	124.9
Blaenau Gwent	33,604	600	56.0
Torfaen	42,132	600	70.2
Monmouthshire	42,335	575	73.6
Newport	66,068	650	101.6
Cardiff	152,126	1100	138.3

2.2 Selection of addresses

An un-clustered sample of addresses was selected from each of the 22 UAs. Addresses were selected at random from across the whole UA area and then grouped into interviewer assignments or 'points'.

There were 591 points in total, each containing 25 addresses. Addresses were grouped together on the basis of proximity, taking account of natural barriers such as mountains and rivers.

2.3 Sampling of households

A small proportion of addresses in the PAF contain more than one dwelling unit (i.e. a self-contained unit of accommodation behind a single door), and/or more than one household (i.e. one or more people sharing cooking facilities and a living area). If more than one dwelling unit was found at an address interviewers selected one at random, using a Kish grid. If more than one household existed within either the address or the

dwelling unit, the interviewer again selected one household at random using the same procedure.

2.4 Sampling of children

Families with children aged under 16 were eligible for the child elements of the survey. In households with three or more children, two children were selected for participation to minimise respondent burden. All children in these households were listed in order of age, and two were selected at random.

2.5 Split sample experiment

In WHS 2015 we used a split sample experiment to compare two sets of adult physical activity questions: the three exercise questions used in earlier years of WHS included in version A of the adult questionnaire, and the new set of questions based on the short IPAQ (International Physical Activity Questionnaire) included in version B.

Within each interviewer point of 25 addresses, addresses 1 to 9 were allocated to the old questions (version A of the adult questionnaire) and addresses 10 to 25 to the new questions (version B). All adults within the address received the same questionnaire.

The sample was split unevenly, with around two thirds of addresses allocated to the new questionnaire and one third to the original questions. This was done to ensure we had enough responses to the new questions for meaningful analysis. Responses to the original exercise questions have been relatively stable to date, so information from earlier years could be used to supplement the responses to these questions.

Both versions of the questionnaire were administered throughout the survey year to control for seasonal differences in physical activity. The sample was designed so that we could administer both versions of the questionnaire in the same interviewer points to control for interviewer effects.

3 Fieldwork.

3.1 Fieldwork period

WHS 2015 fieldwork started in January 2015, and assignments ('points') were divided between twelve months, ending in December 2015. Each fieldwork point contained 25 addresses and fieldwork began on the first day of each month. Interviewers were expected to complete their assignments within four weeks of issue.

3.2 Briefings

All interviewers were briefed in person by the project researchers. The face-to-face briefings lasted a day each and covered all elements of the survey process. Topics included the aims and background of the survey, the advance letter, strategies for doorstep introductions, an overview of the content of the questionnaires, and selecting households and children for participation. Particular emphasis was given to doorstep introductions and selection procedures. Interviewers were also briefed about the services provided by NHS Direct Wales.

3.3 Contact procedures

3.3.1 Advance letter

Prior to the interview, advance letters were sent out by interviewers to all selected households. The wording of these was agreed by NatCen and the Welsh Government. Households were sent versions of the letter in both English and Welsh.

Respondents were informed within the letter that their participation was entirely voluntary.

3.3.2 Contacting respondents

Interviewers made contact with respondents by personal visit. Standard guidelines were issued to all interviewers regarding the timing and number of calls they should make to each address. Interviewers were required to make a minimum of four calls at different times of the day and on different days of the week before accepting a 'non-contact' outcome; in practice, where contact was difficult, interviewers made more calls than this.

3.3.3 Confidentiality

Once interviewers had made contact with a household, they introduced the survey and also presented the survey leaflet which contained information about the survey and reinforced confidentiality in data usage. Copies of this information leaflet were left for all respondents, in English or Welsh, as requested.

3.3.4 NHS Direct

A phone number for NHS Direct Wales was included on the advance letters for respondents to use if they had any queries regarding the survey. NHS Direct Wales operates a bilingual 24-hour service.

3.3.5 Welsh-speaking interviewers

Respondents were given the option of having the interview conducted in English or Welsh. If the latter was requested and the original interviewer was unable to interview in Welsh, the interview was re-arranged with a different, Welsh speaking interviewer.

3.4 Data collection

3.4.1 Overview

The survey consisted of a short household interview, lasting around 10 minutes, with a responsible adult living in the accommodation, and a self-completion questionnaire. All adults aged 16 and over were eligible for a self-completion questionnaire and data linkage consent; up to two selected children aged 0 to 15 were eligible for a questionnaire for their age group, for completion by parents (0 to 12) or children (13 to 15). Interviewers collected self-completion questionnaires and consent forms.

The household and adult questionnaires were similar to those used in previous years of the WHS, with the exception of the physical activity questions. In 2015, we administered two sets of physical activity questions using two different versions of the adult questionnaire (see Section 2.5 for details of the split sample experiment and Appendix A for the adult questionnaire). The documents were colour coded to make it easier for interviewers to administer different versions of the adult questionnaires in the same point: version A of the adult and household questionnaires were purple, version B of the adult and household questionnaires were orange.

The child self-completion questionnaires were similar to the revised child questionnaires, introduced in WHS 2007.

3.4.2 Household level

The short face-to-face household interview was offered to respondents in English or Welsh. This was designed to collect information about the household reference person. It also included questions about each person in the household, for example sex, age, length of residence at that address, general health and whether or not each person needed care. (See Appendix A for the household interview questionnaire.)

The household questionnaire also included instructions for selecting up to two children to participate, a grid showing the outcomes for each additional element, and consent forms for the older children to complete questionnaires.

3.4.3 Individual level instruments

The survey also included a 23-page self-completion questionnaire for all adults aged 16 and over in the household that took approximately 20 minutes to complete. There were three age-specific versions of the children's questionnaire. Those relating to children aged between birth and 3 years old (11 pages) and children aged 4 to 12 (12 pages) were completed by a parent or carer. Children aged between 13 and 15 completed a 12-page questionnaire themselves. English versions of the questionnaires are included in Appendix A.

All survey documents were translated into Welsh, so that respondents could be offered the option of completing the household interview and individual self-completions in either language. All self-completion questionnaires (English and Welsh versions) were professionally designed.

A summary of the questionnaire modules is presented in Table 3.1.

Table 3.1 Summary of survey modules	
Household Questionnaire	
Sex and age (each household member)	Employment Status (HRP)
Years of residence at address, general health and care needs (each household member)	NS-SEC (HRP)
Housing tenure	Contact details
Individual – adults 16+	
Health service use	Fruit and vegetable consumption
Medicines	Exercise*
Illnesses	Carers
Untreated problems or symptoms	Sex and age
General health and wellbeing	Height and weight
Smoking, including e-cigarettes	Ethnicity
Alcohol	Qualifications
Individual – children aged 0-3 (completed by parent or carer)	
Sex and age	Accidents, injuries or poisoning
Ethnicity	Current illnesses
General health and wellbeing	Infant feeding
Health service use	
Individual – children aged 4-12 (completed by parent or carer)	
Sex and age	Current illnesses
Ethnicity	Strengths and Difficulties Questionnaire ⁴
General health and wellbeing	Eating habits
Health service use	Physical activity
Accidents, injuries or poisoning	
Individual – children aged 13-15 (completed by child)	
Sex and age	Current illnesses
Ethnicity	Strengths and Difficulties Questionnaire ⁴
General health and wellbeing	Eating habits
Health service use	Physical activity
Accidents, injuries or poisoning	

*Adults answered the original WHS exercise questions, or a new set of questions designed to measure activity in line with the 2011 Physical Activity guidelines.⁵

⁴ By permission of Robert Goodman. See <http://www.sdqinfo.com> for details

⁵ Start active, stay active: a report on physical activity from the four home countries' Chief Medical Officers. Department of Health, July, 2011. Ref: <https://www.gov.uk/government/publications/start-active-stay-active-a-report-on-physical-activity-from-the-four-home-countries-chief-medical-officers>

4 Response.

4.1 Introduction

4.1.1 Overview

This chapter presents analysis of the response to the 2015 Welsh Health Survey at two levels, among households and individuals, with adults and children shown separately.

Household and individual response are analysed by unitary authority to present response rates for each of the 22 unitary authorities in Wales. The individual response tables show response for adults and children separately, within productive households (i.e. where the household questionnaire was completed). Further tables show individual response by sex and age and by unitary authority. Household and individual response are shown in combination, again for adults and children separately. Respondents and non-respondents in productive households are compared using proxy measures of general health and need for care, taken from the household interview.

4.1.2 Outcome codes

Interviewers assigned a final outcome code to every address in their assignment. The range of possible outcome codes is shown in the Table 4.1.

If respondents requested the household interview to be carried out in Welsh, a temporary outcome code (614) was assigned until a Welsh speaking interviewer was allocated and the interview completed.

Table 4.1 Outcome codes	
Outcome	Code
Deadwood	
Not yet built/under construction	710
Demolished/derelict	720
Vacant/empty	730
Non-residential address e.g. business, school, office, factory	740
Address occupied, no resident household eg. holiday home	750
Communal establishment/institution	760
Other ineligible	790
Unknown eligibility	
Not attempted	612
Inaccessible	620
Unable to locate address	630
Unknown whether address contains residential housing – non contact	640
Residential address – unknown whether occupied	650
Unknown whether address contains residential housing – information refused	810
Other unknown eligibility	690
Unproductive outcomes	
No contact with anyone at the household	310
No contact with any responsible adult at the household	320
Office refusal	410
Refusal at introduction/before interview	430
Refusal during interview	440
Broken appointment – no re-contact	450
Ill at home during survey period	510
Away or in hospital all survey period	520
Physically or mentally unable/incompetent	530
Language difficulties	540
Other unproductive	590
Productive	
Fully productive	110

4.1.3 Definition of household response

In calculating household response, a recommended standard method for social surveys was used.⁶ It incorporates an estimate of the number of eligible and deadwood cases within addresses where eligibility is uncertain. This calculation is shown below.

$$\text{response rate} = \frac{\text{productive}}{\text{productive} + \text{unproductive} + (e * \text{unknown eligibility})}$$

⁶ Lynn, P, Beerten, R, Laiho, J and Martin, J (2001) *Recommended Standard Final Outcome Categories and Standard Definitions of Response Rate for Social Surveys*, ISER Working Papers, Number 2001-23, Colchester: University of Essex.

where e is an estimate of the proportion of cases of unknown eligibility that are eligible, given by:

$$e = \frac{\text{productive} + \text{unproductive}}{\text{productive} + \text{unproductive} + \text{deadwood}}$$

4.2 Household response

Table 4.2 shows a summary of response at the household level in 2015.

Using the method described above, 16 cases of unknown eligibility were assumed to be deadwood and were therefore removed from the eligible sample. The final adjusted response rate for the Welsh Health Survey in 2015 was 76.0%.

		% of eligible sample	% of adjusted eligible sample
Households issued*	14,775		
Deadwood	2,212		
Eligible sample	12,563	100	
Total unknown eligibility	109	0.9	
Estimate of deadwood among unknown eligibility households	16		
Adjusted eligible sample	12,438		100
Estimate of eligible households among those of unknown eligibility	93		0.7
Refusals	1,865	14.8	15.0
Other unproductive	1,048	8.3	8.4
Productive	9,541	75.9	76.7

* In 2015, only one household was issued at each address; if there was more than one dwelling unit or household at the address, only one was selected. Of the 14,775 addresses issued, 14,797 households were identified.

Table 4.3 below shows household response by unitary authority for WHS 2015.

Table 4.3 Household response for WHS 2015				
Unitary authority	Eligible households	Responding households		Adjusted response rate
			%	%
Isle of Anglesey	517	413	79.9	80.1
Gwynedd	499	399	80.0	80.1
Conwy	506	386	76.3	76.3
Denbighshire	515	405	78.6	78.7
Flintshire	569	438	77.0	77.0
Wrexham	583	437	75.0	75.0
Powys	494	389	78.7	78.9
Ceredigion	436	367	84.2	84.4
Pembrokeshire	507	401	79.1	79.2
Carmarthenshire	601	479	79.7	79.7
Swansea	735	556	75.6	75.7
Neath Port Talbot	564	425	75.4	75.4
Bridgend	496	392	79.0	79.1
Vale of Glamorgan	617	471	76.3	76.4
Rhondda, Cynon, Taff	706	537	76.1	76.1
Merthyr Tydfil	542	387	71.4	71.8
Caerphilly	585	465	79.5	79.6
Blaenau Gwent	516	371	71.9	72.0
Torfaen	544	393	72.2	72.3
Monmouthshire	499	382	76.6	76.7
Newport	588	410	69.7	69.8
Cardiff	944	638	67.6	67.7
Total	12,563	9,541	75.9	76.0

4.3 Individual Response

Table 4.4 shows the response among adults in productive households, 77.3%.

4.3.1 Adults

	Number of cases	% of issued sample
Total number of adults identified	17,668	100.0
<i>Average number of adults in productive households</i>	1.9	
Refusal	399	2.3
Questionnaire not returned	2,686	15.2
Other unproductive	927	5.2
Productive	13,656	77.3

As Table 4.5 shows, response was higher among women than among men, and among older adults than younger ones. This follows the pattern seen in previous years.

	16-24 years		25-44 years		45-64 years		65+ years		Total ¹	
		%		%		%		%		%
Men	631	60.9	1,600	68.0	2,132	78.5	1,960	86.6	6,323	75.5
Women	718	66.1	1,901	73.3	2,483	81.9	2,231	86.3	7,333	78.9
Total	1,349	63.6	3,501	70.7	4,615	80.3	4,191	86.4	13,656	77.3

Table 4.6 shows the response among adults in productive households by unitary authority for WHS 2015.

Table 4.6 Response among adults in productive households for WHS 2015, by unitary authority

Unitary authority	Productive	
		%
Isle of Anglesey	575	78.6
Gwynedd	598	79.6
Conwy	532	78.0
Denbighshire	608	82.5
Flintshire	640	78.7
Wrexham	597	73.3
Powys	635	88.0
Ceredigion	552	81.2
Pembrokeshire	488	67.9
Carmarthenshire	685	76.8
Swansea	773	75.5
Neath Port Talbot	600	77.9
Bridgend	591	82.0
Vale of Glamorgan	626	71.0
Rhondda, Cynon, Taff	751	76.0
Merthyr Tydfil	575	81.3
Caerphilly	748	81.3
Blaenau Gwent	564	81.5
Torfaen	555	74.9
Monmouthshire	563	78.7
Newport	562	74.0
Cardiff	838	69.5
Total	13,656	77.3

4.3.2 Children

Table 4.7 shows the response among children aged 0 to 15 in productive households. 4,021 children were identified, and of these 3,586 were selected to take part in the survey (see Section 2.4 for a description of the child selection process). Response among selected children was 72.7%.

Table 4.7 Response among selected children aged 0 to 15 in productive households for WHS 2015		
	Number of cases	% of eligible sample
Number of productive households with children	2608	
Total number of children in productive households	4021	
<i>Average number of children in productive households with children</i>	<i>1.5</i>	
Number of selected children in productive households	3586	100
<i>Average number of selected children in productive households with children</i>	<i>1.4</i>	
Refusal (by child or parent)	65	1.8
Questionnaire not returned	743	20.7
Other unproductive	170	4.7
Productive	2608	72.7

Table 4.8 shows the response by age group, corresponding to the three versions of the questionnaire (see Section 3.4.3). The difference in response between the three groups is significant. Response was lowest in the 0-3 year age group and highest among those aged 4-12 years.

Table 4.8 Response among selected children aged 0 to 15 in productive households for WHS 2015, by age group			
	0-3 years	4-12 years	13-15 years
Number of selected children in productive households	909	2072	605
Refusal (by child or parent)	16	35	14
Questionnaire not returned	207	434	102
Other unproductive	38	82	50
Total non-response	261	551	166
Total self-completions returned	648	1521	439
<i>Response rate¹</i>	<i>71.3</i>	<i>73.4</i>	<i>72.6</i>

¹ Based on selected children in productive households,

Table 4.9 shows response among selected children by age and sex.

Table 4.9 Response among selected children aged 0 to 15 in productive households for WHS 2015, by age group and sex

	0-3 years		4-12 years		13-15 years		Total	
		%		%		%		%
Boys	316	69.5	806	74.5	221	69.7	1343	72.4
Girls	332	73.1	715	72.2	218	75.7	1265	73.0
Total	648	71.3	1521	73.4	439	72.6	2608	72.7

Table 4.10 shows the response among selected children by unitary authority.

Table 4.10 Response among selected children aged 0 to 15 in productive households for WHS 2015, by unitary authority

Unitary authority	Productive	
		%
Isle of Anglesey	101	70.6
Gwynedd	114	76.5
Conwy	92	78
Denbighshire	97	74
Flintshire	125	75.8
Wrexham	108	65.1
Powys	95	80.5
Ceredigion	94	77
Pembrokeshire	59	55.7
Carmarthenshire	118	69
Swansea	154	72
Neath Port Talbot	127	79.4
Bridgend	100	81.3
Vale of Glamorgan	134	69.4
Rhondda, Cynon, Taff	170	71.4
Merthyr Tydfil	118	73.3
Caerphilly	171	79.9
Blaenau Gwent	109	79.6
Torfaen	98	66.7
Monmouthshire	89	73.6
Newport	121	64.4
Cardiff	214	71.1
Total	2608	72.7

4.4 Combined household and individual response

The following tables show overall response, for adults and children separately. These figures take into account response at both the household and individual levels. The number of adults and children within non-responding households is not known, therefore the average number of adults and children in participating households is used to impute the denominator (the total number of adults and children in all eligible households). This figure is likely to overestimate the denominator and therefore underestimate the response, since unproductive households are likely to have fewer residents, on average, than productive households.⁷

Table 4.11 shows the combined response rate for adults in 2015, 58.8%.

Table 4.11 WHS 2015 combined response: Adults		
		%
Households issued	14,775	100.0
Deadwood	2,212	15.0
Estimate of deadwood among households of unknown eligibility	16	0.1
Eligible households after adjustment	12,547	84.9
Productive households	9,541	
Total number of adults in productive households	17,668	
<i>Average number of adults per productive household</i>	<i>1.9</i>	
Imputed number of adults for all eligible households	23,234	100.0
Productive (adults in eligible households)	13,656	58.8

Table 4.12 shows the combined response rate for selected children in 2015, 55.3%.

Table 4.12 WHS 2015 combined response: Children		
		%
Households issued	14,775	100.0
Deadwood	2,212	15.0
Estimate of deadwood among households of unknown eligibility	16	0.1
Eligible households	12,547	84.9
Productive households	9,541	
Total number of selected children in productive households	3,586	
<i>Average number of selected children per productive household</i>	<i>0.4</i>	
Imputed number of selected children for all eligible households	4,716	100.0
Productive (children in eligible households)	2,608	55.3

⁷ McGee A, Fitzgerald R and Thornby M. (2004) *A Description of Non-Respondents to the Family Resources Survey 2002-2003*, National Centre for Social Research.

4.5 Comparison of respondents and non-respondents in productive households

The Welsh Health Survey collects proxy measures of general health and need for care for each member of the household as part of the household questionnaire. It is possible to use these measures to compare respondents and non-respondents within productive households. Tables 4.13 to 4.16 show the proportions of respondents and non-respondents with 'good', 'fairly good' and 'not good' health and the proportion who need care. These measures are shown for adults and selected children

Non-responding adults were more likely than those who responded to the survey to be described by the household informant as having good general health ($p < 0.005$): 70% of non-respondents were reported to have good general health, compared with 64% of respondents. By contrast the non-response patterns in Appendix B suggest that those with poor general health were *less* likely to respond. This difference may be accounted for by the type of analysis: the non-response model controlled for other factors in the model, such as sex, age and NS-SEC.

There was no significant difference in the proportion of responding and non-responding children described by the household informant as having good general health.

There was no significant difference in the proportion of responding and non-responding children described by the household informant as needing care.

There was no significant difference in the proportion needing care between responding and non-responding adults.

Table 4.13 Comparison of general health between adult respondents and non-respondents in 2015

	Respondents		Non-respondents	
	No.	%	No.	%
Good	8,586	63.9	2,929	70.1
Fairly good	3,046	22.7	687	16.4
Not good	1,797	13.4	561	13.4
Total	13,429	100.0	4,177	100.0

Table 4.14 Comparison of general health between child respondents and non-respondents in 2015

	Respondents		Non-respondents	
	No.	%	No.	%
Good	2392	93.6	888	92.9
Fairly good	125	4.9	48	5.0
Not good	38	1.5	20	2.1
Total¹	2555	100.0	956	100.0

¹ Based on eligible selected children in productive households

Table 4.15 Comparison of need for care between adult respondents and non-respondents in 2015				
	Respondents		Non-respondents	
	No.	%	No.	%
Need care	1,043	7.8	320	7.9
Do not need care	12,264	92.2	3,738	92.1
Total	13,307	100.0	4,058	100.0

Table 4.16 Comparison of need for care between child respondents and non-respondents in 2015				
	Respondents		Non-respondents	
	No.	%	No.	%
Need care	102	4.1	39	4.3
Do not need care	2399	95.9	877	95.7
Total¹	2501	100.0	916	100.0

¹ Based on eligible selected children in productive households

5 Data preparation.

5.1 Data keying and scanning

Once interviewers had completed both household and self-completion questionnaires for a household, the questionnaires were returned for processing. The household questionnaires were double keyed in-house at NatCen. The self-completion questionnaires were returned to the office and then sent to a scanning agency. Once these stages were complete, the scanned questionnaires, data and electronic images were sent to NatCen and the data linked to the household data through serial numbers (at both household and individual levels).

A report was run comparing the household data to the data booked in at the scanning agency and subsequently scanned. For cases where the data could not be immediately matched a 'problem file' was produced. Reconciliation procedures were then undertaken to match up household data and self-completion discrepancies (for instance, error in the serial number, individual name or number).

5.2 Data coding and editing

5.2.1 Editing procedures

The self-completion questionnaires were edited using NatCen's in-house system.

The data was checked to correct cases where routing had not been followed, where respondents had coded more than one answer where only one was required, or where incompatible answers had been entered.

As a separate checking measure all handwritten digits on the questionnaires were verified visually as part of the quality control process.

5.2.2 NS-SEC (SOC) coding

The occupation and industry of the Household Reference Person (HRP) was coded using the Standard Occupational Classification (SOC2000) and Standard Industrial Classifications (SIC 1992). The National Statistics Socio-economic Classification (NS-SEC) was derived from SOC2000 and employment status.

5.2.3 Backcoding and International Classification of Diseases (ICD) coding

If appropriate, cases where an 'other' answer was given to questions on chronic or long-term illnesses, health problems or disabilities were 'backcoded' into the previous pre-coded individual illness questions. This process converted the text at 'other' answers on illnesses into ICD groups and chapters which were then matched into the previous illness questions. This process was carried out for both adults and children.

5.3 Data set formats

The data were organised into three data sets for analysis. These were delivered to the Welsh Government after initial analyses. Two productive data sets at the individual level were produced – one for **adult data** and one for **child data**. A **combined data set** was also created containing information from all productive households at the individual level (household data for productive and unproductive individual cases). This enabled a further level of analysis, as the household questionnaire collected information on age, sex, the number of years living at that address, general health and need for care for each member of the household.

6 Weighting.

6.1 Overview

Weights were calculated for the WHS data to correct for unequal selection probabilities and survey non-response.

The sample design, described in Chapter 2, led to respondents having unequal chances of selection for two reasons: the probability of selecting an address varied by Unitary Authority and where addresses contained more than one dwelling unit or household. In addition, up to two children were selected in each household.

Weights were also calculated to adjust for non-response. Response rates differed between groups (see Section 4.3); for example, younger people, particularly young men, were under-represented in the achieved sample, and people aged 65 and over were over-represented. Weighting compensates for these differences, and corrects any resulting bias in the survey estimates.

Two sets of non-response weights were generated, household weights (`wt_hhold`) and individual weights (`wt_adult` and `wt_child`). The household weights adjust for non-contact and refusals of entire households. The individual weights, calculated separately for adults and children, adjust for non-response among individuals within responding households (in addition to adjusting for household non-response).

6.2 Calculating the weights

6.2.1 Selection weights

The first stage of weighting corrected for the imbalances created by the different probabilities of selection within each Unitary Authority. Addresses in smaller UAs were over-sampled to ensure a minimum issued sample in each. Without appropriate weighting, these smaller UAs would be over-represented in the sample. Consequently, selection weights were calculated as the inverse of the selection probabilities (see Table 2.1 in Chapter 2).

For each selected address, only one household was selected for the issued sample (see Section 2.3). Weights were therefore required to correct for the cases where more than one dwelling unit or household was found at a single address. The dwelling unit weights were calculated as the number of dwellings found at an address, and trimmed at 3. The household weights were calculated as the number of households found in the dwelling unit or address, and trimmed at 3. These two weights were then multiplied together.

6.2.2 Household non-response weight

A household non-response model with area-level covariates was used to adjust for non-contact and refusals of entire households. The probability of household response was estimated using a logistic regression model, weighted by the composite selection weights. The dependent variable was whether the household responded or not. The independent variables included both geographic and Census 2011 variables.

Variables included in the model are shown in Appendix B. The odds ratio is a measure used to compare the odds of response for each category of an independent variable relative to a reference category. An odds ratio greater than 1 indicates greater odds of response in that category than in the reference category.

The household non-response weights were calculated as the inverse of the probability of response. Extreme weights below the 1st and above the 99th percentiles were trimmed to the values at these percentiles.⁸ This trimming avoided the situation where some individuals have a very large disproportionate influence on the survey estimates (either disproportionately large or disproportionately small).

Calibration weighting was used to further reduce household non-response bias. The initial weights were the product of the selection weights and the household non-response weight. Calibration weighting adjusted the weighted household sample so that the marginal distributions of age/sex and unitary authority for all individuals within responding households matched the 2014 mid-year population estimates for Wales (see Tables 6.1 and 6.2).

Age	Males			Females		
	N	% of total	% of adults	N	% of total	% of adults
0-4	91,100	6.0	n/a	86,600	5.5	n/a
5-10	107,000	7.0	n/a	102,100	6.5	n/a
11-15	86,500	5.7	n/a	81,600	5.2	n/a
16-24	190,800	12.5	15.4	179,500	11.4	13.8
25-34	188,400	12.4	15.2	185,800	11.8	14.3
35-44	179,500	11.8	14.5	184,800	11.8	14.2
45-54	212,500	14.0	17.2	221,000	14.1	17.0
55-64	186,000	12.2	15.0	194,200	12.4	14.9
65-74	164,300	10.8	13.3	174,100	11.1	13.4
75+	115,200	7.6	9.3	161,100	10.3	12.4
Total	1,521,300			1,570,800		

⁸ 102 cases were below the 1st percentile, 71 cases were above the 99th percentile

⁹ Source: ONS

Table 6.2 2014 mid year population estimates for Wales, by unitary authority¹⁰

Unitary authority	
Anglesey	70,200
Blaenau Gwent	69,700
Bridgend	141,200
Caerphilly	179,900
Cardiff	354,300
Carmarthenshire	184,900
Ceredigion	75,400
Conwy	116,300
Denbighshire	94,800
Flintshire	153,800
Gwynedd	122,300
Merthyr Tydfil	59,100
Monmouthshire	92,300
Neath Port Talbot	140,500
Newport	146,800
Pembrokeshire	123,700
Powys	132,700
Rhondda Cynon Taff	236,900
Swansea	241,300
Torfaen	91,600
Vale of Glamorgan	127,700
Wrexham	136,700
Total	3,092,100

The final household weights used (wt_hhold) were the weights after calibration.

6.2.3 Child selection weight

In households with children aged under 16, no more than two children were selected for inclusion (see Section 2.4). Weights were therefore required to correct for households including three or more children. These weights were calculated as the number of children found within the household divided by the number of children selected for inclusion and were trimmed at 2 (4/2). Three or more children were identified in 355 productive households.

¹⁰ Source: ONS

6.2.4 Individual level non-response weight

Individual weights were calculated for individual respondents to the survey to adjust for non-response at the self-completion stage, in addition to household non-participation. As non-response at each stage was hierarchical, the individual weights were calculated for responding individuals within responding households. Weighted logistic regression models for adults and children were used to estimate the probability of response. The dependent variable in each model was whether an individual in a responding household responded or not. The independent variables were age, sex, UA, household type, NS-SEC of household reference person, self-reported general health and household tenure.

All covariates were significantly associated with response among adults. After adjusting for the other variables in the model, adults were more likely to respond if they were older or living in managerial and professional class.

For children, response was significantly associated with UA, tenure and NS-SEC of household reference person; age and sex, household type and general health were not significant. Children were generally more likely to respond if they were living in owner occupied homes, or in a household headed by someone in a managerial and professional (see Appendix B).

The individual level non-response weights were calculated as the inverse of the probability of response.¹¹

Calibration weighting was used to ensure that the final sample matched the age/sex distribution of the population. The initial weights were the product of the household weights and the individual level non-response weights. The calibration weighting adjusted the weighted individual sample so that the marginal distributions of age/sex for all individuals and those of children and adults (separately) within Unitary Authority matched the 2014 mid-population estimates for Wales (see Tables 6.1 and 6.3).

¹¹ The individual weights were also trimmed at the 1st and 99th percentiles. 136 adults were below the 1st percentile, 118 above the 99th percentile. In the sample of children, 23 were below the 1st percentile and 26 above the 99th percentile.

Table 6.3 2014 mid year population estimates for adults and children in Wales, by unitary authority¹²

Unitary authority	Children 0-15	Adults 16+
Anglesey	12,100	58,100
Blaenau Gwent	12,200	57,400
Bridgend	25,500	115,700
Caerphilly	34,200	145,800
Cardiff	65,300	289,000
Carmarthenshire	32,600	152,300
Ceredigion	11,000	64,400
Conwy	18,900	97,400
Denbighshire	17,100	77,600
Flintshire	28,400	125,400
Gwynedd	20,900	101,400
Merthyr Tydfil	11,000	48,000
Monmouthshire	15,600	76,700
Neath Port Talbot	24,500	116,000
Newport	29,300	117,500
Pembrokeshire	21,600	102,100
Powys	21,900	110,800
Rhondda Cynon Taff	44,200	192,700
Swansea	41,500	199,800
Torfaen	16,900	74,700
Vale of Glamorgan	23,700	104,000
Wrexham	26,300	110,400
Total	554,700	2,537,200

As a last step, each set of weights (wt_hhold, wt_adult and wt_child) were scaled so that the mean of the weights was equal to 1 and consequently the weighted sample size was the same as the un-weighted sample size.¹³

¹² Source: ONS

¹³ As this was done separately for adults and children, the profile of the (combined) all-age sample will not match the profile of the all-age population. Children were under-represented relative to adults due to the selection of a maximum of two children per household and to the lower response rate amongst children. The imbalance can be easily rectified by re-scaling the weights before combining the samples.

7 Sampling Errors.

7.1 Design factors (defts)

The WHS sample was stratified by Unitary Authority and whilst the sampled addresses were un-clustered, respondents are clustered within household. The overall effect of this complex design is that standard errors for survey estimates are generally a little higher than would be obtained from a simple random sample of the same size.¹⁴

The ratio of the standard error of the complex sample to that of a simple random sample of the same size is known as the design factor. The design factor (or 'deft') is the factor by which the standard error of an estimate from a simple random sample has to be multiplied to give the true standard error of the estimate, given the complex design.

The true standard errors and defts for the WHS have been calculated using a Taylor Series expansion method. These take into account weighting, stratification and, although the sample itself was un-clustered, household-level clustering.

Tables 7.1 to 7.6 show the true standard errors and defts for key variables in WHS 2015 covering adults' illnesses, self perceived health, health service use, and health-related lifestyle, as well as various indicators of children's health and related behaviours and children's health service use.

¹⁴ Although standard errors for survey estimates are generally higher than would be obtained from a simple random of sample of the same size in some cases they are slightly lower as the positive effects of stratification outweigh the negative effects of clustering.

Table 7-1 True standard errors and 95% confidence intervals for adults' illnesses in WHS 2015						
Characteristic	%/ mean	Sample size	True standard error	95% confidence interval		Deft
				lower	upper	
Currently being treated for High blood pressure						
Men	19.8	6,120	0.54	18.7	20.8	1.06
Women	19.7	7,113	0.49	18.8	20.7	1.04
Total	19.7	13,233	0.40	19.0	20.5	1.16
Any heart condition (excluding high blood pressure)						
Men	9.4	5,940	0.38	8.7	10.1	0.99
Women	7.3	6,806	0.32	6.6	7.9	1.03
Total	8.3	12,746	0.26	7.8	8.8	1.05
Currently being treated for any respiratory illness						
Men	13.3	6,020	0.47	12.3	14.2	1.08
Women	15.1	6,967	0.47	14.2	16	1.09
Total	14.2	12,987	0.34	13.5	14.9	1.11
Currently being treated for any mental illness						
Men	9.9	6,100	0.44	9.1	10.8	1.16
Women	15.5	7,033	0.47	14.6	16.4	1.1
Total	12.8	13,133	0.35	12.1	13.5	1.19
Currently being treated for Arthritis						
Men	8.8	6,108	0.36	8.1	9.5	1.00
Women	14.7	7,055	0.44	13.8	15.6	1.04
Total	11.8	13,163	0.31	11.2	12.4	1.09
Currently being treated for Diabetes						
Men	8.3	6,295	0.35	7.6	8.9	1.02
Women	6.4	7,281	0.3	5.8	6.9	1.03
Total	7.3	13,576	0.24	6.8	7.8	1.06

Table 7-2 True standard errors and 95% confidence intervals for adults' perceived health and SF-36 scores for WHS 2015						
Characteristic	%/ mean	Sample size	True standard error	95% confidence interval		Deft
				lower	upper	
Limited by health problem/disability						
Men	30.7	6,206	0.68	29.3	32	1.17
Women	36	7,186	0.64	34.8	37.3	1.12
Total	33.4	13,392	0.52	32.4	34.4	1.28
Mean of summary of SF-36 Physical score						
Men	49.8	5,792	0.17	49.4	50.1	1.15
Women	48.1	6,603	0.17	47.8	48.5	1.13
Total	48.9	12,395	0.14	48.7	49.2	1.27
Mean of summary of SF-36 Mental score						
Men	50.5	5,792	0.18	50.1	50.8	1.20
Women	48.0	6,603	0.17	47.6	48.3	1.16
Total	49.2	12,395	0.14	48.9	49.5	1.27

Table 7-3 True standard errors and 95% confidence intervals for adults' health related lifestyle in WHS 2015

Characteristic	%/ mean	Sample size	True standard error	95% confidence interval		Deft
				lower	upper	
Current smokers						
Men	20.9	6,229	0.62	19.7	22.1	1.20
Women	17.9	7,225	0.52	16.9	18.9	1.16
Total	19.4	13,454	0.44	18.5	20.2	1.31
Passive smoking indoors or outdoors (as % of non-smokers)						
Men	28.4	4,733	0.80	26.8	29.9	1.22
Women	30.0	5,508	0.71	28.6	31.3	1.15
Total	29.2	10,241	0.59	28.0	30.3	1.31
Passive smoking indoors (as % of non-smokers)						
Men	15.6	4,661	0.65	14.4	16.9	1.22
Women	16.5	5,428	0.59	15.3	17.6	1.17
Total	16.1	10,089	0.48	15.1	17.0	1.32
Drinking above guidelines on heaviest day last week (including non-drinkers)						
Men	45.2	6,135	0.78	43.6	46.7	1.23
Women	34.3	7,056	0.66	33.0	35.6	1.17
Total	39.6	13,191	0.59	38.5	40.8	1.37
Binge drinking on heaviest day in last week (including non-drinkers)						
Men	29.5	6,135	0.76	28.0	31.0	1.31
Women	19.4	7,056	0.57	18.2	20.5	1.22
Total	24.3	13,191	0.54	23.3	25.4	1.46
5+ portions of fruit and vegetable the previous day						
Men	30.7	6,134	0.69	29.3	32.0	1.17
Women	33.0	7,106	0.62	31.8	34.2	1.11
Total	31.9	13,240	0.51	30.9	32.9	1.26
Moderate exercise at least 5+ times in last week						
Men	37.7	2,238	1.21	35.3	40.0	1.18
Women	24.1	2,589	0.97	22.2	26.0	1.15
Total	30.7	4,827	0.82	29.1	32.3	1.23
Overweight or obese						
Men	63.0	5,903	0.79	61.5	64.6	1.26
Women	55.9	6,574	0.68	54.5	57.2	1.11
Total	59.4	12,477	0.54	58.4	60.5	1.24
Obese						
Men	22.9	5,903	0.61	21.8	24.1	1.12
Women	24.1	6,574	0.59	22.9	25.2	1.13
Total	23.5	12,477	0.46	22.6	24.4	1.20

Table 7-4 True standard errors and 95% confidence intervals for adults' health service use in WHS 2015

Characteristic	%/ mean	Sample size	True standard error	95% confidence interval		Deft
				lower	upper	
Talked to a GP in last 2 weeks						
Men	14.2	6,252	0.49	13.2	15.1	1.12
Women	19.6	7,249	0.51	18.6	20.6	1.09
Total	17.0	13,501	0.37	16.3	17.7	1.14
Visited hospital for accident or injury in past 3 months						
Men	4.8	6,282	0.32	4.1	5.4	1.18
Women	4.4	7,277	0.26	3.9	4.9	1.10
Total	4.6	13,559	0.21	4.2	5.0	1.15
Outpatient in last 12 months						
Men	29.4	6,253	0.66	28.1	30.7	1.15
Women	33.6	7,226	0.60	32.4	34.8	1.09
Total	31.6	13,479	0.47	30.6	32.5	1.18
Inpatient in last 12 months						
Men	7.4	6,268	0.37	6.6	8.1	1.11
Women	9.9	7,257	0.38	9.1	10.6	1.09
Total	8.6	13,525	0.27	8.1	9.2	1.10
Visited a pharmacist in last 12 months						
Men	61.7	5,855	0.74	60.2	63.1	1.17
Women	75.0	6,801	0.59	73.8	76.1	1.13
Total	68.5	12,656	0.51	67.5	69.5	1.24
Visited a dentist in last 12 months						
Men	66.3	6,007	0.73	64.9	67.8	1.20
Women	73.4	6,962	0.62	72.2	74.6	1.17
Total	70.0	12,969	0.53	68.9	71.0	1.32
Visited an optician in last 12 months						
Men	45.4	6,087	0.73	44.0	46.8	1.14
Women	55.4	7,042	0.66	54.1	56.7	1.12
Total	50.5	13,129	0.54	49.4	51.6	1.24

Table 7-5 True standard errors and 95% confidence intervals for children's health status and health-related behaviour in WHS 2015

Characteristic	%/ mean	Sample size	True standard error	95% confidence interval		Deft
				lower	upper	
Longstanding illness (0 to 15 year olds)						
Boys	21.7	1,331	1.28	19.2	24.2	1.13
Girls	17.1	1,262	1.18	14.7	19.4	1.11
Total	19.4	2,593	0.91	17.7	21.2	1.17
Limiting longstanding illness (0 to 15 year olds)						
Boys	8.2	1,324	0.90	6.4	9.9	1.19
Girls	5.6	1,259	0.74	4.1	7.0	1.14
Total	6.9	2,583	0.59	5.8	8.1	1.18
Asthma as a longstanding illness (0 to 15 year olds)						
Boys	5.5	1,326	0.69	4.2	6.9	1.10
Girls	4.5	1,255	0.63	3.3	5.7	1.08
Total	5.0	2,581	0.47	4.1	6.0	1.10
Currently being treated for asthma (0 to 15 year olds)						
Boys	8.6	1,317	0.84	7.0	10.3	1.09
Girls	6.1	1,236	0.73	4.7	7.6	1.07
Total	7.4	2,553	0.57	6.3	8.5	1.09
Eats fruit daily (4 to 15 year olds)						
Boys	63.0	1,017	1.78	59.5	66.5	1.18
Girls	65.3	921	1.78	61.8	68.8	1.14
Total	64.1	1,938	1.33	61.5	66.7	1.22
Eats vegetables daily (4 to 15 year olds)						
Boys	51.7	1,015	1.85	48.1	55.4	1.18
Girls	52.2	917	1.92	48.5	56.0	1.16
Total	52.0	1,932	1.44	49.2	54.8	1.26
5 or more days with at least one hour exercise last week (4 to 15 year olds)						
Boys	56.6	1,017	1.80	53.0	60.1	1.16
Girls	45.2	921	1.90	41.4	48.9	1.16
Total	51.1	1,938	1.40	48.4	53.9	1.23

Table 7-6 True standard errors and 95% confidence intervals for children's health service use in WHS 2015

Characteristic	%/ mean	Sample size	True standard error	95% confidence interval		Deft
				lower	upper	
Spoke to a GP in past 2 weeks						
Boys	12.4	1,339	0.98	10.4	14.3	1.09
Girls	12.5	1,262	0.99	10.5	14.4	1.07
Total	12.4	2,601	0.73	11.0	13.8	1.13
Visited hospital for accident or injury in past 3 months						
Boys	7.9	1,338	0.78	6.4	9.5	1.06
Girls	6.1	1,264	0.70	4.7	7.5	1.05
Total	7.0	2,602	0.53	6.0	8.1	1.06
Visited A&E in past 12 months						
Boys	21.2	1,291	1.25	18.7	23.6	1.10
Girls	18.3	1,229	1.19	15.9	20.6	1.07
Total	19.8	2,520	0.88	18.0	21.5	1.11
Visited dentist in past 12 months						
Boys	78.8	1,315	1.41	76.0	81.5	1.25
Girls	78.7	1,247	1.36	76.0	81.4	1.17
Total	78.7	2,562	1.04	76.7	80.8	1.28

8 Outputs.

8.1 NatCen outputs

NatCen supplied the following outputs to the Welsh Government during and after fieldwork.

- **Monthly progress reports**, describing the progress of fieldwork and summarising response rates.
- **Quarterly progress reports**, showing more detailed analyses of response.
- **Interim data set**
- **Final data sets**: three data sets (described in Section 5.3) for the Welsh Health Survey in 2015

8.2 Data releases and reports

All survey outputs published by the Welsh Government, including the substantive reports for each year of the WHS, can be found at www.wales.gov.uk/statistics

Headline results from the 2015 WHS were published in June 2016. Substantive reports were published by the Welsh Government between June and September 2016 and are available at the time of writing at

<http://wales.gov.uk/topics/statistics/theme/health/health-survey/results/?lang=en>

Data sets from 2015, with supporting documentation, will be lodged with the ESRC Data Archive at Essex in late 2016.

Appendix A. Survey Documents

- **Address record form (ARF)/Household questionnaire**
- **Questionnaire for adults: version A**
- **Questionnaire for adults: version B**
- **Questionnaire for parents of children aged 0 to 3**
- **Questionnaire for parents of children aged 4 to 12**
- **Questionnaire for children aged 13 to 15**