NHS patient survey programme

2017 Maternity Survey:

Quality and Methodology Report

Contents

Introduction

This report provides detailed information on key quality and methodological issues relating to the 2017 Maternity Survey. It covers the development, implementation and analysis of the survey, as well as the quality of the data and any points that should be noted when using the outputs. More details on the development of the survey and errors made during the sampling process can also be found on the NHS Surveys website.

An overview of our approach to quality within the NHS Patient Survey Programme (NPSP) is available in the 'NHS Patient Survey Programme: Quality Statement' document, available here.

Survey development

Survey design and implementation

The NHS Patient Survey Programme adopts general principles of good survey practice. The programme has implemented a number of measures to help maximise response rates, including:

- o Development of survey questions that are relevant to all, or most, people in the sample.
- o Questionnaires written using simple and clear language.
- o Use of cognitive interviewing to test questions and response options with people who have recently used NHS services, in order to ensure that they are easily understood and relevant.
- o Reassurances of anonymity and confidentiality.
- o Sending up to two reminders to non-responders.
- o Long fieldwork periods to encourage lesser-heard groups, such as minority ethnic groups, to respond.
- o A Freephone language line providing translation services.
- o Contact details for Mencap which offers support for people with learning difficulties.
- o Use of a Quality Assurance Framework ensuring all survey materials and results are reliable and accurate.

Like most surveys in the NHS Patient Survey Programme, the Maternity Survey uses a postal survey mode whereby a questionnaire is sent to patients' home addresses. This aims to reduce the effects of social desirability bias, which can arise when people give feedback either directly to staff, or while on trust premises.

A number of steps are taken to ensure the quality of the survey design and implementation. As with all surveys in the programme, an external advisory group is consulted to ensure that a range of stakeholders are given the opportunity to provide input during survey development. Membership includes representatives from CQC, NHS England, Department of Health, NHS trusts, the National Childbirth Trust and the National Perinatal Epidemiology Unit. Questionnaires are also cognitively tested with recent mothers, as described in the 'Questionnaire development' section below.

There were two minor changes to the survey methodology in 2017:

1) In order to streamline the process by which samples are signed off, the sample declaration form was redesigned in Excel. This enables a sample to be signed off electronically by the sample drawer and Caldicott Guardian at the trust.
2) In line with the protocol adopted across the other surveys in the programme, trusts were required to submit both sample and mailing data as one file to their contractors.

Further information about these methodological changes can be found in the [survey development report](#).

All surveys follow a strict methodology, as specified in the [survey instruction manual](#) which all trusts (or the contractors they appoint to run the survey on their behalf) must follow. Any deviation from the survey instructions, depending on severity, may result in data being excluded from published results. Any decision to exclude data is made by the Surveys Team at CQC in conjunction with the Survey Coordination Centre, based on discussion with, and evidence provided by, the trust(s). No trusts were excluded from the 2017 Maternity Survey publication.

Questionnaire development

Following consultations with key stakeholders and analysis of the 2015 survey results, four new questions were added to the 2017 questionnaire, three existing questions were amended, and two questions were removed. Prior to fieldwork, this re-developed questionnaire was cognitively tested with 18 women who had given birth within the previous year. Respondents completed a questionnaire with a researcher to check that the questions and responses options were appropriate and were being understood as intended. The testing took place across Oxford, and women of mixed ages and ethnic groups took part, including women whose first language was not English. Interviews were carried out in three rounds, with alterations made to certain questions between rounds in accordance with feedback from participants and stakeholders.

For more information about the cognitive testing process and amendments made to the 2017 survey please see the [survey development report](#).

Sampling and fieldwork

Sampling

All trusts that provide maternity services and have a sufficient number of births were eligible to take part in the survey[1]. In total, 130 trusts participated in the 2017 survey.

Women were eligible for the survey if they had a live birth during February 2017, were aged 16 years and over at the time of delivery, and gave birth under the care of an NHS trust (including home births). Fifty-three trusts with fewer than 300 eligible deliveries in February were required to also include women who gave birth in January 2017, beginning with deliveries on 31st January and working backwards until a sample size of 300 was achieved or January 1st was reached. Trusts were required to compile their sample according to strict eligibility criteria.

Fieldwork for the survey (the time during which questionnaires were sent out and returned) took place between April and August 2017. This approach allowed for the six-week postnatal period to have concluded by the time fieldwork commenced, which is important because a number of questions in the questionnaire relate to postnatal care. Further information about the sampling process is available in the [sampling handbooks](#).

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[1] Trusts with fewer than 300 live births in January and February 2017 took part voluntarily.

Sampling error

The Maternity Survey's minimum sample size of 300 was set to ensure that samples would be large enough to remain robust while still including trusts with smaller throughputs of women during the sampling period.

Larger samples are associated with greater confidence in results which are more representative of the target population's true value. Larger samples also provide data subject to less sampling error than for smaller samples. Over 18,000 people responded to the 2017 Maternity Survey, ensuring that sampling error is sufficiently small.

Trust mergers

The results for England are based on an average of the pooled results from all participating trusts. Changes in the number of participating trusts have a very small effect on the results for England. However, when reporting individual trust results it would be inaccurate to display historical data if a trust has undergone a merger since the previous survey which makes trust's results incomparable with previous years'.

There was one trust merger in 2017: Chelsea and Westminster Hospital NHS Foundation Trust (RQM) acquired West Middlesex University Hospital NHS Trust (RFW). As such, this merged trust did not receive historical comparisons in 2017. There was also a merger between Birmingham Women's and Birmingham Children's NHS Foundation Trusts, but as no deliveries occur at the Children's trust, comparisons to results from previous years were still able to be made.

Errors in drawing samples

The chances of sampling mistakes being made by trusts (for example, excluding certain eligible women) are minimised by multi-stage sample checks. Firstly, trusts are provided with a checklist to review their sample. Trusts that appoint an approved contractor[2] to undertake the survey on their behalf will then have their sample reviewed by their contractor. Finally, all anonymised samples are checked by the Survey Coordination Centre which looks for errors that are more noticeable when pooling data together, such as unusual or skewed age distributions.

During the Coordination Centre's sample checking process, several items are checked against the previous year's submission to help ascertain whether a trust has followed the guidelines correctly. These include comparisons of population size, and demographics such as age, ethnicity and place of birth. If there are any concerning discrepancies, queries will be raised with the contractor working on behalf of the trust or, in the case of in-house trusts, with the trust directly.

Errors identified from these checks are classified as either minor or major. A minor error is defined as a mistake that will not affect the usage or quality of the survey response data. One example of a minor error is applying patient record numbers in an incorrect format. Minor errors can be rectified by the trust, contractor or the Coordination Centre as appropriate, without the need for the sample to be redrawn or patients to be added or replaced.

A major error is defined as an error that will affect the usage or quality of the response data. An example of this type of error is the exclusion of home birth patients, which potentially creates bias

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[2] These are companies that have been approved by the CQC during a competitive tendering process to carry out surveys in the NHS Patient Survey Programme on behalf of trusts. For more information please see: http://www.nhssurveys.org/approvedcontractors

in the sample. If a major error is spotted during sample checking, the trust is required to totally redraw their sample or add/remove patients as appropriate.

A sampling errors report is produced each year and is published on the NHS surveys website. Trusts and approved contractors are encouraged to review this report to minimise the recurrence of previously detected errors. As detailed in the 2017 report there were seven major errors and 40 minor errors identified in samples submitted to the Coordination Centre for this survey.

A sample declaration form, which trusts must complete prior to submitting their sample, is used to help further reduce sampling errors. This form outlines a number of required checks to ensure that the sampling instructions have been followed. It also helps to confirm that trusts have maintained patient confidentiality by taking the steps laid out in the instruction manual, such as only sharing the required variables. Approval of this form by the trust's Caldicott Guardian prior to data submission not only fulfils the trust's requirements under the Data Protection Act, but also reduces the potential for breaches to the support received under Section 251 of the NHS Act 2006.

We have explored the way in which trusts input data for patients before it is used to create survey samples, in order to identify the level of risk for error at that stage. This is outlined in the Statement of Administrative Sources, available on the CQC website here. It was concluded that, although the potential does exist for inaccurate addresses or coding of cases at this stage, this is unlikely to occur due to the data quality requirements placed upon NHS trusts. As a result, the chances of such errors occurring at this stage are small enough that any impact on trust results is likely to be minimal, and in turn, would have an even smaller impact on the aggregated results for England.

Historical sampling errors and excluded trusts

Part of the Coordination Centre's sample checking process involves comparing a trust's sample data to their samples from previous iterations of the survey and investigating any discrepancies. This can sometimes reveal errors in samples from previous years, which only become apparent when comparing with the current year's sample[3]. If these are classified as major errors, historical comparisons between the current and previous years may not be possible for the trust in question.

The Coordination Centre checked each trust's 2017 sample against their 2015 (and sometimes 2013) sample. In total, six trusts were found to have made major errors in their 2015 and/or 2013 sample, all of which involved incorrectly excluding eligible women such as home birth patients. These trusts were excluded from any trust-level historical comparisons produced for the 2017 survey, and their 2015 and/or 2013 results were removed from the NHS Surveys website. The six trusts in question were:

o RA9 – Torbay and South Devon NHS Foundation Trust
o RD8 – Milton Keynes Hospital NHS Foundation Trust
o RJC – South Warwickshire NHS Foundation Trust
o RN5 – Hampshire Hospitals NHS Foundation Trust
o RTG – Derby Teaching Hospitals NHS Foundation Trust
o RWH – East and North Hertfordshire NHS Trust

For more information about the historical errors identified in the 2017 survey please see the sampling errors report.

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[3] Whilst the Coordination Centre undertake robust checks on the sample, it is not always possible to identify all sampling errors from the sample declaration form and anonymised sample file. Therefore some errors are identified retrospectively when checking the current year's data. It remains the responsibility of trusts to ensure samples are drawn correctly and that all inclusion and exclusion criteria have been correctly applied.

No trusts were excluded from the 2017 survey as a consequence of sample checking or analysis of the final data.

Data analysis and reporting

Data cleaning and editing

Survey data from each participating trust - whether conducting the survey themselves in-house or using an approved contractor[4] - are submitted to the Coordination Centre for cleaning. During fieldwork, a data cleaning manual covering the cleaning that the Coordination Centre undertakes is published. This document allows participating trusts and contractors to understand and replicate the Coordination Centre's cleaning processes. Data are submitted to the Coordination Centre in Excel although the final dataset for the survey that is used by secondary data users and deposited to the UK Data Service (UKDS) is in SPSS.

There are a number of standard checks undertaken on the data. These include checking that:

o Hard copies of questionnaires from contractors and in-house trusts are correct, i.e. questions, response options, routing and instructions are as they should be.
o The number of rows of data (i.e. the number of patients) is as expected.
o The variable, question and response option wording matches the questionnaire.
o There are no out-of-range values in either sample or response data.
o Routing has been followed correctly, i.e. respondents have not answered a question that does not apply to them.
o All response coding falls within the expected range of response options for a question.
o Response data reflect the sample data, e.g. year of birth in the sample data matches the year of birth reported by the respondent.
o Only eligible women were included in the survey.

The data are also checked for a number of other, more in-depth, errors. This includes looking at questionnaire item non-response, which can indicate if a question is not necessarily being understood in the way it has been designed. In addition, high levels of missing data on suites of questions that are positioned next to each other can indicate an issue with page turnover.

When data are suppressed for a question, which occurs when there are fewer than 30 responses for a trust, this is cross-referenced against the raw Excel data submitted by a trust to confirm that the suppression was correctly applied. When a trust has a low response rate, the data are also checked against the sample for representativeness (in terms of demographics), in order to determine whether the data should be included. There were no exclusions made for the 2017 data due to representativeness concerns.

When errors are found, trusts or contractors are asked to re-submit the data with corrections made. In 2017 one in-house trust was required to re-submit because they originally submitted cleaned rather than raw data. One contractor was also required to re-submit due to a partial misalignment of response data to sample data for one of their trusts.

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[4] In 2017 all but five participating trusts chose to use a contractor.

Statistical release

A [statistical release](#) has been published which provides full England-level results for the 2017 survey compared against the 2013 and 2015 surveys, and a multi-level analysis of subgroups. This is published on the CQC website.

The data are weighted in order to control for the influence individual trusts' response rates have on the England-level average[5]. For questions that are comparable (i.e. unchanged) across survey years, comparisons were made using z-tests to determine whether differences between years were statistically significant.

The multi-level analysis of subgroups highlights the experiences of different demographic sub-populations. Results for each demographic subgroup are generated as adjusted means (also known as estimated marginal means or population marginal means) using a linear mixed effects model. These means are compared across themes, derived from composites of results from specific questions. This model takes into account trust-level effects, as trusts are likely to have an effect on reported patient experience at an England-level.

To assess whether experiences differ by demographic factors, F-tests were performed on each factor (fixed effect) as a predictor of the target variable. P-values were generated to show the likelihood of the observed differences between groups arising from a population where no actual differences occur. They relate to the demographic factor as a whole rather than to comparisons between specific categories within the factor. Predictor variables were checked for multicollinearity to ensure coefficients could be accurately estimated.

Differences of at least 0.1 standard deviations from the overall mean of the target variable are treated as being noteworthy.

For the 2017 survey the following demographic subgroups were analysed:

- o Age
- o Ethnicity
- o Religion
- o Sexual orientation
- o Long-term health conditions
- o Parity
- o Type of delivery
- o Stirrups usage
- o Named midwife status

The themes of patient-centred care against which these subgroups were compared are as follows:

- o Choice: B4, B7, F1
- o Information sharing: B6, C1, C17, D6, F13, F16
- o Involvement: B16, C11, C18
- o Compassionate care: B12, F12, F9, D7, F17
- o Breastfeeding support: E1, E4, E5, E6
- o Individual questions: C19

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[5] More information on the weighting approach applied to the data can be found in the 'Addressing non-response bias in the survey results' section of this report.

Trust results

Analysis is conducted on the data at trust level to allow comparisons to be drawn between the performances of different trusts for individual questions in the survey. The method for this analysis is detailed in the technical document.

The results of this analysis are published in benchmark reports for each individual trust. Three types of benchmark reports are produced, one for each section of the questionnaire: antenatal care, labour and birth, and postnatal care. All trusts receive a report containing their labour and birth results. Trusts also receive an antenatal and/or postnatal report as long as they completed the attribution exercise[6] and received enough responses from women who received antenatal and/or postnatal care from the trust.

To score questions, each response option is assigned a score (from 0-10), and composite section scores are then produced by grouping similar questions together. Demographic questions, non-specific responses, some routing questions and other questions that do not evaluate a trust's performance are not scored. A scored version of the questionnaire can be found here.

A trust's question score is calculated by taking the weighted average[7] of responses for the trust, for the given question. A chart is produced for each scored question and each section of the questionnaire, unless a question has fewer than 30 responses[8]. These charts show the overall range of trusts' scores for a question, broken down into three parts (where a black diamond indicates the score of the trust in question):

o If the black diamond lies in the orange section of the graph, the trust result is 'worse' than expected when compared with most other trusts in the survey.
o If the black diamond lies in the green section of the graph, the trust result is 'better' than expected when compared with most other trusts in the survey.
o If the black diamond lies in the grey section of the graph, the trust result is 'about the same' when compared with most other trusts in the survey.

Tables are also produced for the benchmark reports, giving the trust's score, the range of scores for each section and question, and the number of responses to each question. An additional table in the labour and birth reports shows the number of respondents, response rate, and demographic information at trust-level and for all respondents across England[9].

Historical comparisons are made, where possible, against the 2015 survey. Arrows next to comparable questions indicate where the 2017 score is significantly higher or lower than the 2015 score. No arrow reflects no statistically significant change.

NHS Outcomes Framework

Six questions from the 2017 survey contribute to the NHS Outcomes Framework managed by NHS Digital for the Department of Health (B6, B14, C14, C18, D6 and E6). These support indicator 4.5

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[6] See the 'Attribution data' section of this report for further details.

[7] Weighting the responses adjusts for variation between trusts in age and parity.

[8] If a question has fewer than 30 responses for a given trust, the confidence interval around the trust's question score is considered too large to be meaningful and results are not reported. Additionally, for any such question, the trust is excluded from England averages and is not given a section score.

[9] England figures are calculated using survey data from all trusts - these figures refer to the sampled population, which may have different characteristics to the population of England.

"Improving women and their families' experience of maternity services". More information is available at: http://content.digital.nhs.uk/nhsof

Quality assurance

Approved contractor / in house trust checks

Each contractor and in-house trust undertakes a series of checks at key stages of the survey, especially the sample preparation and data cleaning stages. These checks are to identify any obvious errors in the sample and response data, such as inclusion of ineligible patients or incorrect coding. Validation checks are also undertaken on mailing information in order to determine whether the patient's address is complete enough for a survey to be sent.

Coordination Centre checks

There are a number of quality assurance (QA) checks undertaken by the Coordination Centre at various stages of the survey. The first QA checks are on the sample files submitted by either contractors or in-house trusts. These checks help to determine whether there are any errors in the sample file, such as the exclusion of eligible patients.

The Coordination Centre also checks hard copies of the covering letters and questionnaire used by in-house trusts and contractors. This can help to identify if any errors have been introduced when the survey documents are reproduced. Errors are usually typographical in nature, such as misspelt or missing words, improper use of emboldening (which is normally used to highlight key words), and misworded or missing response options. If an error is identified that would compromise the data collected, the Coordination Centre asks the contractor or in-house trust to rectify the error and resubmit their hard copies. However, if mailings have already commenced, the data for the question containing the error would be excluded from the final dataset and outputs for the affected trusts. There have been no exclusions made on this basis for the 2017 survey.

During fieldwork the Coordination Centre monitors the weekly progress of the mailings and response rates both at England and trust-level. This is important because low response rates can limit the representativeness, and therefore usability, of the data. In addition, the survey needs to be administered using a standardised approach with a set number of mailings during fieldwork, and a particular deadline for the final mailing. This is to allow groups that tend to respond late in surveys to have sufficient time to respond. If any concerns about the progress of the survey are identified, the Coordination Centre will investigate the reasons for this.

The final set of QA checks undertaken by the Coordination Centre focuses on the response data and analysis. In addition to the specific checks of the survey data, as outlined in the 'Data cleaning and editing' section above, each stage of the data cleaning is second-checked internally.

All analysis outputs based on the data (such as the trust-level results and England-level reporting) go through a two-stage quality assurance process, checked by both the Coordination Centre and CQC.

Data limitations

Context

As with any survey, statistical analysis of data from the Maternity Survey is susceptible to various types of error from different sources. Potential sources of error are carefully controlled through development work in terms of questionnaire design and sampling strategy, which is in turn supported by quality assurance at every stage of the survey.

Seasonal effects

All women included in the Maternity Survey gave birth in February (and also January for smaller trusts), and will therefore have received their antenatal and postnatal care at similar times of the year to each other. There may therefore be some seasonal effects on responses – for example if staffing levels or birth rates differ throughout the year. However, as the sampling period is the same for all trusts and across all years the survey has run, any such seasonal variation would not impact on the comparability of the data or its use in assessing the performance of trusts.

Attribution data

Trusts are asked to provide information on whether the women in their sample also received their antenatal and/or postnatal care from the trust. This enables us to better attribute women's responses to certain sections of the questionnaire to the trust at which they gave birth, and therefore increase the accuracy of the data provided to trusts in their benchmarking reports. However, the attribution information provided by trusts has several limitations, and as such the data from the antenatal and postnatal sections of the questionnaire cannot be considered as statistically robust as the data from the labour and birth sections, as explained below.

- As attribution data are provided voluntarily, it cannot be considered representative for all trusts in the survey; only trusts that completed the exercise can be compared. Trusts are only identified as being 'better' or 'worse' within the subset of trusts that completed the exercise, therefore it is not a true benchmark for performance across England.
- For trusts that do not keep electronic records of antenatal and postnatal care, attribution is based on the residential location of respondents. Therefore it is not possible to identify whether women received care from a different provider for reasons such as requiring specialist care or moving home. This may mean that some respondents are included in the data despite having received care from another trust.
- Several trusts that use residential location of respondents to estimate care provider experience improvements in electronic records between survey years. Particular care should therefore be taken when interpreting historical changes in trust results, as it is possible that these may be affected by the increased accuracy of the respondent sample.
- Trusts complete the attribution exercise themselves, and due to the limitations of this process the Coordination Centre are unable to verify the accuracy of the information. This means we cannot be certain about the reliability of the attribution data.

Response rates

Response rates for the Maternity survey have dropped since it was first launched, from 59% in 2007 to 37% in 2017. This is consistent with other surveys in the NHS Patient Survey Programme

and with industry-wide trends in social and market research. Figure 1 below illustrates response rate trends for the more established surveys in the NHS Patient Survey Programme[10]. As shown, there is a clear downwards trend across all surveys.
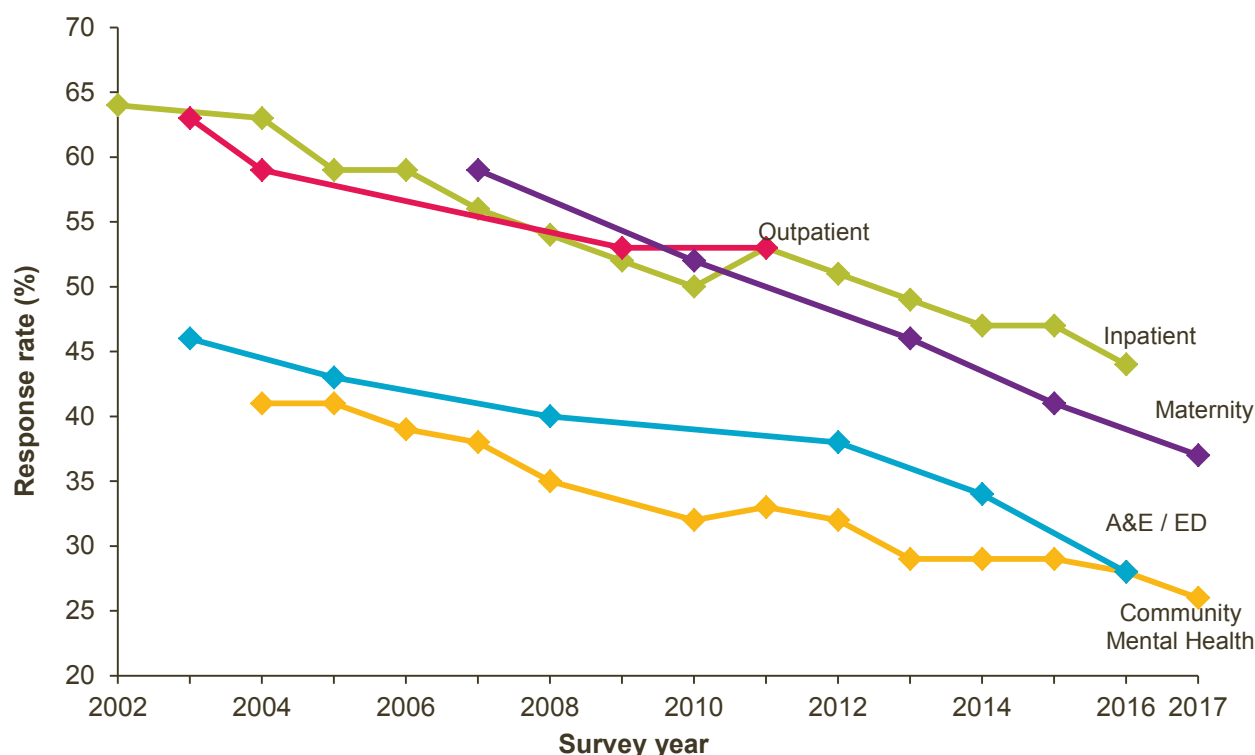

Figure 1: Response rates for established surveys in the NHS Patient Survey Programme

The Coordination Centre conducts pilot work to test different approaches aimed at increasing response rates. For example, four interventions were piloted alongside the 2017 Community Mental Health Survey, with results indicating that redesigned covering letters and a redesigned questionnaire were most effective at increasing response rates. The Coordination Centre has previously made changes across the survey programme as a whole on the basis of similar pilots.

Non-response bias

One of the main issues that can affect survey results is non-response bias, and as response rates for surveys decline, the risk of non-response bias increases. Non-response bias refers to the risk that those who chose to respond to the survey are different from those who chose not to respond. This type of bias would arise, for example, if women with more positive views of their care were to be more likely to respond that those with negative views. However, whether non-response bias is present is difficult to assess, as we do not have any way of knowing how those people who did not respond would have answered.

A further issue is that we cannot always differentiate between those who did not receive a questionnaire and hence could not respond, versus those who received a questionnaire but chose not to respond. The number of questionnaires that are returned undelivered are logged during the

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[10] Please note that not all surveys are carried out annually.

course of the survey. However, there may be another group of women who, for example, changed address but not inform the trust, and therefore did not receive a questionnaire. It is not possible to know how large this group is.

Furthermore, patient confidentiality prevents the Survey Coordination Centre from assessing the data quality of the samples that were drawn, as they do not have access to the name and address details of those in the sample population.

Research, including work carried out as part of the NHS Patient Survey Programme, has shown that certain groups are consistently less likely to respond, including young people, black and minority ethnic groups (BME), and people from deprived areas[11][12][13].

Tables 1 and 2 below show that age and ethnic group response biases exist in the Maternity Survey. Table 1 shows responders and non-responders, while Table 2 shows the demographic profile for respondents and for the sample as a whole (everyone selected for inclusion in the survey). It can be seen that older mothers are more likely to respond compared with other age groups, and women who identify as white are more likely to respond than those from other ethnic groups. When interpreting these tables please bear in mind that it is likely that there are also inter-relationships between these groups.

Table 1: Responders and non-responders to the 2017 Maternity Survey by key demographics

Demographics	Responded (%)	
	Yes	**No**
Age		
16-18	13%	88%
19-24	20%	80%
25-29	32%	68%
30-34	42%	58%
35 and over	47%	54%
Ethnicity		
White	39%	61%
Mixed	30%	70%
Asian or Asian British	28%	72%
Black or Black British	27%	73%
Arab or other	31%	69%
Not stated or missing	42%	58%

Note: Percentages are rounded to the nearest whole number - group totals may add up to more than 100%.

[11] http://www.nhssurveys.org/Filestore/documents/Increasing_response_rates_literature_review.pdf

[12] http://www.nhssurveys.org/Filestore/documents/Review_BMEcoverage_HCC_surveys.pdf

[13]
http://www.nhssurveys.org/Filestore/documents/Increasing_response_rates_stakeholder_consultation_v6.pdf

Table 2: Sample versus respondent demographic profile for the 2017 Maternity Survey

Demographics	Sample	Respondent
Age		
16-18	1%	0%
19-24	13%	7%
25-29	26%	22%
30-34	33%	37%
35 and over	27%	34%
Ethnicity		
White	71%	74%
Mixed	2%	1%
Asian or Asian British	11%	8%
Black or Black British	4%	3%
Arab or other	3%	3%
Not stated or missing	10%	11%

Note: Percentages are rounded to the nearest whole number - group totals may add up to more than 100%.

Please note that Tables 1 and 2 are based on information from trust sample files[14] only, and will therefore differ from response rates published elsewhere which are compiled from response information, or sample information if a response is missing. We cannot use respondent-provided information to calculate response rates, as the corresponding information is unavailable for non-responders. When calculating response rates, women who have died (or whose baby has died) and anyone for whom the questionnaire was undeliverable, are removed from the base.

Addressing potential non-response bias in the survey results

We have considered the application of non-response weighting to the survey results for both the England data and the trust-level results. However, in considering whether to weight for non-response and whether this should be according to either the sample or population data, we need to factor in the primary aim of why the survey data are being collected.

For the majority of social research studies, in particular those that are cross-sectional or general population studies, non-response is weighted for against the target population demographics. This is normally achieved by weighting for key characteristics such as age, gender, marital status and socio-economic status, if this auxiliary data exist on the sampling frame. Re-weighting is used to eliminate, or at least reduce, total non-response bias. In a non-response approach, a model is developed to estimate unknown response probabilities with weights adjusted to the estimated response probabilities. Units with the same characteristics and the same propensity to respond are grouped together to protect against model insufficiency[15]. Alternatively, if an England-level dataset exists for these key characteristics, such as the census for national population estimates, then this can be used in deriving the weighting approach. The reason why weighting back to the population is key for these studies is that they are looking to make generalisations about a population as a whole rather than individual cases or sampling units within it.

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[14] Trust sample files contain all people selected to take part in the survey and include information such as age, date of delivery, place of delivery, and ethnicity.

[15] http://www.statcan.gc.ca/pub/12-539-x/2009001/response-reponse-eng.htm.

Trust-level benchmark analysis

For the NHS Patient Survey Programme, the data collected are used for measuring and comparing the performance of individual NHS trusts. Therefore it is important that we are able to distinguish between the characteristics of different trusts (i.e. the variation between them) to identify those trusts that are doing better or worse than the 'average' trust. As demographic characteristics such as parity (whether or not a woman has given birth previously) and age are known to be related to responses, we therefore standardise different organisations to a common average case-mix when calculating organisational results. This removes demographic differences as a source of variation and provides a 'level playing field' for comparing providers. Weighting for non-response to either an England-level population dataset or back to the sample data for a trust would not achieve this.

Differences between trust populations in the Maternity Survey are partly addressed via standardising by age and parity in the trust-level results[16]. Standardising by ethnicity would in theory also improve comparability, however whether to do this is subject to a number of considerations detailed below.

o   The more variables included in the standardisation, the more complex the analysis becomes. It also greatly increases the risk of having very small groups with large weights.

o   In order to weight by a certain variable, we need to have information for that variable for each respondent. Information for age and parity is largely complete, with only very few, if any, missing cases for these variables. In 2017, all respondents had age information (taken from response data, or sample data if response data were missing), and parity information was only missing for 167 respondents (0.9%). However, ethnicity information (which is only taken from response data due to data quality concerns about sample data) is less complete. If we were to additionally standardise by ethnicity, we would have to remove 696 people from the analysis in 2017, which is not desirable, particularly in a survey with already low response rates.

o   Some trusts have very low proportions of people in some ethnic groups. As weights are capped to avoid heavy weighting, this would lead to many respondents having capped weights. This should be avoided as far as possible when standardising data as it limits the comparisons that can be made.

o   Standardising by ethnicity should also be avoided as it would risk standardising out genuine differences in experiences across the subgroups.

Furthermore, it should be noted that direct assessment of non-response bias upon survey data is difficult to measure due to the obvious ethical implications of acquiring such data. This would require further contact with patients who do not wish to be contacted. Rather than further adjusting the data, this issue is managed by adopting best-practice methodologies so as to maximise response rates from all groups, as discussed in the 'Survey design and implementation' section of this report.

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[16] For more information on the methodology for the trust-level results, please see the technical document which is referenced in the 'Further Information' section at the end of this document.

Results for England

Some trusts have a higher response rate than others and would therefore have a greater influence over the England average if a simple mean was calculated across all respondents. To avoid this, 'trust' weights are applied to the England-level data. Doing so means that each trust has an equal influence over the England average for each question, regardless of differences in response rates between trusts.

Additional 'population' weights were also introduced for the first time in the 2017 survey, with the aim of reducing potential non-response bias. This involved weighting by age groups so that the weighted proportions in each age group in the respondent population match those in the sampled population. Increased weight is therefore given to groups that had lower propensity to respond. A single population weight was computed for each respondent.

As the 2017 England-level results present trend comparisons across surveys from 2013 to 2017, it was also necessary to weight the historic data in the same way as for the current year. Population weights and trust weights were multiplied together to produce a single, combined weight for each question and this was applied when generating the national tables for England[17].

Assuming that responses were missing at random, weighting each trust's results to their eligible population in this way theoretically makes the trust's results more representative of their population, thus potentially yielding a more accurate experience of the average trust. However, it is not possible to check the extent to which this 'missing at random' assumption is satisfied.

The introduction of non-response weights to the England-level results is a 'design effect' that reduces the precision of statistics from the survey. This has been taken into account for year-to-year comparisons. The design effect can be estimated as the following, where w_i is the weight for respondent i.

$$DEFF = \frac{n_{total} * \left[\sum_i w_i^2\right]}{[\sum_i w_i]^2}$$

This is then used to adjust the alpha value for the tests of column proportions in national tables for England, using alpha_new = 2-tailed probability for a result at least as extreme as |1.95996398454 x $\sqrt{DEFF}$|.

This weighting has been applied to the England-level results for all except the demographic questions. These questions are presented without weights applied, as it is more appropriate to present unadjusted data that describe the demographic profile of respondents, rather than average figures.

Data revisions

CQC publishes a Revisions and Corrections Policy relating to these statistics. This policy sets out how CQC will respond if an error is identified and it becomes necessary to correct published data and/or reports. The NHS Patient Survey data are not subject to any scheduled revision as the surveys capture the views of patients about their experiences of care at a specific point in time. All new survey results are therefore published on CQC's website and the NHS Surveys website, as appropriate, and previously published results for the same survey are not revised.

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[17] As this approach was new for 2017, the England-level results for the 2013 and 2015 Maternity Surveys will differ slightly from the 2013 and 2015 trend comparison results in the 2017 England-level results.

Further information

The England-level and trust-level results can be found on the CQC website. You can also find a 'technical document' here which describes the methodology for analysing trust-level results:

http://www.cqc.org.uk/maternitysurvey

Results from previous Maternity Surveys that took place in 2007, 2010, 2013 and 2015 are available at the link below:

http://www.nhssurveys.org/surveys/299.

Full details of the methodology for the survey, including questionnaires and covering letters, instructions on how to carry out the survey, and the survey development report, are available at:

http://www.nhssurveys.org/surveys/1055.

More information on the NHS Patient Survey Programme, including results from other surveys and a programme of current and forthcoming surveys, can be found at:

http://www.cqc.org.uk/surveys

Feedback

We welcome all feedback on the survey findings and the approach we have used to report the results, particularly from people using services, their representatives, and those providing services. If you have any views, comments or suggestions on how this publication could be improved, please contact Paul Williamson, User Voice Development Manager, at patient.survey@cqc.org.uk.

The information you provide will be reviewed by CQC and used, as appropriate, to improve the statistics that we publish across the NHS Patient Survey Programme.