Inpatient Experience Survey 2017/18

Weighting Methodology

1. Introduction

When conducting a survey, it is important to have a representative sample of the population you are interested in to reduce bias in the estimates produced. Applying weighting methods reduces the potential bias by making the results more representative of the population but also increases the variation in the estimates.

Survey weights are numbers associated with the responses that specify the influence the various observations should have in the analysis. The final survey weight associated with a particular response can be thought of as a measure of the number of population units represented by that response.

2. Methodology Pre-2017/18 Survey

A summary of the sampling and weighting approaches used in the Inpatient Experience Surveys prior to 2017/18 is provided in this section. Full details on the methodology used in each survey can be found in the relevant technical report, available at www.gov.scot/InpatientSurvey.

2.1 Sampling

A random sample was taken of adults who had an overnight stay in a Scottish hospital as an inpatient[1] between set dates. Some people were excluded from the sample, such as those who received privately funded care.

Sample strata were agreed with each NHS Board to meet their needs in providing local results at the most useful level. These strata were defined either at site (hospital) level, sub-site (directorate or grouped specialities) level or as groupings of smaller hospitals, depending on what was most appropriate for each NHS Board.

Sampling was done within strata to aim for sufficient responses to achieve a reasonably reliable result for each defined area.

2.2 Weighting

Results at Scotland, NHS Board and (in some cases) hospital level were weighted in order to account for the unequal probability of selection. Unweighted results at strata level (including some hospital level results) were made available to NHS Boards.

Weights were calculated for each question. They were calculated as the number of respondents in a strata (for the relevant question) as a proportion of the total number of patients eligible for inclusion in that strata.

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[1] Defined as one night or more where the individual was in hospital at midnight in an inpatient bed.

Weighting the results in this way provided results more representative of the population than would be the case if all strata (small and large) were given equal weighting in the calculation of aggregate results.

3. Weighting Review

Feedback from a UK Statistics Authority[2] (UKSA) review of the Care Experience Survey publications prompted a review of the weighting methodology employed by the Health and Care Experience Survey. Details of the weighting review that was carried out for this survey, including final recommendations, can be found at www.gov.scot/Resource/0053/00533823.pdf.

Following this review, and publication of the 2017/18 Health and Care Experience survey results, a similar approach is being considered for each of the other Care Experience surveys, including the Inpatient Experience survey.

4. Methodology Applied to 2017/18 Results

The recommendations from the Health and Care Experience survey review were adapted for appropriate use on the Inpatient Experience survey. The final weighting methodology applied is detailed here:

One weight will be calculated for sections of the questionnaire, rather than one weight per question. This will be done on the following basis:

Section	Relevant Questions in 2017/18
Population total	1, 3 ,9 – 23, 29 – 32, 36 – 38, 43 - 45
Non-emergency admissions	2
Emergency admissions	4 – 8
Had an operation or procedure	24 – 28
Were delayed when leaving hospital	33 – 35
Received care and support services on leaving hospital	39 – 42

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[2] www.statisticsauthority.gov.uk/

The weight for each section will be calculated in two steps:

1. **Weight for unequal probability of selection** by weighting respondents up to the total population in each strata as is currently done.

2. **Weight for non-response** by weighting up to the entire population **using** the service based on **age** and **sex**.

   a. The total number of people in the inpatient population will be the total number of people in the sampling frame for the survey (taken from the SMR01[3] database).

   b. The total number of people who were non-emergency admissions, emergency admissions and who had an operation or procedure will also be derived from the SMR01 database.

   c. The estimated population totals for people who were delayed and who required care and support on leaving hospital, will be based on the proportions of the relevant 2017/18 survey responses at a national level, applied at all levels of reporting.

   d. Respondents will be assigned to one of 7 age groups (16-24; 25-34; 35-44; 45-54; 55-64; 65-74; 75+) based on their age in the CHI database. This will be used for the weighting calculations and analysis of responses by age.

   e. The sex of each respondent will be taken from the CHI database, rather than gender as reported in the survey (Q49), to ensure the weighting calculations are not impacted by missing data.

Survey results will be published at National, Regional, NHS Board, Hospital and strata levels. The weighting methodology will be applied to all reporting levels with the following adjustments:

- **Regional/NHS Board Level** – As described but with five age categories (rather than the seven used at national level): 16-44; 45-54; 55-64; 65-74; 75+

- **Hospital Level (where hospitals are groups of strata)** - As described but with two age categories (rather than the seven used at national level): 16-64; 65+

- **Hospital Level (where hospitals aren't groups of strata) and Strata Level** – There is no need to calculate a weight for unequal probability of selection at this level. Instead, the weights should just equal the weight for non-response as described but with two age categories: 16-64 and 65+.

Trimming will be applied such that the maximum weight is calculated as:

$$\text{Mean} + (x * \text{Standard Deviation})$$

where x is an integer such that less than 5% of respondents have their weight trimmed for each reporting level.

In addition, in a small number of cases where the final weight is between 0 and 1, the weight has been set to 1.

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[3] ISD's Scottish Morbidity Register database (SMR01) of hospital admissions

5. Impacts of Methodology Applied to 2017/18 Results

The change in methodology will have an impact on the results as the relevant population is being better represented by the new methodology. For example, analysis has shown that, generally, older people are more likely to report a positive experience and we know that older people are also more likely to respond to the survey – this weighting will help to redress this balance.

Results from the 2017/18 Inpatient Experience Survey will be published in August 2018 via a national report and an interactive dashboard, available at www.gov.scot/Inpatientsurvey. These results will have the weighting methodology described in Section 4 applied **at all levels of reporting**. Time series figures for the 2014 and 2016 surveys will be backdated where appropriate to ensure comparisons over time are available.

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