

Maternity Care Survey 2019

Technical Supplement

December 2020

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State Health Publication Number: (BHI) 200526-1

Suggested citation:

Bureau of Health Information. Technical Supplement – Maternity Care Survey 2019. Sydney (NSW): BHI; 2020.

Please note there is the potential for minor revisions of data in this report.

Please check the online version at **bhi.nsw.gov.au** for any amendments or errata.

Published December 2020

The conclusions in this report are those of BHI and no official endorsement by the NSW Minister for Health, the NSW Ministry of Health or any other NSW public health organisation is intended or should be inferred.

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NSW Patient Survey Program

The New South Wales (NSW) Patient Survey Program began sampling patients in NSW public health facilities from 2007. Up to mid-2012, the program was coordinated by the NSW Ministry of Health (Ministry). Responsibility for the NSW Patient Survey Program was transferred from the Ministry to the Bureau of Health Information (BHI) in 2012.

BHI has a contract with a survey vendor to support data collection, while BHI conducts all survey development and analysis.

The aim of the NSW Patient Survey Program is to measure and report on patients' experiences in public healthcare facilities in NSW, on behalf of the Ministry and local health districts (LHDs). The survey program is guided by the NSW Patient Survey Program Strategy 2019–22, which ensures that all patient surveys maximise benefits to patients and deliver unique value for the NSW health system.

This document outlines the sampling methodology, data management and analysis of the results of the Maternity Care Survey 2019.

For more information on how to interpret results and statistical analysis of differences between hospitals and NSW, please refer to the Guide to Interpreting Differences on BHI's website at bhi.nsw.gov.au/nsw_patient_survey_program

Maternity Care Survey

The Maternity Care Survey asks women who recently gave birth in a NSW public hospital about the care they received. This survey was mailed to women who attended a NSW public hospital and gave birth during their admission between January and December 2019.

The 2019 survey is the third undertaken, following surveys in 2015 and 2017.

For changes in the questionnaire content between the Maternity Care Survey 2017 and the Maternity Care Survey 2019, please refer to the development report on BHI's website.

Producing survey samples

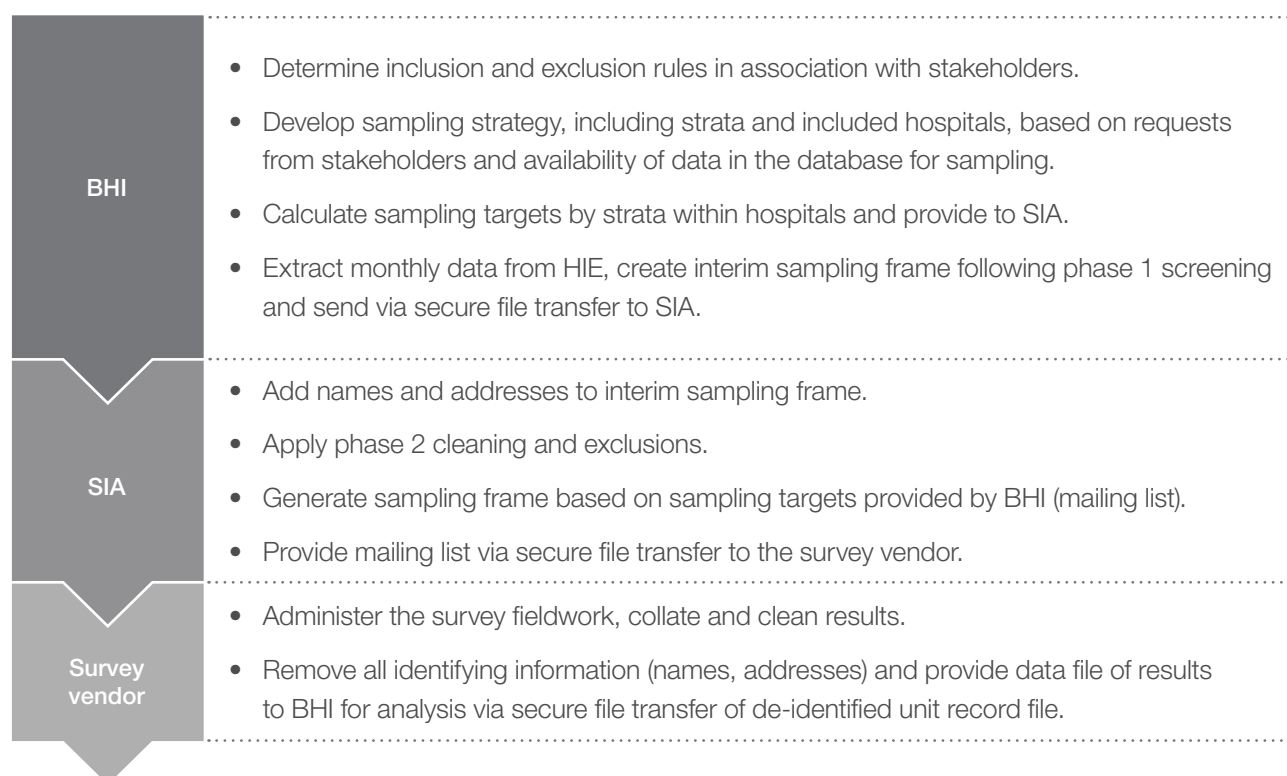
The NSW Patient Survey Program assures patients that their responses will be confidential and no identifying information will be given to the hospitals they attended. BHI does this through a number of mechanisms, including:

- data suppression (results for LHDs and hospitals with fewer than 30 responses are suppressed)
- reporting aggregated results
- anonymisation of patient comments
- segregation of roles when constructing the survey samples (Figure 1).

The sampling method for the NSW Patient Survey Program is a collaboration between BHI, the survey vendor and the Ministry's Systems Information and Analytics (SIA) branch (see Figure 1). NSW Health's Health Information Exchange (HIE) is the main source of data for the sampling frame.

BHI has access to de-identified unit record hospital data from selected tables of the HIE database. Use of an encrypted patient number allows de-duplication of patients within a hospital. For the Maternity Care Survey, sampling frames were extracted on a monthly basis, with the date at discharge used to define eligible patients. Sampling targets for each hospital were calculated in advance, as explained later in this report.

Figure 1 Organisational responsibilities in sampling and survey processing, Maternity Care Survey 2019



Inclusion criteria

Admitted patient data were passed through two phases of screening to create a frame of patients eligible to participate in the Maternity Care Survey 2019. BHI conducted phase 1 screening, and SIA conducted phase 2 screening. Many of the inclusion and exclusion criteria were developed in response to stakeholder advice.

Phase 1 screening

Inclusions

Admitted patients aged 18+ years, who gave birth during their admission to a hospital (ICD-10 Z37.0, Z37.2, O80-O84, or procedure codes of 90467, 90468, 90469, 90470 or 16520).

The first version of the April 2019 cohort for the Maternity Care Survey included no maternity patients at John Hunter Hospital. An investigation showed that this was due to a very low level of complete clinical coding (5% coded), and that the incomplete coding had also impacted previous months, resulting in only 22 maternity patients included in the period from January to March 2019. By comparison, in 2018, the average monthly number of maternity cases at John Hunter Hospital was 312.

Therefore, following discussions with SIA, from April 2019 a series of further inclusion criteria were applied to broaden the definition of maternity patients for hospitals with fewer than 90% of coded records to include records where `unit_type = '66'` (birth suite) or `ward_identifier = 'BSUITE'` or `'DSUITE'`. These ward identifiers represent the delivery suites at John Hunter Hospital.

Following this, in July 2019, after further discussion with SIA, patients with a `unit_type` of '49' were also included, but only where the list of AMO specialty codes during their stay included 'obstetrics' (using the `ward_episode` and `AMO_episode` table views from HIE), as a unit type of 49 can be used as an overflow for other bed or unit types. See the Health Information Resources Directory (HIRD), available at bhi.health.nsw.gov.au/hird for further information.

As part of continuous quality improvement processes, the following additional quality assurance steps were added to the sampling procedure from April 2019:

1. Assessment of the level of coding at a hospital level in order to identify hospitals that need to use the alternative method for identifying maternity patients, and to identify hospitals where patients are unable to be screened for the exclusions listed below.
2. Identification of hospitals where the number of eligible patients for each individual survey was lower than the minimum monthly number for that facility in 2018, in order to avoid a repeat of the unexpectedly low number of eligible maternity patients at John Hunter Hospital between January and March 2019.

Exclusions

Patients who died during their hospital admission – mode of separation of 6 (death with autopsy) or 7 (death without autopsy).

The following facilities, while included in the Maternity Care Survey 2017, were considered to have insufficient maternity patients for inclusion in the 2019 survey: Coonabarabran District Hospital; Cobar District Hospital; Wellington Hospital, Bindawalla; Lake Cargelligo Multipurpose Service; Prince Albert Memorial Hospital, Tenterfield; Bourke Multipurpose Service; and Tomaree Community Hospital.

A series of further exclusion criteria were applied to take into account a range of factors including:

- the potentially high vulnerability of particular patient groups and/or patients with particularly sensitive reasons for admission
- certain patients' ability to answer questions about their experiences
- the relevance of the survey questions to particular patient groups, including:
 - patients receiving Acute and Post-Acute Care (APAC) services

- patients who were admitted to a psychiatric unit during any hospital stay during the sampling month
- patients with a personal history of self-harm (ICD-10 Z91.5) or who have intentionally self-harmed (ICD-10 X60-X84, Y87.0, Y34)
- patients with a family history of mental or behavioural disorders (ICD-10 Z81.8) and patients who have expressed suicidal ideation (ICD-10 R45.81)
- patients recorded with maltreatment syndromes (ICD-10 T74) in any diagnosis field, including neglect or abandonment, physical abuse, sexual abuse, psychological abuse, other maltreatment syndromes and maltreatment syndrome, unspecified
- patients who experienced a stillbirth (ICD-10 Z37.1, Z37.3, Z37.4, Z37.6, Z37.7)
- patients who experienced pregnancy with an abortive outcome (ICD-10 O00-O08)
- patients admitted for a termination of pregnancy procedure (ICD-10 35643-03, 35640-03)
- patients admitted for same-day haemodialysis (code 13100-00 in any procedure fields)
- same-day patients who stayed for less than three hours
- same-day patients transferred to another hospital
- patients recorded as receiving contraceptive management (ICD-10 Z30) in any diagnosis field, including general counselling and advice on contraception, surveillance of contraceptive drugs, surveillance of contraceptive device, other contraceptive management and contraceptive management, unspecified
- records that did not include a date of birth.

Where patients had multiple admitted patient stays within the sampling month, the episode of care that included the birth was retained for sampling.

Patients with incomplete diagnosis coding were not excluded, but reduced the opportunity to be selected as a maternity patient, especially prior to April 2019. In NSW in 2019, 5% of patients had a diagnosis code that was incomplete. At the hospital level, between one and five hospitals had more than 70% incompletely coded records in at least one sampling month.

Phase 2 screening

BHI provided the interim sampling frame to SIA, who added patient name and address information. Data then underwent a second phase of screening. This resulted in exclusions for administrative/logistical reasons, or where death had been recorded after discharge, but before the final sampling frame was prepared.

Exclusions

Patients meeting the following exclusion criteria were removed in this phase:

- invalid address (including those with addresses listed as hotels, motels, nursing homes, community services, Mathew Talbot Hostel, 100 William Street, army quarters, jails, unknown)
- invalid name (including twin, baby of)
- invalid date of birth
- on the 'do not contact' list
- sampled in the previous six months for any BHI patient survey
- recorded as deceased according to the NSW Registry of Birth Deaths and Marriages and/or Agency Performance and Data Collection, prior to the sample being provided to the survey vendor.

The remaining patients were considered to be the final Maternity Care Survey 2019 sampling frame.

Drawing the sample

Survey design

Survey design is part of the mechanism that ensures that the results of the survey are representative of the population. It does this by carefully selecting patients across hospitals and demographic characteristics.

BHI and the Centre for Aboriginal Health (CAH) are working together to collect the experiences and outcomes of care for Aboriginal people admitted to NSW public hospitals. In 2019, every woman who identified as Aboriginal and gave birth during their hospital stay was invited to participate in the Maternity Care Survey 2019.

For non-Aboriginal patients, a stratified sample design was applied, with each hospital defined as a stratum.

Simple random sampling without replacement was applied within each stratum to create a final sample of non-Aboriginal patients who were mailed a survey.

Calculation of sample sizes and reporting frequency

Sample size calculation ensures that the sufficient number of patients are receiving the questionnaire to ensure that the level of accuracy of the results is sufficient for the purpose.

Monthly sample sizes were determined prior to the commencement of the survey cycle. Although sampling was undertaken monthly, sample size calculations are based on the reporting frequency. All hospitals were sampled for annual reporting.

Patients were selected within strata using simple random sampling without replacement. Sample sizes were defined at the hospital level, with proportional sampling of strata within hospitals.

The monthly targets, by strata, for the Maternity Care Survey 2019 were based on data extracted from the HIE for the previous year (after Phase 1 of the screening process).

The required sample size per year for each hospital was estimated using the following equation:

$$S_i = \frac{x^2 N_i P(1-P)}{d^2 (N_i - 1) + x^2 P(1-P)} \quad (1)^*$$

Where:

S_i = desired sample size for reporting based on sampling for 12 months, for hospital i

x^2 = tabulated value of chi-squared with one degree of freedom at 5% level of significance (3.841)

N_i = patient population of hospital i per reporting period

P = expected proportion giving positive response to the question on satisfaction with overall care (0.8), based on previous levels of response to patient surveys

d = degree of accuracy of the 95% confidence interval expressed as a proportion (± 0.07).

The sample size calculation aimed for a confidence interval around an expected proportion of 0.8 of ± 0.07 at the hospital level.

Finally, cell sample sizes were inflated to account for non-responses to the survey. This was done by dividing the expected sample size by the expected response rate. Expected response rates for this survey was 33%. This was divided by 12 to create a monthly target.

In addition, a minimum monthly target of six patients was applied to all strata (e.g. if calculations required fewer than six patients in any stratum, this was increased to six patients).

The adjusted cell sample sizes were provided to SIA as the monthly targets for the Maternity Care Survey 2019 survey. For each month of sampling, SIA randomly selected patients within each stratum, according to these targets. Targets for Aboriginal patients were set at 1000 for each hospital, ensuring all eligible patients were included.

*The sample size calculation based on equation 1 assumes simple random sampling, whereas a stratified survey design was used. This, and differences in the response rate between strata, may result in some estimates having wider confidence intervals than expected, even when the prevalence was 80%.

Data collection and analysis

Data collection

Patients sampled received a paper questionnaire and were given the option to complete the questionnaire online. Respondents were asked to return (for paper questionnaire) or submit (for electronic questionnaire) their completed questionnaire to the survey vendor. Paper questionnaires were scanned for fixed response options and manually entered in the case of free text fields.

All text entry fields were checked for potential identifiers (e.g. mention of patient or staff names and contact details, day of week, gender of clinician), and to remove offensive language, and any that were found were replaced with 'XXXX'. However, on a rare occasion, details may not be detected by coders, and these comments should be anonymised on detection by LHDs, who are provided comments for their hospitals.

Following this, each record was checked for any completion errors. Reasonable adjustments were made, such as removing responses where the respondent did not correctly follow the instructions or where the respondent provided multiple answers to a single response question.

At the end of this process, the survey vendor transferred the prepared de-identified records securely to BHI's servers, all of which are password protected with limited staff access.

The process of data collection ensures that BHI does not have access to patient names and contact details to ensure respondent confidentiality. This process also ensures that, in the context of BHI's reporting function, identifying information can never be reported to LHDs or publicly released.

For the Maternity Care Survey 2019, the data was collected from women aged 18+ years who gave birth in a NSW public hospital from January to December 2019.

Data analysis

For the Maternity Care Survey 2019, there were 15,481 questionnaires mailed and 4,446 responses received.

Completeness of questionnaires

Survey completeness is a measure of how many questions each respondent answered as a proportion of all questions. The completeness of responses was high overall, with respondents answering an average of 90 of the 95 non-text questions (this includes questions that were correctly skipped).

Weighted response rate

The response rate is the percentage of people sampled who actually completed and returned or submitted their responses.

As a result of the oversampling of Aboriginal patients, the distribution of patients in the sample (patients who responded to the questionnaire) did not match the distribution of patients in the population in terms of Aboriginal status. Therefore, response rates were adjusted to ensure the overall survey response rate reflected what would be observed if patients were sampled proportional to the patient mix, creating the 'weighted response rate'.

The overall weighted response rate for the Maternity Care Survey 2019 was 32%, and the overall response rate for the Maternity Care Survey 2017 was 35%. This decline is, in part, related to the census sample of Aboriginal people in 2019, where all Aboriginal women who gave birth in a NSW public hospital during 2019 were invited to provide feedback about their experiences of care. In 2019, the weighted response rate for Aboriginal women was 10% and the weighted response rate for non-Aboriginal women was 33%.

Across LHDs, the weighted response rate ranged from 25% to 40%. Across hospitals, it ranged from 20% to 51%. There was one hospital with 100% weighted response rate. However, this hospital had only one eligible woman who was included in the sample and who responded to the survey. Weighted response rates are provided in Table 1 (LHD level) and Table 2 (hospital level) on pages 9–11.

Weighting of data

Survey responses were weighted to take into account the oversampling of Aboriginal patients and to optimise the degree to which results were representative of the experiences and outcomes of the overall patient population. At the NSW and LHD level, weights also ensured that the different sampling proportions used at the hospital level were accounted for, so that LHD results were not unduly influenced by small hospitals that had larger sampling proportions. Responses were weighted to match the population by Aboriginal status (Aboriginal or non-Aboriginal) where possible at hospital level. It is assumed that the respondents are the random samples within each stratum.

A weight was calculated for respondents in each stratum using the following equation:

$$w_i = \frac{N_i}{n_i} \quad (2)$$

Where:

N_i = total number of patients eligible for the survey in the i^{th} stratum

n_i = number of respondents in the i^{th} stratum.

If the stratum cell size within a hospital was five or fewer, and the weight was greater than the median weight, then cells within that hospital were aggregated for weighting purposes by grouping across Aboriginal status unless this increased the weight of the small cell. However, as Aboriginal status was the only stratum at hospital level, and the maximum weight for these small cells was 26, the cells were not aggregated over Aboriginal status, so the responses were weighted to match the population by Aboriginal status at hospital level. Decisions on aggregation were agreed by two analysts.

The weights were then passed through the generalised regression weights (GREGWT) macro, a survey-specific SAS program developed by the Australian Bureau of Statistics (ABS) to assist with weighting of complex survey data. It uses iterative proportional fitting to ensure that the weights at the margins agree with the population totals even though it is often impossible for the weights to equal the population at the individual cell level i.e. within hospital and each stratum. The marginal totals specified were hospital and Aboriginal status. The GREGWT macro was run with hospital and Aboriginal status as benchmarks for annual weights. A lower bound of one was specified in the macro. The annual weights were used for the reporting of results based on the full 12 months of data. The GREGWT macro was used, in two stages, to ensure agreement of weights with populations at the margins.

For the Maternity Care Survey 2019, the sampling weights were only calculated for the full 12 months of data. Therefore, results were representative of Aboriginal status only at annual level, and not quarterly level.

Assessment of weights

Weights were assessed to ensure that undue emphasis was not applied to individual responses. The ratio of the maximum to median weight at the hospital level was reviewed. For this survey, this ranged from 1.0 to 10.1. The large ratio is a result of there being only one Aboriginal respondent in one hospital.

The design effect (DEFF) estimates the increase in variance of estimates due to the complex sample design over that of a simple random sample. It is estimated as $(1 + \text{coefficient of variance [weights] by the power of 2})$. The DEFF was calculated for each hospital, LHD and overall. Across hospitals, the maximum DEFF was 2.2 and across LHDs, it was 2.3. A DEFF of two indicates that the variance of estimates will be double the sample variance that would have been obtained if simple random sampling had been done.

Generally speaking, LHDs with the largest DEFFs are those that have the greatest range in patient volumes across the hospitals within the LHD. The standard errors at the LHD level are fairly small because of the sample sizes at that level. Therefore, the increase in standard errors caused by the survey design (and leading to a larger DEFF at LHD level) is more than offset by the fact that each hospital has a sufficient sample size to allow hospital-level reporting. In addition, the estimates at the LHD level have appropriate distribution of respondents between large and small hospitals.

Sample sizes, DEFF and weighted response rates based on the full year of data are shown in Table 1 (by LHD and NSW) and Table 2 (by hospital) on pages 9–11.

Table 2 also shows the maternity service level of each of the hospitals included in the survey. These levels are defined in the Ministry's NSW Maternity and Neonatal Service Capability Framework, available at www1.health.nsw.gov.au/pds/ActivePDSDocuments/GL2016_018.pdf

Maternity service levels describe the complexity of services required based on the health needs of pregnant women. Each level includes care outlined in lower levels.

Level 1: Postnatal care only, provided there are no complications.

Level 2: Normal-risk delivery only. Also able to cope with sudden unexpected complications until transfer.

Level 3: May deliver selected moderate-risk pregnancies in consultation.

Level 4: Care for mothers and babies at moderate risk and elective lower segment caesarean sections.

Level 5: May deliver selected high-risk pregnancies.

Level 6: Care of normal, moderate and high-risk deliveries.

Table 1 Number of surveys mailed, responses, weighted response rates and design effects (DEFF) by LHD and overall, Maternity Care Survey 2019

LHD	Surveys mailed	Survey responses	Weighted response rate (%)	DEFF
Central Coast	547	155	34	1.3
Far West	153	40	26	1.3
Hunter New England	2,513	674	30	1.9
Illawarra Shoalhaven	741	206	31	1.3
Mid North Coast	911	268	32	1.1
Murrumbidgee	964	289	32	1.3
Nepean Blue Mountains	1,107	290	30	2.3
Northern NSW	1,151	331	31	1.3
Northern Sydney	679	271	40	1.3
South Eastern Sydney	976	324	35	1.1
South Western Sydney	1,636	407	27	1.4
Southern NSW	914	305	34	1.1
Sydney	657	199	33	1.0
Western NSW	1,519	452	32	1.2
Western Sydney	1,013	235	25	1.2
NSW	15,481	4,446	32	1.9

Table 2 Maternity service level, number of surveys mailed, responses, weighted response rates and design effects (DEFF) by hospital, Maternity Care Survey 2019

Hospital	Maternity service level	Surveys mailed	Survey responses	Weighted response rate (%)	DEFF
Armidale Hospital	3	271	85	33	1.2
Auburn Hospital	4	290	70	24	1.0
Bankstown-Lidcombe Hospital	4	311	59	20	1.0
Bathurst Health Service	3	276	79	29	1.0
Blacktown Hospital	5	378	79	25	1.0
Blue Mountains District Anzac Memorial Hospital	3	171	70	41	1.0
Bowral and District Hospital	3	252	100	40	1.0
Broken Hill Health Service	3	153	40	26	1.3
Byron Central Hospital	2	125	45	36	1.0
Campbelltown Hospital	4	421	88	25	1.1
Canterbury Hospital	4	295	62	21	1.0
Coffs Harbour Health Campus	5	357	98	30	1.0
Cooma Hospital and Health Service	3	136	50	37	1.0
Cootamundra District Hospital	3	44	11	25	1.0
Cowra Health Service	3	88	31	35	1.1
Deniliquin Hospital and Health Services	3	69	22	32	1.0
Dubbo Base Hospital	5	468	109	28	1.0
Fairfield Hospital	4	298	76	26	1.0
Glen Innes Hospital	2	44	14	32	1.2
Gloucester Soldier's Memorial Hospital	2	1	1	100	#
Gosford Hospital	5	464	121	32	1.1
Goulburn Base Hospital and Health Service	4	224	62	28	1.0
Grafton Base Hospital	4	250	67	27	1.1
Griffith Base Hospital	4	280	77	29	1.1
Gunnedah Hospital	3	121	39	32	1.0
Hawkesbury District Health Services	4	288	83	30	1.1
Hornsby Ku-ring-gai Hospital	4	295	115	39	1.0
Inverell Hospital	3	170	52	31	1.3
John Hunter Hospital	6	416	88	28	1.1
Kempsey District Hospital	3	188	56	30	1.2
Lachlan Health Service – Forbes	3	144	49	34	2.2
Lachlan Health Service – Parkes	3	30	11	37	1.0
Leeton Health Service	3	23	8	35	1.0

* Information is not available.

Hospital	Maternity service level	Surveys mailed	Survey responses	Weighted response rate (%)	DEFF
Lismore Base Hospital	5	378	86	26	1.0
Lithgow Hospital	3	125	40	32	1.1
Liverpool Hospital	6	354	84	26	1.0
Macksville District Hospital	2	28	10	36	1.0
Maitland Hospital	5	405	106	31	1.0
Manning Hospital	4	324	76	26	1.3
Moree Hospital	3	120	27	23	1.7
Moruya District Hospital	3	175	38	22	1.1
Mudgee Health Service	3	177	67	38	1.0
Murwillumbah District Hospital	3	61	23	38	1.0
Muswellbrook Hospital	3	59	15	25	1.0
Narrabri Hospital	3	59	14	24	1.3
Nepean Hospital	6	523	97	23	1.2
Orange Health Service	4	336	106	34	1.0
Port Macquarie Base Hospital	5	338	104	34	1.0
Queanbeyan Hospital and Health Service	3	221	95	44	1.0
Royal Hospital for Women	6	360	119	37	1.0
Royal North Shore Hospital	6	314	120	39	1.0
Royal Prince Alfred Hospital	6	362	137	44	1.0
Ryde Hospital	2	70	36	51	1.0
Scott Memorial Hospital – Scone	3	34	12	35	1.0
Shoalhaven District Memorial Hospital	3	342	94	30	1.1
Singleton Hospital	2	108	46	43	1.0
South East Regional Hospital	3	158	60	38	1.0
St George Hospital	5	317	95	31	1.0
Sutherland Hospital	4	299	110	38	1.0
Tamworth Hospital	4	381	99	28	1.0
Temora District Hospital	3	52	25	48	1.0
The Tweed Hospital	5	337	110	34	1.0
Tumut Health Service	3	12	5	42	1.0
Wagga Wagga Rural Referral Hospital	5	361	102	32	1.0
Westmead Hospital	6	345	86	27	1.0
Wollongong Hospital	5	399	112	31	1.1
Wyong Hospital	2	83	34	41	1.0
Young Health Service	3	123	39	32	1.0

Comparing weighted and unweighted patient characteristics

One of the aims of sample weights is to ensure that, after weighting, the characteristics of the respondents closely reflect the characteristics of the patient population. Table 3 shows demographic characteristics of respondents to the Maternity Care Survey 2019 against the patient population. The four columns denote:

1. percentage in patient population – the patient population prior to the phase 2 screening process
2. percentage in eligible population – the final sampling frame from which the sample was drawn. Limited demographic variables are available at this level
3. percentage in respondents (unweighted) – respondents to the survey, not adjusted for unequal sampling
4. percentage in respondents (weighted) – respondents to the survey, adjusted by weighting to be representative of the patient population.

Table 3 Demographic characteristics of patient population and respondents, Maternity Care Survey 2019

Demographic variable	Sub-group	% in patient population	% in eligible population	% in respondents (unweighted)	% in respondents (weighted)
LHD	Central Coast	4	4	3	4
	Far West	0	0	1	0
	Hunter New England	10	10	15	10
	Illawarra Shoalhaven	5	5	5	5
	Mid North Coast	3	3	6	3
	Murrumbidgee	3	3	7	3
	Nepean Blue Mountains	7	7	7	7
	Northern NSW	4	4	7	4
	Northern Sydney	6	6	6	6
	South Eastern Sydney	11	11	7	11
	South Western Sydney	17	17	9	17
	Southern NSW	2	2	7	2
	Sydney	9	9	4	9
	Western NSW	4	4	10	4
	Western Sydney	15	15	5	15
Peer group	A1	47	48	22	48
	A3	6	5	3	5
	B	37	37	39	37
	C1	5	5	16	5
	C2	5	4	18	4
	D	0	0	2	0
Age group	18–24	15	#	11	9
	25–29	29	#	27	24
	30–34	34	#	38	40
	35–39	18	#	19	22
	40–44	4	#	4	5
	45+	0	#	0	0
Aboriginal status	Non-Aboriginal	95	96	94	96
	Aboriginal	5	4	6	4

#Information is not available.

Reporting

Confidentiality

BHI does not receive any confidential patient information and only publishes aggregated data and statistics. Any question must have a minimum of 30 respondents at reporting level (hospital, LHD or NSW) for results to be reported. This ensures there are enough respondents for reliable estimates to be calculated, and that patient confidentiality and privacy are protected. For the Maternity Care Survey 2019, 14 out of 68 hospitals had fewer than 30 respondents and were therefore ineligible for public reporting.

Suppression rules

For suppression at the hospital or LHD level, if the number of respondents was between 30 and 49 with at least a 20% response rate, or more than 49 with less than a 20% response rate, results were checked for representativeness of the NSW patient population for key patient characteristics (age and Aboriginal status). If these results were found to be representative of the NSW population, they were publicly released and accompanied by an 'interpret with caution' note. If found not to be representative of the NSW population, results were suppressed for that hospital or LHD. For the Maternity Care Survey 2019, there was 11 reportable hospitals that had between 30 and 49 respondents with at least a 20% response rate, and no hospital with less than a 20% response rate.

Interpret with caution

All sample surveys are subject to sampling error (i.e. the difference between results based on surveying a selection of respondents, and the results if all people who received care were surveyed). The true result is expected to fall within the 95% confidence interval 19 times out of 20.

For the Maternity Care Survey 2019, fewer than 150 survey responses were received for each hospital. As a result, where the confidence interval was wider than 25 percentage points, results are noted with a '**' to indicate 'interpret with caution'.

In addition, percentages of 0 or 100, which do not have confidence intervals, are also noted as 'interpret with caution' where the number of respondents was fewer than 200. Results flagged as 'interpret with caution' in the supplementary data tables are not included in the figures showing the range of hospital results in the Snapshot report.

In order to provide comparable results, the same level of confidence in the point estimate was also applied to the Maternity Care Survey 2017 results retrospectively.

Despite the small sample size, the Maternity Care Survey 2019 had a relatively high response rate (between 20% and 51%) at the hospital level and the results are closely representative of age group and Aboriginal status.

Statistical analysis

Data were analysed for the period January to December 2019 inclusive. Analysis was undertaken in SAS V9.4 using the SURVEYFREQ procedure with hospital and Aboriginal status as strata variables. Results were obtained for each individual survey question, and also aggregated across surveys where questions were considered sufficiently similar. Results were weighted for all questions, with the exception of questions related to socio-demographic characteristics and self-reported health status.

The result (percentage) for each response option in the questionnaire was determined using the following method:

Numerator – the (weighted) number of survey respondents who selected a specific response option to a certain question, minus exclusions.

Denominator – the (weighted) number of survey respondents who selected any of the response options to a certain question, minus exclusions.

Calculation – the numerator/denominator x 100.

Unless otherwise specified, missing responses and those who responded 'don't know/can't remember' to questions were excluded from analysis. The exception is questions for which 10% or more of respondents selected 'don't know/can't remember' response options.

When reporting on questions used to filter respondents through the questionnaire rather than asking about hospital performance, the 'don't know/can't remember' option and missing responses were also reported. Appendix 1 presents the rates of missing or 'don't know' responses.

In some cases, the results from several responses were combined to form a 'derived measure'. For information about how these measures were developed, please see Appendix 2.

Reporting by population group

Results were generated for each question in the survey at the NSW, LHD, peer group and hospital levels. In addition, results were reported for the groups and levels outlined in Table 4.

Reporting on antenatal data

Women who responded to this survey received antenatal care from a variety of providers (public hospital midwife/obstetrician, private midwife/obstetrician, or GP).

Reporting of public hospital results for questions related to antenatal care is restricted to women who received care at the same hospital where they gave birth. Results for NSW and LHDs include all respondents, regardless of where they received antenatal care.

Table 4 Levels of reporting, Maternity Care Survey 2019

Grouping	NSW	Peer group	LHD	Hospital
All patients	✓	✓	✓	✓
Age group: self-reported – administrative data used where question on year of birth was missing or invalid	✓	✓	✓	
Education: response 'Still at secondary school' was combined with 'Less than Year 12'	✓	✓	✓	
Given birth before	✓	✓	✓	
Main language spoken at home	✓	✓	✓	
Longstanding health condition(s)	✓	✓	✓	
Self-reported health status	✓	✓	✓	
Quintile of disadvantage: based on the Australian Bureau of Statistics Index of Relative Socio-demographic Disadvantage	✓	✓	✓	
Rurality of patient residence: based on ARIA+* category of postcode of respondent residence – outer regional, remote and very remote combined	✓	✓	✓	
Type of birth: self-reported type of birth	✓	✓	✓	
Type of birth (dichotomous): based on self-reported type of birth and categorised into two responses: 'Vaginal birth' and 'Caesarean section'	✓	✓	✓	
Aboriginal status: self-reported Aboriginal status	✓			

*Accessibility and Remoteness Index of Australia (ARIA+) is the standard Australian Bureau of Statistics measure of remoteness. For more information, refer to www.abs.gov.au/websitedbs/d3310114.nsf/home/remoteness+structure

Reporting on Aboriginal census sample data

All BHI patient survey questionnaires ask about Aboriginality as part of the demographic group of questions ('About you'). This question is used to group respondents as Aboriginal, Torres Strait Islander or both (self-reported Aboriginality). Aboriginal status is also provided via the administrative dataset. However, it has been demonstrated that administrative data may under-represent the number of Aboriginal people who use health services. This may be because Aboriginal people might not want to be identified, or staff have not asked all patients if they are Aboriginal, although asking this question is mandatory.¹

Among the 4,446 respondents to the 2019 Maternity Care Survey, 283 women said they were either Aboriginal, Torres Strait Islander or both. Of these women, 266 (94%) were also identified as Aboriginal in the administrative data (Table 5). For this survey, the results for Aboriginal women are based on those respondents who self-identified as Aboriginal.

The weighted response rate for Aboriginal women was 10% and the sampling strategy for this survey was not specifically designed to be representative of Aboriginal women receiving maternity care. However, the Aboriginal identifier in the hospital administrative data was used to create a profile of characteristics of the Aboriginal women admitted to NSW public hospitals who were eligible to be surveyed. This was compared with the characteristics of the Aboriginal women who responded to the survey, to assess the representativeness of the sample (Table 6). The distributions of age, residential location and rurality for these women is similar to the hospital records for all Aboriginal women who received maternity care in 2019.

Table 5 Number of survey respondents based on self-identified and administrative data measures, Maternity Care Survey 2019

Survey question	Administrative data identifier		Total
	Aboriginal	Non-Aboriginal	
Aboriginal	266	17	283
Non-Aboriginal	14	4,126	4,140
Unknown/Decline to answer	2	21	23
Total	282	4,164	4,446

Table 6 Characteristics of Aboriginal women in eligible population and the survey respondent cohort, Maternity Care Survey 2019

		Characteristic of the 4,499 Aboriginal women in the eligible population (%)	Characteristic of the 282 Aboriginal women in survey cohort (%)
Age group	18–24	43	31
	25–29	30	33
	30–34	18	24
	35–39	7	9
	40–44	2	3
LHD	Central Coast	5	6
	Far West	1	1
	Hunter New England	24	23
	Illawarra Shoalhaven	6	6
	Murrumbidgee	5	5
	Mid North Coast	8	8
	Nepean Blue Mountains	10	10
	Northern NSW	8	7
	Northern Sydney	1	1
	South Eastern Sydney	3	3
	Southern NSW	2	2
	South Western Sydney	7	7
	Sydney	3	2
	Western NSW	13	13
Western Sydney	5	5	
Rurality of facility	Major cities	49	50
	Inner regional	42	42
	Outer regional	8	8

Standardised comparisons

Previously, BHI's approach to comparisons between hospital and NSW results in BHI reports relied on a basic method (overlapping confidence intervals) to determine if the experiences reported for each hospital differed significantly from the NSW result. While this method is commonly used to highlight differences in survey results, it cannot account for differences in the mix of patient characteristics across hospitals.

To enable fairer comparisons across hospitals and as part of the implementation of standardised comparisons, BHI reporting now takes the mix of patient characteristics at each hospital into account. Therefore, when a hospital is flagged as having a significantly higher or lower result than NSW, this reflects differences in patient experiences rather than differences that can be explained by the mix of characteristics among a hospital's patients. For the Maternity Care Survey 2019, the patient characteristics accounted for were age, language, and whether the woman had given birth before.

The difference between the former and new methods might not be entirely due to adjustment for patient characteristics. The difference could also be partly due to the different method used for identifying the outliers (i.e. overlapping confidence intervals vs. significance testing).

The standardised comparison is currently only applied at the hospital level and not at LHD level. BHI is exploring methods for standardised comparisons of LHDs.

Methodology

The survey asks women questions about different aspects of their maternity care, such as accessibility and timeliness, the physical environment of the hospital, safety and hygiene, communication and information, and whether they were treated with respect and dignity.

For survey questions related to aspects of care, the percentage of respondents who selected the most positive response was compared between each hospital and NSW. For example, one question asked women: 'Were you given enough privacy in the birth room or theatre?'. It had the following response options:

- Yes, always
- Yes, sometimes
- No.

In this case, the most positive response was 'Yes, always' (i.e. the event), and the other two responses were grouped together for the analyses (i.e. the reference group).

Logistic regression mixed models were used for all analyses, with hospitals as random intercept terms. Patient characteristics were fixed covariates in the model.

For each performance question in the survey, the most positive response option was treated as the 'event' and the other response options were grouped to create a binary dependent variable.

The general formula for the logistic mixed model is:

$$g(E(Y_i)) = \beta X_i + b_i Z_i$$
$$b_i \sim N(0; D) \quad (3)$$

where:

- the link function $g(\cdot)$ is the logistic function $g(\pi_{ij}) = \log\left(\frac{\pi_{ij}}{1-\pi_{ij}}\right)$
- X_i is the design matrix for fixed effect covariates
- β is the vector containing estimates for fixed effect covariates
- Z_i is the design matrix for random effects, $i=1$ to number of hospitals
- b_i is the vector of random intercepts (hospitals), $i=1$ to number of hospitals.

Covariate selection

Differences in patient experiences between groups may reflect differences in experiences of care. However, they may also reflect differences in expectations or in the way various groups tend to respond to surveys. To enable fairer comparisons across hospitals, the enhanced reporting method considers which patient characteristics may be consistently associated with more positive or less positive reported experiences.

Information regarding rurality of patients and socioeconomic status (SES) was also considered as these factors may relate to response tendency. However, BHI chose not to include factors such as rurality or SES as they may reflect differences in care. Instead, analyses of results by these patient groups are presented in BHI's interactive data portal, Healthcare Observer, to allow hospitals to see which patient groups reported more or less positive experiences of care.

A list of patient characteristics considered for inclusion in the model for standardised comparisons and how they were sourced is included in Table 7.

Information on patient health status such as self-reported overall health or mental health status could also influence both experiences of care and responding tendency. However, BHI chose not to include these factors in the model. Currently BHI only standardises comparisons for experience of care questions by adjusting patient, not clinical or health, characteristics.

For age, missing values were filled in using administrative data. Following this, there was no missing data for age. Missing data for other patient characteristics were included in all analyses as an extra category in the model. Missing data in performance-related questions were excluded from all analyses.

Table 7 Patient characteristics considered for adjustment for comparisons and source, Maternity Care Survey 2019

Variable	Source	Categories
Age	Survey question, or using administrative data if missing	18–24, 25–29, 30–34, 35+
Whether patient had given birth before	Survey question	Yes, no, missing
Language mainly spoken at home	Survey question	English, other than English, missing
Education	Survey question	Completed year 12, trade/technical certificate/diploma, university degree, postgraduate degree, missing
Mode of response	Survey question	Paper, online

Table 8 presents a list of covariates considered for adjustment by selection stage. These patient characteristics were then passed through two selection stages, as follows:

1. Univariate models were fitted for each patient characteristic (covariate) for all performance-related questions in the survey. Covariates with $p < 0.1$ in the univariate models for at least 50% of the questions were considered for inclusion in the multivariate model.
2. Multivariate logistic mixed models were fitted across all performance-related questions in the survey using the covariates selected from stage one, with age included in all models. Forward stepwise modelling was used based on the equation above, including age, and all additional covariates added appropriately following a forward stepwise approach. Selected interaction terms were also tested.

Within each outcome (i.e. performance-related survey question) the models were ranked by the Akaike Information Criterion (AIC) – the model with the smallest AIC value was assigned the highest rank of 1. The AIC was recommended as an appropriate method for selecting models where different fixed effects are included as it applies a penalty for the number of covariates in order to protect against model overfitting.²

The following values were obtained:

- number of questions for which the model was ranked first
- mean rank across all questions
- mean AIC value across all questions.

These values were used to identify the optimal model to create adjusted comparisons for the survey results, with each survey from the NSW Patient Survey Program assessed independently. That is, the optimal model had a high count of 1st ranking, a low mean rank, and a low mean AIC relative to other models, across all performance-related questions in the survey.

Table 8 Covariates considered for adjustment for comparisons by selection stage, Maternity Care Survey 2019

	Available for adjustment	Passed univariate model selection threshold (stage 1)	Passed multivariate model selection threshold (stage 2)	After consultation with expert panel and confirmed by sensitivity analyses
Age	✓	✓	✓	✓
Whether patient had given birth before	✓	✓	✓	✓
Language mainly spoken at home	✓	✓	✓	✓
Education	✓			
Mode of response	✓			

Finally, covariates that marginally improved the model were excluded by comparing the models' AIC values, to define a parsimonious number of patient-related covariates to use in standardised comparisons. Covariates that were not part of patient characteristics (e.g. induced labour) were not included in the testing. This is because standardised comparisons are intended to control for differences in patient characteristics only, and some of these factors were considered to be under the control of hospital management rather than patients.

In all cases, further assessments of the AIC summary values indicated that the model with age, whether the woman had given birth before and language had results very similar to the model with age and whether patient had given birth before. Moreover, the proportion of women who mainly spoke a language other than English at home also varied across hospitals. Therefore, language was retained as a covariate in the comparison model.

Sensitivity analyses were taken to investigate the association between a woman's age and whether they had given birth before to assess if this caused collinearity in the comparison model. There was a weak relationship between the two covariates – i.e. older women were more likely to have given birth before (Phi-Coefficient=0.27). However, when included in the comparison model, the interaction term between the two covariates was only significant for four out of the 57 performance questions. Therefore, the interaction term was not included in the comparison model.

Age, whether the woman had given birth before, and language mainly spoken at home were the three characteristics chosen for adjustment in the comparison model.

Model-based comparisons

The model calculates an estimate for each hospital's random intercept, and produces a p-value to indicate how likely these estimates are different from the average, or NSW value.

The exponential values of the estimated hospital random intercepts based on the random intercept logistic regression model can be used to estimate the odds of a positive experience (e.g. 'very good' for overall care question) for the hospital with reference to an 'average' hospital.

The p-value for each hospital intercept estimate was used to determine if the hospital was significantly different from NSW, when adjusted for patient characteristics, using the following guidelines:

- If the p-value was less than the significance level (0.01) and the solution for the hospital random intercept was greater than 0, the hospital was flagged as having a more positive result than NSW.
- If the p-value was less than the significance level and the random effect solution was less than 0, the hospital was flagged as having a less positive result than NSW.
- If the p-value was greater than the significance level, the hospital was flagged grey as not significantly different to NSW.
- For results flagged as 'interpret with caution', comparisons are not highlighted due to the lack of precision in the result.

When making multiple comparisons there is an increased likelihood of flagging a difference that is not 'real', but due to chance. To mitigate this issue, a p-value of 0.01 was used to reduce the likelihood of identifying differences due to chance to one comparison in 100 (from one in 20, with the more commonly used p-value of 0.05). Sampling weights were used in all models to ensure the comparisons were representative of the NSW patient population.

Statistical software

SAS software version 9.4 was used for all statistical analyses. PROC GLIMMIX procedure was used for performing logistic mixed models.³

Appendix 1

Unweighted percentage of missing and 'Don't know' responses

Table 9 Percentage of 'Don't know' and/or missing responses by question, Maternity Care Survey 2019

Question number	Question text	Missing %	Don't know %	Missing + Don't know %*
1	Did you receive any antenatal care during your recent pregnancy?	0.43		0.43
2	Was your antenatal care provided using a Shared Care model (i.e. some care provided by a GP or private midwife and some by hospital staff)?	1.40		1.40
3	Who provided most of your antenatal care?	4.05		4.05
4	Was this antenatal care provided by the hospital named on the cover of this booklet?	1.11		1.11
5	How long did you usually have to travel (one way) for antenatal care check-ups during your pregnancy?	1.26	0.21	1.47
6	How long did you usually spend at your antenatal check-ups between the time you arrived and when you left?	0.63	0.39	1.01
7	How much of this time did you usually spend waiting to be seen? [at antenatal check-ups]	0.51	0.27	0.77
8	Do you think the amount of time you waited was...? [at antenatal check-ups]	0.29	0.34	0.63
9	Did the health professionals providing your antenatal care explain things in a way you could understand?	1.26		1.26
10	Did the health professionals discuss with you what was important to you in managing your antenatal care and birth?	1.22	0.51	1.73
11	Did you feel your emotional health was supported by the health professionals during your pregnancy?	1.17		1.17
12	Did you have confidence and trust in the health professionals providing your antenatal care?	1.22		1.22
13	Were the health professionals providing your antenatal care polite and courteous?	1.26		1.26
14	Was there any time when the health professionals needed access to your medical history and it was not available? [at antenatal check-ups]	1.33	12.73	14.06
15	Were you provided with a personal antenatal document (e.g. a Yellow Card), where information about your antenatal check-ups was recorded?	1.15	1.31	2.46
16	Did the health professionals update your personal antenatal document at every check-up?	0.49	0.68	1.17
17	Did the health professionals give you advice about the risks of consuming alcohol while pregnant?	1.19	5.22	6.41
18	Did the health professionals give you advice about the risks of exposure to tobacco smoke while pregnant?	1.19	5.15	6.34
19	Did the health professionals discuss the importance of healthy weight gain with you? [at antenatal check-ups]	1.22	5.29	6.50
20	Did the health professionals give you advice about your sleeping position during late pregnancy?	1.26	10.27	11.53
21	Did you have worries or fears about your pregnancy or the birth? [during antenatal period]	1.29		1.29

Question number	Question text	Missing %	Don't know %	Missing + Don't know %*
22	Did the health professionals discuss your worries or fears with you? [at antenatal check-ups]	0.21		0.21
23	Did you receive enough information about pain relief options prior to the birth?	1.36		1.36
24	Overall, how would you rate the antenatal care you received during your pregnancy?	1.29		1.29
25	Did you give birth to a single baby or multiple babies (twins, triplets or more)?	0.13		0.13
26	How many weeks pregnant were you when your baby was born?	0.36		0.36
27	In the two weeks following the birth, did your baby spend any time being cared for in a special care unit or nursery?	0.20	0.54	0.74
28	What type of birth did you have?	0.45		0.45
29	Was your labour induced?	0.52		0.52
30	During your labour, were you able to move around and choose the position that made you most comfortable?	0.44		0.44
31	Did you have enough say about your pain relief during your labour and birth?	0.45		0.45
32	Do you think the midwives or doctors did everything reasonable to help you manage your pain during your labour and birth?	0.61		0.61
33	Had any of the midwives or doctors who cared for you during your labour and birth been involved in your antenatal care?	0.54		0.54
34	Did the midwives or doctors who you did not already know, introduce themselves to you during your labour and birth?	0.40	2.68	3.08
35	Were you able to get assistance from midwives or doctors when you needed it? [during labour and birth]	0.22		0.22
36	During your labour and birth, did the midwives or doctors explain things in a way you could understand?	0.16		0.16
37	Did midwives or doctors ever give you conflicting information during your labour and birth?	0.49		0.49
38	I was involved as much as I wanted in making decisions during labour and birth...	0.25		0.25
39	During your labour and birth, was your birthing companion (e.g. your partner, the baby's father, doula or family member) involved as much as they wanted to be?	0.22	0.34	0.56
40	Did you have confidence and trust in the midwives or doctors taking care of you during your labour and birth?	0.20		0.20
41	Were the midwives or doctors kind and caring towards you? [during labour and birth]	0.13		0.13
42	Did you have worries or fears during your labour and birth?	0.31		0.31
43	Did a midwife or doctor discuss your worries or fears with you? [during labour and birth]	0.77		0.77

Question number	Question text	Missing %	Don't know %	Missing + Don't know %*
44	Did you feel you were treated with respect and dignity during your labour and birth?	0.31		0.31
45	Were you given enough privacy in the birth room or theatre?	0.29		0.29
46	Did you have skin to skin contact with your baby (i.e. your baby was naked, and placed directly on your chest or stomach) shortly after the birth?	0.27		0.27
47	Overall, how would you rate the care you received in the hospital during your labour and birth?	0.29		0.29
48	Shortly after the birth, did a health professional talk to you about your birth experience?	0.13	17.32	17.45
49	After the birth of your baby, did the health professionals explain things in a way you could understand?	0.34		0.34
50	After the birth, did the health professionals give you enough information about how to care for yourself (e.g. how to go to the toilet, how to sit and lie down)?	0.27		0.27
51	After the birth, did the health professionals give you enough information about how to care for your baby (e.g. how to hold your baby, how to put a nappy on your baby)?	0.38		0.38
52	After the birth of your baby, did you ever receive conflicting information from health professionals about how to care for yourself or your baby?	0.34		0.34
53	Were your cultural or religious beliefs respected by all hospital staff?	0.56		0.56
54	Were you ever in any pain after the birth of your baby?	0.18		0.18
55	Do you think the health professionals did everything they could to help you manage your pain after the birth of your baby?	0.90		0.90
56	After the birth of your baby, were you able to get assistance or advice from health professionals when you needed it?	0.25		0.25
57	After the birth of your baby, were the health professionals taking care of you kind and caring?	0.20		0.20
58	How clean were the wards or rooms you stayed in after the birth of your baby?	0.45		0.45
59	How clean were the toilets and bathrooms you used after the birth of your baby?	0.43		0.43
60	Did you see the health professionals wash their hands, or use hand gel to clean their hands, before touching you or your baby?	0.31	10.89	11.20
61	During your stay in hospital, were you ever bothered by any of the following?	1.24		1.24
62	Did you have any hospital food during this stay?	0.40		0.40
63	How would you rate the hospital food?	0.12		0.12
64	Did you have any special dietary needs (e.g. vegetarian, diabetic, food allergies, religious, cultural, or related to your treatment)?	0.09		0.09
65	Was the hospital food suitable for your dietary needs?	0.60	0.72	1.33

Question number	Question text	Missing %	Don't know %	Missing + Don't know %*
66	Did the hospital provide access to food when you needed it?	0.24	5.21	5.45
67	Were your decisions about how you wanted to feed your baby respected by the health professionals?	0.40		0.40
68	Did you ever receive conflicting advice about feeding your baby from the health professionals?	0.54		0.54
69	Did you try to breastfeed your baby?	0.40		0.40
70	How long did you breastfeed your baby for?	0.56		0.56
71	Did midwives in the hospital work with you to show you a good position for breastfeeding your baby?	0.51		0.51
72	Did you feel involved in decisions about your discharge from hospital?	0.40		0.40
73	Looking back, do you feel that the length of your stay in hospital was...?	0.45		0.45
74	Before leaving hospital, were you given enough information about caring for yourself and your baby at home?	0.43		0.43
75	Did hospital staff tell you who to contact if you were worried about your health or your baby's health after you left hospital?	0.31	4.61	4.93
76	Were you given information about possible changes to your emotional health after the birth of your baby?	0.27	5.96	6.23
77	Did hospital staff tell you who to contact if you needed support for any emotional changes you might experience after you left hospital?	0.31	14.80	15.11
78	Overall, how would you rate the care you received in the hospital after your baby was born?	0.47		0.47
79	If friends and family asked about your maternity experience at the hospital where you gave birth, how would you respond?	0.47		0.47
80	In the first two weeks after arriving home, did you have a postnatal visit with a midwife or nurse?	0.27		0.27
81	During a postnatal visit, did a midwife or nurse ask you how you were feeling emotionally?	0.36	2.96	3.32
82	In general, did you feel that the midwife or nurse listened to you? [at follow-up appointment]	0.43		0.43
83	In general, did you have enough time with the midwife or nurse to ask questions or discuss any concerns? [at follow-up appointment]	0.41		0.41
84	At any point during your pregnancy or after the birth, were you shown, or given information, about safe sleeping for your baby?	0.65		0.65
86	Apart from this recent birth, have you given birth before?	0.22		0.22
87	Highest level of education completed	0.31		0.31
88	In general, how would you rate your health?	0.45		0.45
89	Which, if any, of the following longstanding conditions do you have (including age-related conditions)?	1.19		1.19
90	Language mainly spoken at home	0.45		0.45

Question number	Question text	Missing %	Don't know %	Missing + Don't know %*
91	Did you need, or would you have liked, to use an interpreter at any stage while you were in hospital?	0.30		0.30
92	Did the hospital provide an interpreter when you needed one?	0.71		0.71
93	Aboriginal and/or Torres Strait Islander	0.52		0.52
94	Did you receive support, or the offer of support, from an Aboriginal Health Worker during your hospital stay?	0.35	8.48	8.83
95	Who completed this survey?	0.45		0.45
96	Do you give permission for the Bureau of Health Information to link your answers from this survey to health records related to you (the patient)?	0.67		0.67

*Percentages for this column may not equal the sum of the 'Missing %' and 'Don't know %' columns because they were calculated using unrounded figures. Percentages are unweighted.

Appendix 2

Derived measures

Definition

Derived measures are those for which results are calculated indirectly from respondents' answers to a survey question. These tend to be from questions that contain a 'not applicable' type response option and are used to gather information about patients' needs.

Derived measures involve the grouping together of more than one response option to a question. The derived measure 'Quintile of disadvantage' is an exception to this rule. For more information on this, please refer to the Data dictionary: Quintile of disadvantage on BHI's website at bhi.nsw.gov.au/nsw_patient_survey_program

Statistical methods

Results are expressed as the percentage of respondents who chose a specific response option or options for a question. The reported percentage is calculated as the numerator divided by the denominator (see definitions below).

Results are weighted as described in this report.

Numerator

The number of survey respondents who selected a specific response option/s to a certain question, minus exclusions.

Denominator

The number of survey respondents who selected any of the response options to a certain question, minus exclusions.

Exclusions

For derived measures, the following are usually excluded:

- response: 'don't know/can't remember' or similar non-committal response
- response: invalid (i.e. respondent was meant to skip a question but did not)
- response: missing (with the exception of questions that allow multiple responses or a 'none of these' or 'none of the above' option, to which the missing responses are combined to create a 'none reported' variable).

Interpretation of indicator

The higher the percentage, the more respondents fell into that response category.

Table 10 shows the questions and responses used in the construction of the derived measures for the Maternity Care Survey 2019 questionnaire.

Table 10 Derived measures for the Maternity Care Survey 2019 questionnaire

Derived measure	Original question	Derived measure categories	Original question responses
Antenatal care provider type	Q3. Who provided most of your antenatal care?	Most by private midwife/obstetrician or GP	GP/family doctor Private midwife/midwives Private obstetrician
		Most by public hospital	Public hospital midwife/midwives including Midwifery Group Practice Public hospital obstetrician
Antenatal care provided by public hospital*	Q4. Was this antenatal care provided by the hospital named on the cover of this booklet?	Most by same public hospital as where baby was born	Yes
		Most by different public hospital as where baby was born	No
Needed information about pain relief options for the birth	Q23. Did you receive enough information about pain relief options prior to the birth?	Did not need information	I did not need information about pain relief options
		Needed information	No
			Yes, definitely Yes, to some extent
Type of birth	Q28. What type of birth did you have?	Caesarean section	Caesarean section after going into labour (emergency)
			Caesarean section before going into labour (planned)
		Vaginal birth	Assisted vaginal birth (with vacuum extraction or forceps)
			Vaginal birth
Knew all the midwives or doctors who provided care during labour and birth	Q34. Did the midwives or doctors who you did not already know, introduce themselves to you during your labour and birth?	Already knew them	I already knew all the staff who cared for me
		Didn't know them	No
			Yes, always Yes, sometimes
Needed assistance from midwives or doctors during labour and birth	Q35. Were you able to get assistance from midwives or doctors when you needed it?	Didn't need assistance	I did not need assistance
		Needed assistance	No
			Yes, always Yes, sometimes
Needed information about how to care for self after the birth	Q50. After the birth, did the health professionals give you enough information about how to care for yourself (e.g. how to go to the toilet, how to sit and lie down)?	Needed information	No
			Yes, completely Yes, to some extent
		Not applicable to situation	Not applicable to my situation

*Calculation of the derived measure 'Antenatal care provided by public hospital' was dependent on how women answered Q3 and Q4. If a woman's response to Q3 was 'Public hospital midwife/midwives including Midwifery Group Practice' or 'Public hospital obstetrician', they were directed to answer Q4. If they responded with 'Yes' to Q4, their derived measure value was 'Most by same public hospital as where baby was born'. If they responded with 'No' to Q4, their derived measure value was 'Most by different public hospital as where baby was born'.

Derived measure	Original question	Derived measure categories	Original question responses
Needed information about how to care for the baby after the birth	Q51. After the birth, did the health professionals give you enough information about how to care for your baby (e.g. how to hold your baby, how to put a nappy on your baby)?	Needed information	No Yes, completely Yes, to some extent
		Not applicable to situation	Not applicable to my situation
Had religious or cultural beliefs to consider	Q53. Were your cultural or religious beliefs respected by all hospital staff?	Beliefs not an issue	My beliefs were not an issue
		Had beliefs to consider	No, my beliefs were not respected Yes, always Yes, sometimes
After the birth, needed assistance or advice from health professionals in the hospital	Q56. After the birth of your baby, were you able to get assistance or advice from health professionals when you needed it?	Didn't need assistance	I did not need assistance or advice
		Needed assistance	No Yes, always Yes, sometimes
Bothered by noise, lack of privacy, lack of security or lighting during stay in hospital	Q61. During your stay in hospital, were you ever bothered by any of the following?	Not bothered	None of the above
		Was bothered	Lack of privacy Lack of security for your belongings Lighting Noise from hospital staff Noise from other people's babies Noise from patients Noise from visitors
Made decisions about feeding the baby	Q67. Were your decisions about how you wanted to feed your baby respected by the health professionals?	Made decisions	No Yes, always Yes, sometimes
		Not applicable to situation	Not applicable to my situation
Received advice about feeding the baby from health professionals in the hospital	Q68. Did you ever receive conflicting advice about feeding your baby from the health professionals?	Not applicable to situation	Not applicable to my situation
		Received advice	No Yes
Wanted to be involved in decisions about their discharge from hospital	Q72. Did you feel involved in decisions about your discharge from hospital?	Didn't want involvement	I did not want or need to be involved
		Wanted involvement	No, I did not feel involved Yes, definitely Yes, to some extent
Needed information about caring for self and baby at home	Q74. Before leaving hospital, were you given enough information about caring for yourself and your baby at home?	Didn't need information	I did not need this information
		Needed information	No Yes, completely Yes, to some extent

Derived measure	Original question	Derived measure categories	Original question responses	
Had follow-up postnatal visit with a midwife or nurse	Q80. In the first two weeks after arriving home, did you have a postnatal visit with a midwife or nurse?	Didn't have follow-up	No	
		Had follow-up	Yes, at a hospital Yes, at home Yes, somewhere else	
Received information about safe sleeping for baby	Q84. At any point during your pregnancy or after the birth, were you shown, or given information, about safe sleeping for your baby?	No	No, I was not shown, or given information, about safe sleeping	
		Yes, given information	Yes, I was given this information Yes, the midwives or doctors showed me safe sleeping techniques for my baby	
Respondent had university degree	Q87. What is the highest level of education you have completed?	Has university degree/s	Post graduate/higher degree University degree	
		No university degree	Completed Year 12 or equivalent Less than Year 12 or equivalent	
			Trade or technical certificate or diploma	
Aboriginal and/or Torres Strait Islander	Q93. Are you of Aboriginal origin, Torres Strait Islander origin, or both?	Aboriginal	Yes, Aboriginal Yes, Torres Strait Islander Yes, both Aboriginal and Torres Strait Islander	
			Non-Aboriginal	No

References

1. NSW Ministry of Health, Aboriginal and Torres Strait Islander Origin – Recording of Information of Patients and Clients. Policy Directive. Sydney, Australia.
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3. SAS Documentation: Example Weighted Multilevel Model for Survey Data. [online] Available from: **documentation.sas.com/?docsetId=statug&docsetTarget=statug_glimmix_examples23.htm&docsetVersion=15.1&locale=en**

About the Bureau of Health Information

The Bureau of Health Information (BHI) is a board-governed organisation that provides independent information about the performance of the NSW healthcare system.

BHI was established in 2009 and supports the accountability of the healthcare system by providing regular and detailed information to the community, government and healthcare professionals. This in turn supports quality improvement by highlighting how well the healthcare system is functioning and where there are opportunities to improve.

BHI manages the NSW Patient Survey Program, gathering information from patients about their experiences and outcomes of care in public hospitals and other healthcare facilities.

BHI publishes a range of reports and information products, including interactive tools, that provide objective, accurate and meaningful information about how the health system is performing.

BHI's work relies on the efforts of a wide range of healthcare, data and policy experts. All of our assessment efforts leverage the work of hospital coders, analysts, technicians and healthcare providers who gather, codify and supply data. Our public reporting of performance information is enabled and enhanced by the infrastructure, expertise and stewardship provided by colleagues from NSW Health and its pillar organisations.

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