2018 Maternity Survey:

Quality and Methodology Report

Contents

Introduction

This report provides detailed information on key quality and methodological issues relating to the 2018 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 detail on the development of the survey and errors made during the sampling process can also be found here: nhssurveys.org/surveys/1197.

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: cqc.org.uk/sites/default/files/20151125_nhspatientsurveys_quality_statement.pdf

Survey development

Survey design and implementation

The NPSP 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 all other surveys in the NPSP, the Maternity Survey uses a postal survey mode whereby questionnaires are 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, National Maternity Voices, National Childbirth Trust, Department of Health and Social Care, NHS trusts and maternity service users. Questionnaires are also cognitively tested with service users, as described in the 'Questionnaire development' section below.

There were three minor changes to the survey methodology in 2018:

1) The format and wording of the covering letters were altered following the success of the revised covering letters trialled as part of the 2017 Community Mental Health Survey pilot study.
2) In order to help reduce sample queries, the sample declaration form was amended to include free-text comment boxes and to ask for the total number of deliveries at the trust within the sampling period.
3) The instruction manuals were redeveloped in line with those introduced for the 2017 Inpatient Survey. The new manuals are designed to be shorter and more user-friendly.

Further information about these methodological changes can be found in the survey development report: nhssurveys.org/survey/2076.

All surveys follow a strict methodology, as specified in the survey handbook, which all in-house trusts[1] and approved contractors[2] must follow (see nhssurveys.org/survey/2071). 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 2018 Maternity Survey publication.

Questionnaire development

Following consultations with key stakeholders and analysis of the 2017 survey results, one new question was added to the 2018 questionnaire, one question was removed, and several changes were made to existing questions (both to question stem and response options) and instructions/notes. Prior to fieldwork, this redeveloped questionnaire was cognitively tested with 25 women who had given birth within the previous year. Respondents completed a questionnaire with a researcher to check that the questions and response options were appropriate and were understood as intended. The testing took place across five different counties, and women of mixed ages and ethnic groups took part. 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 2018 questionnaire please see the survey development report at: nhssurveys.org/survey/2076.

Sampling and fieldwork

Sampling

All trusts that provide maternity services and have a sufficient number of monthly births were eligible to take part in the survey[3]. In total, 129 trusts participated in the 2018 survey.

Women were eligible for the survey if they had a live birth during February 2018, were aged 16 years or over at the time of delivery, and gave birth under the care of an NHS trust (including home

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[1] These are trusts who have opted to carry out the survey themselves.

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

[3] Trusts with fewer than 300 live births across January and February 2018 took part voluntarily.

births). Trusts with fewer than 300 eligible deliveries in February were required to also include women who gave birth in January 2018, beginning with deliveries on 31st January and working backwards until either 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 2018. 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 instruction manual: nhssurveys.org/survey/2073.

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 17,500 women responded to the 2018 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.

There were two trust mergers since the 2017 survey. North West Anglia NHS Foundation Trust (RGN) formed from a merger between Peterborough and Stamford Hospitals NHS Foundation Trust (RGN) and Hinchingbrooke Health Care NHS Trust (RQQ). Manchester University NHS Foundation Trust (R0A) formed from a merger between University Hospital of South Manchester NHS Foundation Trust (RM2) and Central Manchester University Hospitals NHS Foundation Trust (RW3). These merged trusts did not receive historical comparisons in 2018.

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 a contractor 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 Survey Coordination Centre's sample checking process, several items are checked against the previous two years' submissions to help ascertain whether a trust has followed the guidelines correctly. These include comparisons of population size, year of birth, ethnicity and site code. If there are any concerning discrepancies, queries will be raised with the contractor or in-house trust as appropriate.

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 Survey 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 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 contractors are encouraged to review this report to minimise the recurrence of previously detected errors. As detailed in the 2018 report there were 16 major errors and 13 minor errors identified in samples submitted to the Survey Coordination Centre for the 2018 Maternity Survey (see nhssurveys.org/survey/2182).

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 Survey 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[4]. 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 Survey Coordination Centre checked each trust's 2018 sample against their 2017 and 2015 (and sometimes 2013) sample. In total, two trusts were found to have made minor errors in their previous samples. Nine major errors were also discovered in previous samples, and two of these

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[4] Whilst the Survey Coordination Centre undertakes 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.

errors were considered serious enough to warrant the trusts' exclusion from any trust-level historical comparisons produced for the 2018 survey. These two trusts were:

- o   RJ7 – St George's University Hospitals NHS Foundation Trust
- o   RWE – University Hospitals of Leicester NHS Trust

For more information about the historical errors identified during the 2018 survey please see the sampling errors report at nhssurveys.org/survey/2182.

No trusts were excluded from the 2018 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 in-house or via a contractor[5] - is submitted to the Survey Coordination Centre for cleaning. During fieldwork, a data cleaning manual is published (see nhssurveys.org/survey/2140). This document allows in-house trusts and contractors to understand and replicate the Survey Coordination Centre's cleaning processes. Data is submitted to the Survey Coordination Centre in an Excel file, although the final dataset for the survey that is used by secondary data users and deposited to the UK Data Service (UKDS) is an SPSS .sav file.

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

- 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 reflects 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 is 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 is 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 is 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 from the 2018 data due to representativeness concerns.

When errors are found, in-house trusts or contractors are asked to correct their data and resubmit. In 2018 one contractor was required to resubmit due to a partial misalignment of responses for the

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[5] In 2018 all but five participating trusts chose to use a contractor.

ethnicity question. Another contractor was also required to resubmit due to a scanning issue whereby responses had been recorded for a small number of questionnaires that had been returned blank.

Statistical release

A statistical release has been published which provides full England-level results for the 2018 survey compared against the 2013, 2015 and 2017 surveys, and a multi-level analysis of subgroups. This is published on the CQC website here: cqc.org.uk/maternitysurvey.

The data is weighted in order to control for the influence individual trusts' response rates have on the England-level average[6]. For questions that are comparable across survey years, comparisons were made using Z-tests to determine whether differences between 2017 and 2018 are statistically significant.

The multi-level analysis of subgroups highlights the experiences of different demographic sub-populations. Results for each demographic subgroup were generated as adjusted means (also known as estimated marginal means or population marginal means) using a linear mixed effects model. These means were compared within 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. 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, and with 95% confidence intervals that do not include the grand mean, are treated as being noteworthy.

For the 2018 survey the following demographic subgroups were analysed:

- o Age group
- o Ethnicity
- o Religion
- o Sexual orientation
- o Long-term health conditions
- o Parity[7]
- o Type of delivery
- o Stirrups usage
- o Named midwife status

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

- o Choice: B4, B7
- o Respect for patient-centred values, preferences and expressed needs: D7, C19
- o Shared decision making (antenatal): B16
- o Shared decision making (labour and birth): C18
- o Involvement of family and friends: C11, D8
- o Confidence and trust (labour and birth): C20
- o Confidence and trust (postnatal): F11
- o Feeding support: E3, E4, F15
- o Information, communication and education (antenatal): B6, B10

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

[7] Parity refers to whether or not a woman has given birth before.

- o Information, communication and education (labour and birth): C17, D6
- o Information, communication and education (postnatal): F14, F17
- o Availability of staff: C14, C16

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 here: cqc.org.uk/maternitysurvey.

The results of this analysis are published in benchmark reports for each individual trust, available here: nhssurveys.org/surveys/1363. Three types of benchmark reports are produced, one for each section of the questionnaire: antenatal care, care during 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[8] and received enough responses from women who received antenatal and/or postnatal care from their trust.

For certain 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: nhssurveys.org/survey/2132.

A trust's question score is calculated by taking the weighted average[9] 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[10]. 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.

An example of a chart is shown below.

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

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

[10] 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.

Also produced for the benchmark reports are tables 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[11].

Historical comparisons are made, where possible, against the 2017 survey. Arrows next to comparable questions indicate where the 2018 score is significantly higher or lower than the 2017 score. No arrow reflects no statistically significant change.

NHS England National Statistics for England

Six questions from the 2018 survey contribute to the Overall Patient Experience Scores as outlined by NHS England (B6, B16, C14, C18, D7, and E4). These support the NHS Outcomes Framework indicator "Improving women and their families' experience of maternity services". More information is available at: england.nhs.uk/statistics/statistical-work-areas/pat-exp/.

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 during the sample preparation and data cleaning stages. These checks help 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.

Survey Coordination Centre checks

There are a number of quality assurance (QA) checks undertaken by the Survey 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 Survey Coordination Centre also checks hard copies of the covering letters and questionnaire used by in-house trusts and contractors. This helps to identify whether 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 collected data, the Survey 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 each affected trust. There have been no such exclusions for the 2018 survey.

During fieldwork the Survey 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

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[11] 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.

administered using a standardised approach with a set number of mailings during fieldwork. If any concerns about the progress of the survey are identified, the Survey Coordination Centre will investigate the reasons for this.

The final set of QA checks undertaken by the Survey 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 QA process, checked by both the Survey 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 questionnaire design and sampling strategy, which is in turn supported by extensive QA 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 a similar time of year. 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 the same as previous maternity surveys, 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 for 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 benchmark 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 section, as explained below.

o As attribution data is provided voluntarily, it cannot be considered representative of 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.

o 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.

- o Trusts undergo 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.
- o Trusts complete the attribution exercise themselves, and due to the limitations of this process the Survey Coordination Centre is 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 decreased since it was first launched, from 59% in 2007 to 37% in 2017. This is consistent with other surveys in the NPSP and with industry-wide trends in social and market research. Figure 1 below illustrates response rate trends for the more established surveys in the NPSP[12]. The figure shows a clear downwards trend across all surveys.
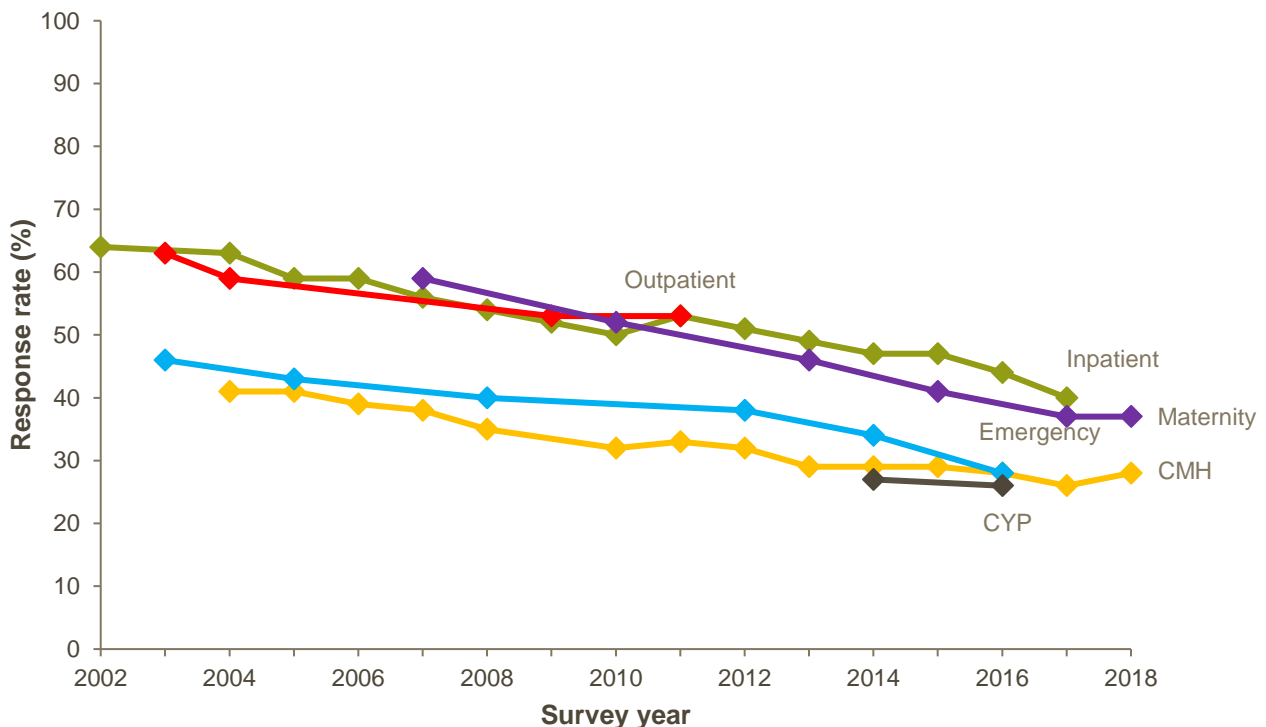

Figure 1: Response rates for established surveys in the NHS Patient Survey Programme

The Survey Coordination Centre conducts pilot work to test different approaches aimed at increasing response rates. Most recently, four interventions were piloted alongside the 2017 Community Mental Health (CMH) Survey, with results indicating that redesigned covering letters and a redesigned questionnaire were most effective at increasing response rates. The Survey Coordination Centre makes changes across the survey programme on the basis of such pilots. For example, the redesigned covering letters piloted during CMH 2017 were adopted for Maternity 2018, which may have contributed to the stabilisation in response rate between 2017 (37.4%) and 2018 (36.8%).

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

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 than those with negative views. However, whether and to what extent non-response bias is present is difficult to assess, as we do not have any way of finding out how non-responders 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. Although the number of questionnaires that are returned undelivered are logged during the course of the survey, it is possible that there is another group of women who did not receive a questionnaire because, for example, they changed address but did not inform the trust. Unfortunately, it is not possible to know how large this group is.

Research, including work carried out as part of the NPSP, 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[13][14][15].

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.

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[13] nhssurveys.org/Filestore/documents/Increasing_response_rates_literature_review.pdf

[14] nhssurveys.org/Filestore/documents/Review_BMEcoverage_HCC_surveys.pdf

[15] nhssurveys.org/Filestore/documents/Increasing_response_rates_stakeholder_consultation_v6.pdf

Table 1: Responders and non-responders to the 2018 Maternity Survey by key demographics

Demographic	Responded (%)	
	Yes	No
Age		
16-18	15%	85%
19-24	20%	80%
25-29	31%	69%
30-34	41%	59%
35 and over	46%	54%
Ethnicity		
White	38%	62%
Mixed	30%	70%
Asian or Asian British	27%	73%
Black or Black British	27%	73%
Chinese	41%	59%
Any other ethnic group	33%	67%

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

Table 2: Sample versus respondent demographic profile for the 2018 Maternity Survey

Demographic	Sample	Respondent
Age		
16-18	1%	0%
19-24	13%	7%
25-29	26%	22%
30-34	33%	36%
35 and over	28%	35%
Ethnicity		
White	80%	86%
Mixed	2%	2%
Asian or Asian British	10%	7%
Black or Black British	4%	3%
Chinese	1%	1%
Any other ethnic group	4%	1%

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[16] 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

Non-response weighting is currently applied to the England-level data, but not the trust-level data. 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 collecting the survey data.

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 exists 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[17]. 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.

Trust-level benchmark analysis

For the NPSP, the data collected is 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 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[18]. Standardising by ethnicity would in theory also improve comparability, however whether to do this is subject to a number of considerations as 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.

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

[17] statcan.gc.ca/pub/12-539-x/2009001/response-reponse-eng.htm.

[18] 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.

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 2018, all respondents had age information (taken from response data, or sample data if response data was missing), and parity information was only missing for 154 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 a further 470 people from the analysis in 2018.

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[19].

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.

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 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 2018 England-level results present trend comparisons across surveys from 2013 to 2018, 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[20].

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-

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[19] Potter F. (1990), A study of procedures to identify and trim extreme sample weights, Proceeding of the Survey Research Methods Section, American Statistical Association, pp.225-230.

[20] As this approach was new in 2017, the England-level data reported in the 2013 and 2015 Maternity Surveys will differ slightly from the 2013 and 2015 data reported in the 2018 England-level results.

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 describes 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 NPSP data is 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.

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:

cqc.org.uk/maternitysurvey

The England- and trust-level results from previous Maternity Surveys that took place in 2007, 2010, 2013, 2015 and 2017 are available at the link below:

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:

nhssurveys.org/surveys/1168.

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

cqc.org.uk/content/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 Tamatha Webster, 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 NPSP.