Adult Admitted Patient Survey 2020

Technical Supplement

November 2021

The conclusions in this report are those of BHI and no official endorsement by the NSW
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Table of contents

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 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 Adult Admitted Patient Survey (AAPS) 2020.

For changes in the questionnaire content between AAPS 2019 and AAPS 2020, please refer to the development report on BHI's website at **bhi.nsw. gov.au/__data/assets/pdf_file/0007/586177/BHI_ AAPS_2020_DEVREPORT.pdf**

Adult Admitted Patient Survey

AAPS has been conducted annually since 2013 and is mailed to adult patients who are admitted to a NSW public hospital between January and December each year.
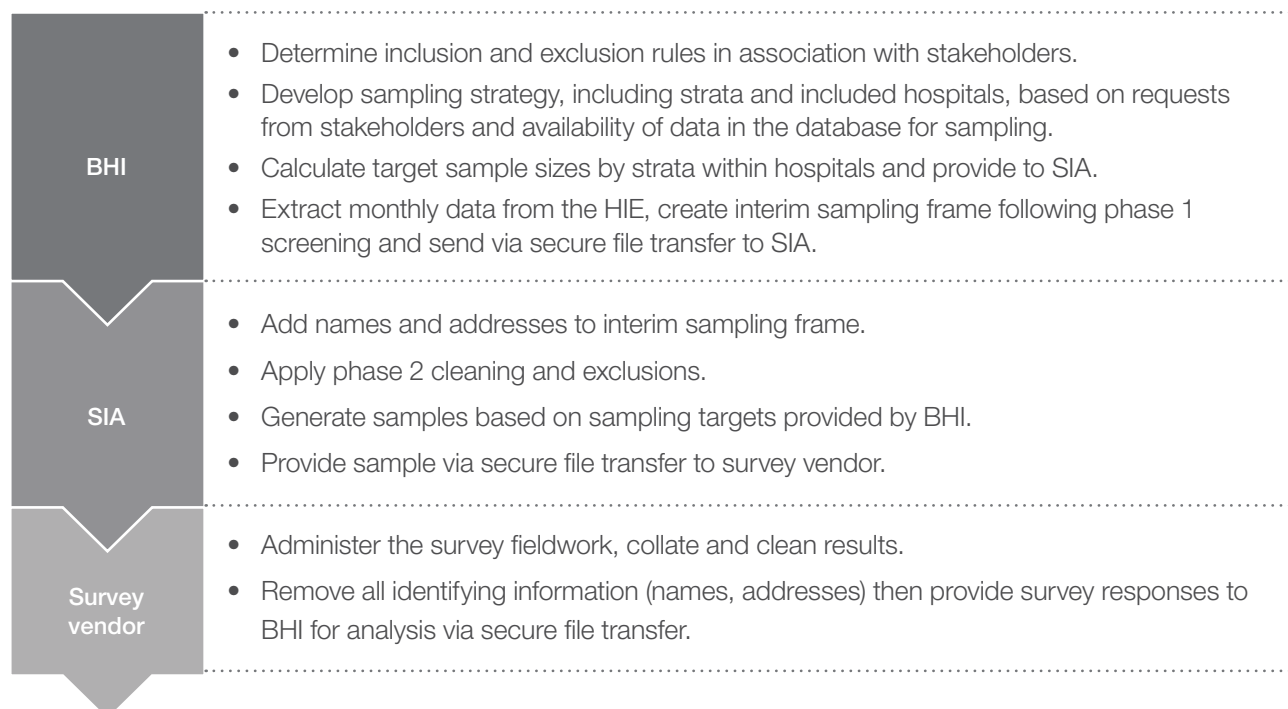
Producing survey samples

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 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 AAPS, as with all other BHI surveys, is a collaboration between BHI, the survey vendor and the Ministry's Systems Information and Analytics (SIA) branch. Figure 1 shows the organisational responsibilities in sampling and survey processing for AAPS 2020.

BHI has access to de-identified unit record hospital data from selected tables of NSW Health's Health Information Exchange (HIE) database. Use of an encrypted patient number allows de-duplication of patients within a hospital. For AAPS, sampling frames are extracted on a monthly basis, with the date at discharge used to define eligible patients. Sampling targets for each hospital are calculated in advance, as explained in the section 'Targets for sampling and drawing the sample' (page 4).

Figure 1   Organisational responsibilities in sampling and survey processing, AAPS 2020

BHI
- Determine inclusion and exclusion rules in association with stakeholders.
- Develop sampling strategy, including strata and included hospitals, based on requests from stakeholders and availability of data in the database for sampling.
- Calculate target sample sizes by strata within hospitals and provide to SIA.
- Extract monthly data from the HIE, create interim sampling frame following phase 1 screening and send via secure file transfer to SIA.

SIA
- Add names and addresses to interim sampling frame.
- Apply phase 2 cleaning and exclusions.
- Generate samples based on sampling targets provided by BHI.
- Provide sample via secure file transfer to survey vendor.

Survey vendor
- Administer the survey fieldwork, collate and clean results.
- Remove all identifying information (names, addresses) then provide survey responses to BHI for analysis via secure file transfer.

Inclusion criteria

For AAPS 2020, the target population included patients aged 18+ years who were discharged from a NSW public hospital between January and December 2020. Patients were eligible to participate in the survey if the last 'episode of care' for their most recent hospital stay in a sampling month was for acute or rehabilitation care.

Data from the HIE Admitted Patient Data Collection (APDC) were passed through two phases of screening to create a frame of patients eligible to participate in AAPS 2020. BHI conducted phase 1 screening, and SIA conducted phase 2 screening.

Phase 1 screening

Inclusions

- Admitted patients aged 18+ years, who received either 'acute' or 'rehabilitation care' in hospital (episode of care types 1 and 2) and were admitted to a NSW public hospital with a peer group classification of either:

    - A1: Principal referral

    - A3: Ungrouped acute – tertiary referral

    - B1: Major hospitals group 1

    - B2: Major hospitals group 2

    - C1: District group 1

    - C2: District group 2.

Exclusions

The following patients were excluded from the sampling frame:

- patients who died during their hospital admission (mode of separation of six or seven)

- patients receiving Acute and Post-Acute Care (APAC) services.

A series of further exclusion criteria were applied to consider 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; and the relevance of the survey questions to particular patient groups. As a result, patients meeting the following exclusion criteria were also removed in Phase 1 screening:

- admitted for a termination of pregnancy procedure: procedure code 35643-03

- admitted to a psychiatric unit during any hospital stay during the sampling month

- treated for maltreatment syndromes: ICD-10 code = T74 in any diagnosis field, including neglect or abandonment, physical abuse, sexual abuse, psychological abuse, other maltreatment syndromes or 'unspecified'

- treated for contraceptive management: ICD-10 code = Z30 in any diagnosis field, including general counselling and advice on contraception, surveillance of contraceptive drugs, surveillance of contraceptive device, other contraceptive management, or 'unspecified'

- patients who gave birth in the target hospital during the sampling month: ICD-10 codes Z37.0, Z37.2, O80-O84; or procedure codes 90467, 90468, 90469, 90470 or 16520

- admitted for pregnancy with an abortive outcome: ICD-10 code = O00-O08

- diagnosis of stillborn baby: ICD-10 code = Z37 in any diagnosis field (including single stillbirth, twins (one liveborn and one stillborn), twins (both stillborn) and other multiple births (some liveborn)

- intentional self-harm, or sequelae of intentional self-harm: ICD-10 code between X60 and X84 or ICD-10 code = Y87.0

- unspecified event, undetermined intent: ICD-10 code commencing with Y34

- suicidal ideation: ICD-10 code = R45.81

- family history of other mental and behavioural disorders: ICD-10 code commencing with Z81.8

- personal history of self-harm: ICD-10 code commencing with Z91.5

- admitted for same-day haemodialysis: procedure code 13100-00 in any procedure field

- same-day patients who stayed for less than three hours

- same-day patients transferred to another hospital

- records that did not include a date of birth.

Many of these exclusions require knowledge of the diagnosis codes. Coding of admitted patient records should occur within six weeks of discharge but can vary. At the NSW level in 2020, by the time sampling was undertaken, less than 5% of patients had incomplete diagnosis coding. The level of coding completeness differed by month and by hospital, with no more than four hospitals having more than 70% incompletely coded records per month.

Records with incomplete diagnosis coding were not excluded because the exclusion of these records may impact the ability to meet the sample size required to ensure robust results are available at the hospital level.

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 also removed in Phase 2 screening:

- 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

- invalid date of birth

- on the 'do not contact' list

- sampled in the previous six months for any BHI patient survey

- mode of separation of death for a subsequent admission to hospital

- recorded as deceased according to the NSW Registry of Birth Deaths and Marriages and/or NSW Health data collection reporting, prior to the sample being provided to the survey vendor.

The result was considered by BHI as the final sampling frame.

Targets for sampling and drawing the sample

Sample design

Sample 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.

A stratified sample design was applied, with each hospital defined as a stratum. Within each hospital, patients were further stratified by the following variables:

- Age group: 18-49 years or 50+ years, based on the age variable

- Stay type: same-day or overnight admission, based on the start and end times of the last admitted patient stay in the month.

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

Changes between AAPS 2019 and AAPS 2020

- A common response rate was used to adjust for non-response in AAPS 2020 (36%), whereas in AAPS 2019 the response rate used differed between the age groups (20% for 18–49 years, 55% for 50+ years).

- Measurement frequency for most hospitals changed from quarterly to semi-annual. See 'Calculation of sample sizes and measurement frequency' on page 6 for further details.

- There was no oversampling of Aboriginal patients in AAPS 2020.

- The margin of error used in equation 1 (see page 6) changed from 0.072 in AAPS 2019 to 0.07 in AAPS 2020.

Changes during the survey year

Between May and July 2020, patients with a diagnosis in scope of the Leading Better Value Care (LBVC) program were eligible for the LBVC survey. Patients selected for the LBVC survey were not eligible for selection for AAPS 2020 if they were admitted to the same or a different hospital within six months of being mailed the LBVC questionnaire.

BHI was also advised by SIA to make the following changes during the survey year:

- From August 2020, only patients who received all their admitted patient care in a single public hospital were included in the sampling frame. In addition, patients receiving collaborative care* or Community/Residential care† were also excluded.

- From 26 March 2020, the Commonwealth Government's National Cabinet suspended all non-urgent elective surgery in response to the COVID-19 pandemic. When non-urgent elective surgery resumed, some public hospitals entered into collaborative or contracted care arrangements for surgical activity with private or other public hospitals. The HIE tables used for identifying the survey population recorded the care under the original facility code. The care for these patients could not be attributed to the original hospital, so they were excluded.

- The code for identifying patients who received at least part of their stay at another facility is obtained from the 'contract status' field‡. A contract status of '0' indicates admitted patient care was received from a single facility.

- In August 2020, 68,980 of 71,246, (97%) of the records eligible for AAPS following Phase 1 screening received care from a single facility.

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* 'Collaborative care' represents a 'virtual' bed established on the patient administration system to record admitted patient activity provided by another public or private hospital under a collaborative (or contract) care arrangement. Collaborative care is defined by the unit type of (29) 'Collaborative Care Service Provider – General', (30) 'Collaborative Care Service Provider – Drug and Alcohol'. (32) 'Collaborative Care Service Provider – Mental Health'.

† 'Community/Residential care' represents a residential aged care place operated in a high care residential aged care facility, or mental health community residential care clients in a unit staffed 24 hours a day. Community/Residential care is defined by the unit type of (51) 'Respite – High: Federal Govt. Block Funded', (52) 'Respite – Low: Federal Govt. Block Funded', (54) ' Mental Health Community Residential (24 hour staff)', (55) 'Mental Health Community Residential (< 24 hour staff)'.

‡ 'Contract status' field indicates whether or not the admitted patient service being provided during this stay in hospital is being performed under a contractual agreement with another facility or health service.

Calculation of sample sizes and measurement frequency

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

Monthly sample sizes were determined prior to the commencement of the survey cycle. Although sampling was undertaken monthly, sample size calculations were based on the measurement frequency of each hospital. The measurement frequency equates to the periods for which results are expected to be reported. For AAPS 2020, all hospitals were sampled with a semi-annual measurement frequency with the exception of hospitals in LHDs with fewer than three hospitals included in the survey. Hospitals in Far West LHD, Central Coast LHD and St Vincent's Health Network were sampled with a quarterly measurement frequency in order to ensure sufficient responses for robust reporting of quarterly LHD-level key performance indicators (KPIs).

Monthly hospital-level targets were based on data collated from January to December 2019 (after Phase 1 of the screening process).

The sample size calculation aimed for a confidence interval around an expected proportion of 0.8 of ±0.07 at the hospital level. Sample sizes were then allocated proportionately across strata internal to the hospital to ensure that allocations across age and stay type groups were approximately in proportion to the target population.

The target sample size (desired number of responses) for each hospital *(i)* was estimated using the following equation:

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

Where:

S_i = target sample size for the measurement period, for hospital i

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

N_i = target population of hospital i per measurement 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).

Finally, sample sizes were inflated to account for non-responses to the survey. This was done by dividing the target sample size by the expected response rate. A response rate of 36% was used for AAPS 2020.

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 age group/stay type stratum, this was increased to six patients).

The adjusted cell sample sizes were provided to SIA as the monthly targets for the AAPS 2020 survey. For each month of sampling, SIA randomly selected patients within each stratum, according to these targets.

RPAH Institute of Rheumatology and Orthopaedics and Royal Prince Alfred Hospital are combined for sample size calculation and reporting. As the two entities have different facility codes in the HIE, separate targets are set for strata within each entity.

* 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

Sampled patients 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.

Patients selected for AAPS for the months of January to June 2020 received an invitation to complete the questionnaire online instead of a paper questionnaire in the first and second mailings. A third mailing included the paper questionnaire. This was done to allay any concerns respondents may have had about completing and posting the paper questionnaire because of concerns about COVID-19.

All text fields were checked for potential identifying information (e.g. mentions of patient or staff names, dates of treatment, date of birth or age, contact details or addresses, physical appearance) and any that were found were replaced with 'XXXX'. However, on rare occasions, 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 questionnaire's 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 access by authorised staff only.

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.

Data analysis

For AAPS 2020, there were 50,278 questionnaires mailed and 16,313 responses received.

Completeness of questionnaires

Survey completeness is a measure of how many questions each respondent answered as a proportion of all questions in the questionnaire. The completeness of responses was high overall, with respondents answering, on average, 80 of the 98 non-text questions (this includes questions that were correctly skipped).

Response rate

The response rate is the percentage of people sampled who actually completed and returned or submitted their responses. The overall response rate, number of mailings, number of respondents and design effect are provided in Appendix 1.

Weighting of data

Survey responses were weighted to optimise the degree to which results were representative of the experiences and outcomes of the eligible population. At the NSW and LHD levels, 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.

Weights were calculated in two stages:

1. for each quarter of data as they became available

2. once 12 months of data were available.

For each quarter of data, responses were weighted at the hospital level, where possible, to match the population by age (18–49 years or 50+ years) and stay type (same-day or overnight). This weighting

was completed for hospitals that were sampled for quarterly reporting and at the LHD level for hospitals that were sampled for semi-annual reporting.

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

$$w_i = \frac{N_i}{n_i}$$

where:

N_i = total number of patients eligible for the survey in the ith stratum

n_i = number of respondents in the ith 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 age groups or service categories, unless this increased the weight of the small cell. Decisions on aggregation were agreed by two analysts.

The interim quarterly 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 equal the population totals even though it is often impossible for the weights to equal the population at the individual cell level (i.e. within each hospital and stratum).

The marginal totals specified were: hospital (hospitals within the same LHD that were reported semi-annually were combined into one entity), service category, and age group. The GREGWT macro was run with hospital, service category and age group as benchmarks for quarterly weights, with a lower bound of one specified in the macro.

Each quarter of data was weighted separately using this process. These weights were used for results based on data combined over less than 12 months.

Once the four quarters of data were available, they were aggregated. The weights for hospitals sampled on the basis of semi-annual reporting were recalculated at the hospital level. The adjusted (annual) weights were used to report results based on the full 12 months of data. For annual weighting, the GREGWT macro was used, in two stages, to ensure weights were equal to populations at the margins.

The GREGWT macro was run with the following benchmarks for annual weighting:

- benchmark 1: hospital
- benchmark 2: quarter x LHD
- benchmark 3: hospital, stay type and age group.

The interim quarterly weights were used as initial response weights, with a lower bound of one specified in the macro. Weights generated using the GREGWT macro were trimmed to 400 to avoid extreme weights.

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 1.9 to 10.8.

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+coefficient of variance [weights] by the power of 2). The DEFF was calculated for each LHD and overall, for each quarter and for the four quarters combined. Across hospitals, the maximum DEFF was 2.3 and across LHDs, it was 3.3. 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 that is sampled has 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 Appendix 1 at NSW, LHD and hospital level.

Weighted percentages

All the results in the report were weighted. The weighted percentage of patients selecting 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.

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.

To ensure comparability across years, the inclusion of missing and 'Don't know'/'Can't remember' responses in the AAPS 2020 analysis is consistent with 2019.

When reporting on questions used to identify sub-cohorts, the 'Don't know'/'Can't remember' option and missing responses were also reported. Appendix 2 presents the rates of missing or 'Don't know'/'Can't remember' responses for all questions.

It is assumed that no bias is introduced by the way patients who did not respond to the whole survey, or did not respond to specific questions, were handled. This is because it is also assumed these patients did so randomly and therefore any missing responses do not relate to the experience of care.

For some questions, the results from several responses were combined to form a 'derived measure'. For information about how these measures were developed, please see Appendix 3.

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 target population.

Table 1 shows demographic characteristics of respondents against the target population.

The four columns denote:

1. percentage in target population – the target 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 target population.

Table 1 Demographic characteristics of target population and respondents, AAPS 2020

Demographic variable	Sub-group	% in target population	% in eligible population	% in respondents (unweighted)	% in respondents (weighted)
LHD	Central Coast	5	5	6	5
	Far West	0	0	2	0
	Hunter New England	13	12	18	12
	Illawarra Shoalhaven	5	5	6	5
	Mid North Coast	5	4	6	4
	Murrumbidgee	3	3	5	3
	Nepean Blue Mountains	5	5	5	5
	Northern NSW	6	6	11	6
	Northern Sydney	7	7	4	7
	South Eastern Sydney	11	11	6	11
	South Western Sydney	12	12	5	12
	Southern NSW	3	2	9	2
	St Vincent's Health Network	2	2	2	2
	Sydney	9	9	4	9
	Western NSW	4	4	7	4
	Western Sydney	10	10	4	10
Peer group	A1	46	47	18	47
	A3	3	3	4	3
	B	35	35	26	35
	C1	10	10	20	10
	C2	6	5	33	5
Age group	18–49 years	31	33	13	32
	50+ years	69	67	87	68
Stay type	Overnight	66	63	60	63
	Same day	34	37	40	37
Aboriginal status	Non-Aboriginal	96	#	98	98
	Aboriginal	4	#	2	2
Sex*	Male	50	#	47	47
	Female	50	#	53	53

#: Data not available.
*Information on sex is drawn from administrative data.

Standardised comparisons

To enable fairer comparisons between a hospital and the NSW result, in this survey, BHI used models adjusted for patients' socio-demographic characteristics (age, sex, language spoken at home and education level). Therefore, when a hospital is flagged as having a significantly higher or lower result than NSW, this should reflect differences in patient experiences rather than differences in a hospital's patient mix. The standardised comparison is currently only applied at the hospital level and not at LHD level.

The covariates included in the modelling for AAPS 2020 data are based on results of a thorough study conducted in 2018.

Methodology

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. Missing data in questions were excluded from the analyses. Logistic regression mixed models were used, with hospitals included as a random intercept term. Other covariates were included as fixed variates in the model.

The general formula for the logistic mixed model is:

$$g\big(E(Y_i)\big) = \boldsymbol{\beta} \boldsymbol{X}_i + b_i Z_i$$
$$b_i \sim N(0; D)$$

where:

- the link function $g(\cdot)$ is the logistic function
  $$g\big(\pi_{ij}\big) = \log\left(\frac{\pi_{ij}}{1-\pi_{ij}}\right)$$

- $\boldsymbol{X}_i$ is the design matrix for fixed effect covariates

- $\boldsymbol{\beta}$ is the vector containing estimates for fixed effect covariates

- Z_i is the design matrix for random effects, i=1 to number of facilities

- b_i is the vector of random intercepts (facilites), i=1 to number of facilities.

Covariate selection

Differences in patient experiences between groups may reflect differences in experiences of care. However, they may also reflect differences in expectations, or 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) were also considered as they may relate to response tendency. A list of all patient characteristics considered for inclusion in the model for standardised comparisons and how they were sourced is included in Table 2.

Information on patient health status – such as self-reported overall health or mental health status – or mode of survey response could also influence both experiences of care and responding tendency, but these were not considered for inclusion in the model. Currently BHI only standardises comparisons for experience of care questions by adjusting patient, not clinical or health, characteristics.

For age and sex, missing values were filled in using administrative data. Missing data for other characteristics were included as a separate category in the model.

Table 2   Patient characteristics considered for adjustment, AAPS

Variable	Source	Categories
Age	Survey question ('What year were you born?'), or using administrative data if missing	18–34
		35–54
		55–74
		75+ years
Sex	Survey question ('What is your gender?'), or using administrative data if missing	Female
		Male
Education	Survey question ('What is the highest level of education you have completed?')	Completed year 12
		Trade/technical certificate/diploma
		University degree
		Postgraduate/higher degree
		Missing
Language mainly spoken at home	Survey question ('Which language do you mainly speak at home?')	English
		Language other than English
		Missing
Stay type	Administrative data	Same-day admission
		Overnight admission
ED on arrival	Survey question ('When you arrived in hospital did you spend time in the emergency department?')	Yes
		No
		Missing
Proxy response	Survey question ('Who completed this survey?')	The patient
		The patient with help
		Someone else on patient's behalf
		Missing
Mode of survey response	Response data	Paper
		Online

Table 3 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) as independent variables for all performance 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 models.

2. Multivariate logistic mixed models were fitted across all performance questions using the covariates selected from stage one, with age and sex included in all models. Forward stepwise modelling was used based on the equation above, including age, sex and all additional covariates added appropriately. 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.[1]

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 which has the list of covariates to be included in the standardised comparisons. This process is assessed independently for each survey in the NSW Patient Survey Program. 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 questions in the survey.

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. whether patients were staying overnight or had a same-day admission) 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 smaller model had results very similar to those with the hospital factors included (e.g. stay type, admission type). The remaining covariates were then used in the final model to adjust for each performance-related question to create the standardised comparisons.

Age, sex, education and language spoken at home were chosen for adjustment for the comparison model.

Table 3

Table 3   Covariates considered for adjustment for comparisons at each selection stage, AAPS 2020

	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	✓	✓	✓	✓
Sex	✓	✓	✓	✓
Education	✓	✓	✓	✓
Language spoken at home	✓	✓	✓	✓
Stay type	✓	✓	✓	
ED on arrival	✓	✓	✓	
Proxy response	✓	✓	✓	
Mode of survey response	✓	✓	✓	

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.

- When results flagged as 'interpret with caution' (page 16) or when the model did not converge, 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. The PROC SURVEYFREQ procedure with a finite population correction factor and the Clopper-Pearson adjustment was used to adjust for the sampling weights when calculating the percentages and related confidence intervals. Hospital, service category and age group were included as strata variables.

The PROC GLIMMIX procedure and 'weight statement' was used for performing logistic mixed models to compare hospital results with NSW, adjusting for covariates and sampling weights.[2]

The calculation of percentages and standardised comparisons were adjusted for sampling weights using these SAS procedures.

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 the reporting level (hospital, LHD or NSW) to be reportable. This ensures there are enough respondents for reliable estimates, and patient confidentiality and privacy are protected.

For AAPS 2020, all hospitals had more than 30 respondents and were therefore eligible for public reporting.

Suppression rules

When the number of respondents at a hospital or LHD were fewer than 30, results will be suppressed. The results suppressed still contribute to NSW level result and/ or LHD level result.

For questions asking about types of complications (i.e. experienced an infection, uncontrolled bleeding, a negative reaction to medication, complications as a result of surgery), results are reported at NSW level because of low prevalence at the hospital and LHD levels. However, the combined complication prevalence (i.e. had any complication) is reported at all levels. No statistical comparison was done for these questions, as the survey data currently do not capture information on patient clinical conditions that might influence results for these questions.

Interpret with caution

All data collected using surveys are subject to sampling error (i.e. the difference between results based on a sample of a target population, and the results if all people who received care were surveyed). The 95% confidence interval of the average is expected to contain the true result 19 times out of 20.

Where the confidence interval was wider than 20 percentage points, results for individual questions 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.

Where the number of respondents was between 30 and 49 with a response rate at or above 20%, or the number of respondents more than 49 with a response rate less than 20%, results are publicly reported and an 'interpret with caution' note appended to the hospital to indicate an uncertainty about the representativeness of the result.

Reporting by population group

In addition to reporting results for all respondents, BHI also reports the results by specific groups, as follows:

- Age
- Sex
- Education level
- Language spoken at home
- Longstanding health condition: 'had condition/s', 'none reported'
- Rurality of hospital: 'major cities', 'inner regional', 'outer region or remote or very remote'*
- Aboriginal status (at NSW level only).

The above results, where they satisfy BHI's suppression rules (page 16) are available on the **BHI Data Portal**.

Monthly trend analysis

In the Snapshot report for AAPS 2020, patients' overall ratings of care are presented for each month of 2020, in comparison with 2019, to provide insights into patient experience at different times throughout the year.

For AAPS 2020, the NSW-level data was analysed by month and weighted by the annual weight. The results were compared with AAPS 2019 (without adjustment) to identify any changes in patient experience over time. Changes in patient experience could be due to factors not accounted for in the analyses such as patient characteristics, or by changes in the system (e.g. the introduction of a new policy).

Sensitivity analyses were conducted to investigate if the changes in patient experience between AAPS 2019 and 2020 were due to changes in sampling methodology. In AAPS 2020, the overall sample size of respondents was smaller, and patients aged 18–49 were not oversampled. Aboriginal patients were also not census sampled in 2020. The sensitivity analyses confirmed that changes in results were not due to differences in sampling methodology.

The monthly results were weighted by the annual weight, and therefore may differ from the results published in BHI's report, *Healthcare in Focus – New South Wales and the COVID-19 pandemic in 2020*, where the results were analysed by month and weighted by the quarterly weights.

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

Appendix 1

Surveys mailed, survey responses, response rate and design effects at NSW, LHD and hospital level, AAPS 2020

Table 4 — Number of surveys mailed, responses, response rates and design effects (DEFF) by LHD and overall, AAPS 2020

NSW/LHD	Surveys mailed	Survey responses	Response rate (%)	DEFF
NSW	50,278	16,313	32	2.7
LHD				
Central Coast	2,666	905	34	1.2
Far West	1,145	286	25	1.2
Hunter New England	9,265	3,013	32	3.3
Illawarra Shoalhaven	2,435	933	37	2.6
Mid North Coast	2,604	1,056	40	2.3
Murrumbidgee	2,406	808	33	3.3
Nepean Blue Mountains	2,580	854	31	3.3
Northern NSW	4,729	1,740	36	2.8
Northern Sydney	2,026	679	33	1.6
South Eastern Sydney	3,336	963	30	1.6
South Western Sydney	3,340	858	25	1.7
Southern NSW	3,821	1,443	38	1.5
St Vincent's Health Network	1,334	347	27	1.2
Sydney	2,244	626	28	1.2
Western NSW	3,642	1,164	31	2.4
Western Sydney	2,705	638	24	1.7

Table 5 Measurement frequency, number of surveys mailed, responses, response rates and design effects (DEFF) by hospital, AAPS 2020

Hospital	Measurement frequency	Surveys mailed	Survey responses	Response rate (%)	DEFF
Armidale Hospital	Semi-annual	663	226	34	1.4
Auburn Hospital	Semi-annual	669	141	21	1.2
Ballina District Hospital	Semi-annual	595	223	39	1.2
Bankstown-Lidcombe Hospital	Semi-annual	668	137	20	1.4
Batemans Bay District Hospital	Semi-annual	632	240	40	1.1
Bathurst Health Service	Semi-annual	654	197	29	1.6
Belmont Hospital	Semi-annual	659	233	36	1.4
Blacktown Hospital	Semi-annual	689	173	25	1.3
Blue Mountains District Anzac Memorial Hospital	Semi-annual	634	249	39	1.5
Bowral and District Hospital	Semi-annual	652	257	40	1.5
Broken Hill Health Service	Quarterly	1,145	286	25	1.2
Byron Central Hospital	Semi-annual	500	155	31	1.3
Calvary Mater Newcastle	Semi-annual	663	216	33	1.4
Campbelltown Hospital	Semi-annual	679	170	25	1.3
Canterbury Hospital	Semi-annual	678	170	25	1.2
Casino & District Memorial Hospital	Semi-annual	485	175	36	1.5
Cessnock Hospital	Semi-annual	625	230	37	1.3
Coffs Harbour Health Campus	Semi-annual	687	261	38	1.4
Concord Repatriation General Hospital	Semi-annual	681	200	30	1.1
Cooma Hospital and Health Service	Semi-annual	578	214	38	1.2
Cowra Health Service	Semi-annual	590	206	35	1.4
Deniliquin Health Service	Semi-annual	482	176	37	2.0
Dubbo Hospital	Semi-annual	677	199	29	1.7
Fairfield Hospital	Semi-annual	659	140	21	1.3
Gosford Hospital	Quarterly	1,347	467	35	1.3
Goulburn Base Hospital	Semi-annual	651	230	35	1.3
Grafton Base Hospital	Semi-annual	648	255	40	1.5
Griffith Base Hospital	Semi-annual	660	188	29	1.3
Gunnedah Hospital	Semi-annual	433	148	34	1.3
Hawkesbury District Health Service	Semi-annual	660	203	30	1.5
Hornsby Ku-ring-gai Hospital	Semi-annual	665	241	36	1.2
Inverell Hospital	Semi-annual	576	183	33	1.3
John Hunter Hospital	Semi-annual	697	209	30	1.4

Hospital	Measurement frequency	Surveys mailed	Survey responses	Response rate (%)	DEFF
Kempsey District Hospital	Semi-annual	662	282	46	1.2
Kurri Kurri Hospital	Semi-annual	689	326	51	1.1
Lachlan Health Service - Forbes	Semi-annual	461	154	34	1.5
Lismore Base Hospital	Semi-annual	675	246	36	1.3
Lithgow Hospital	Semi-annual	607	225	38	1.7
Liverpool Hospital	Semi-annual	682	154	23	1.1
Macksville District Hospital	Semi-annual	580	251	46	1.2
Maclean District Hospital	Semi-annual	515	213	42	1.3
Maitland Hospital	Semi-annual	696	214	30	1.5
Manning Hospital	Semi-annual	684	243	36	1.3
Milton Ulladulla Hospital	Semi-annual	403	175	43	1.8
Moree Hospital	Semi-annual	501	100	21	2.3
Moruya Hospital	Semi-annual	632	256	40	1.3
Mount Druitt Hospital	Semi-annual	674	158	23	1.4
Mudgee Health Service	Semi-annual	590	190	30	1.7
Murwillumbah District Hospital	Semi-annual	622	249	42	1.2
Muswellbrook Hospital	Semi-annual	590	197	34	1.3
Narrabri Hospital	Semi-annual	487	122	26	2.0
Nepean Hospital	Semi-annual	679	177	26	1.4
Orange Health Service	Semi-annual	670	218	32	1.4
Port Macquarie Base Hospital	Semi-annual	675	262	40	1.7
Prince of Wales Hospital	Semi-annual	676	171	25	1.3
Queanbeyan Hospital and Health Service	Semi-annual	644	217	34	1.2
Royal Hospital for Women	Semi-annual	620	173	27	1.3
Royal North Shore Hospital	Semi-annual	679	224	33	1.1
Royal Prince Alfred Hospital	Semi-annual	885	256	29	1.1
Ryde Hospital	Semi-annual	682	214	31	1.2
Shellharbour Hospital	Semi-annual	674	256	39	1.3
Shoalhaven District Memorial Hospital	Semi-annual	684	286	42	1.7
Singleton Hospital	Semi-annual	629	170	27	1.5
South East Regional Hospital	Semi-annual	684	286	42	1.4
St George Hospital	Semi-annual	673	197	29	1.2
St Vincent's Hospital Sydney	Quarterly	1,334	347	27	1.2
Sutherland Hospital	Semi-annual	688	230	33	1.4
Sydney Hospital and Sydney Eye Hospital	Semi-annual	679	192	28	1.2
Tamworth Hospital	Semi-annual	673	196	29	1.7

Hospital	Measurement frequency	Surveys mailed	Survey responses	Response rate (%)	DEFF
The Tweed Hospital	Semi-annual	689	224	33	1.3
Wagga Wagga Base Hospital	Semi-annual	663	219	33	1.5
Westmead Hospital	Semi-annual	673	166	25	1.2
Wollongong Hospital	Semi-annual	674	216	32	1.4
Wyong Hospital	Quarterly	1,319	438	34	1.1
Young Health Service	Semi-annual	601	225	38	2.1

Appendix 2

Unweighted percentage of missing and 'Don't know'/'Can't remember' responses

Unweighted percentage of 'Don't know'/'Can't remember' and missing responses by question, AAPS 2020

Number	Question	Missing %	'Don't know'/'Can't remember' %	Missing + 'Don't know'/'Can't remember' %*
1	Was your stay in hospital planned in advance or an emergency?	3.37		3.37
2	When you arrived in hospital did you spend time in the emergency department?	4.55	2.17	6.72
3	Were the emergency department staff polite and courteous?	1.82	1.31	3.13
4	Do you think the amount of time you spent in the emergency department was...?	2.95	5.30	8.25
5	Were the staff you met on your arrival to hospital polite and courteous?	1.89		1.89
6	Do you think the time you had to wait from arrival at hospital until you were taken to your room or ward was...?	2.75	3.07	5.83
7	How clean were the wards or rooms you stayed in while in hospital?	3.19		3.19
8	How clean were the toilets and bathrooms that you used while in hospital?	4.01		4.01
9	Did you see nurses wash their hands, or use hand gel to clean their hands, before touching you?	3.04	10.95	13.99
10	Did you see doctors wash their hands, or use hand gel to clean their hands, before touching you?	3.79	16.83	20.62
11	Were you given enough privacy when being examined or treated?	3.12		3.12
12	Were you given enough privacy when discussing your condition or treatment?	3.33		3.33
13	If you needed to talk to a doctor, did you get the opportunity to do so?	3.78		3.78
14	When you had important questions to ask a doctor, did they answer in a way you could understand?	4.21		4.21
15	In your opinion, did the doctors who treated you know enough about your medical history?	4.52		4.52
16	Did you have confidence and trust in the doctors treating you?	3.87		3.87
17	Were the doctors kind and caring towards you?	4.05		4.05
18	Overall, how would you rate the doctors who treated you?	3.73		3.73
19	If you needed to talk to a nurse, did you get the opportunity to do so?	3.94		3.94
20	When you had important questions to ask a nurse, did they answer in a way you could understand?	4.12		4.12
21	In your opinion, did the nurses who treated you know enough about your care and treatment?	4.52		4.52
22	Did nurses ask your name or check your identification band before giving you any medications, treatments or tests?	4.19	2.95	7.15
23	Did you have confidence and trust in the nurses treating you?	4.00		4.00
24	Were the nurses kind and caring towards you?	4.08		4.08
25	Overall, how would you rate the nurses who treated you?	4.05		4.05
26	Did you have any hospital food during this stay?	3.75		3.75

Number	Question	Missing %	'Don't know'/'Can't remember' %	Missing + 'Don't know'/'Can't remember' %*
27	How would you rate the hospital food?	1.76		1.76
28	Did you have any special dietary needs (e.g. vegetarian, diabetic, food allergies, religious, cultural, or related to your treatment)?	2.20		2.20
29	Was the hospital food suitable for your dietary needs?	1.11	1.43	2.54
30	Did the health professionals introduce themselves to you?	3.79		3.79
31	Did the health professionals explain things in a way you could understand?	3.88		3.88
32	During your stay in hospital, how much information about your condition or treatment was given to you?	4.22		4.22
33	Did you have worries or fears about your condition or treatment while in hospital?	4.30		4.30
34	Did a health professional discuss your worries or fears with you?	3.08		3.08
35	I was involved as much as I wanted in making decisions about my treatment and care...	5.35		5.35
36	How much information about your condition or treatment was given to your family, carer or someone close to you?	4.52	4.13	8.65
37	Did you ever receive contradictory information about your condition or treatment from the health professionals?	5.41		5.41
38_01	During your stay in this hospital, did staff assist you when you needed help for eating or drinking?	5.61		5.61
38_02	During your stay in this hospital, did staff assist you when you needed help for taking medication?	5.60		5.60
38_03	During your stay in this hospital, did staff assist you when you needed help for going to the toilet?	5.04		5.04
38_04	During your stay in this hospital, did staff assist you when you needed help for adjusting your position in bed?	5.02		5.02
38_05	During your stay in this hospital, did staff assist you when you needed help for standing up or walking?	4.85		4.85
38_06	During your stay in this hospital, did staff assist you when you needed help for getting dressed?	5.34		5.34
38_07	During your stay in this hospital, did staff assist you when you needed help for getting in or out of a wheelchair or chair?	6.55		6.55
38_08	During your stay in this hospital, did staff assist you when you needed help for using the telephone or television?	6.49		6.49
39	Did you feel you were treated with respect and dignity while you were in the hospital?	3.28		3.28
40	Were your cultural or religious beliefs respected by the hospital staff?	4.54		4.54
41	Were you ever treated unfairly for any of the reasons below?	10.01		10.01
42	How would you rate how well the health professionals worked together?	4.04		4.04
43	Was a call button placed within easy reach?	4.21	3.90	8.12
44	Was your sleep ever disturbed due to noise at night?	10.68		10.68

Number	Question	Missing %	'Don't know'/'Can't remember' %	Missing + 'Don't know'/'Can't remember' %*
45	Not including the reason you went to hospital, during your hospital stay, or soon afterwards, did you experience any of the following complications or problems?	7.61		7.61
46	Was the impact of this complication or problem...?	4.55		4.55
47	In your opinion, were the health professionals open with you about this complication or problem [that you experienced during or soon after your visit]?	4.30		4.30
48	Were you ever in any pain while in hospital?	3.76		3.76
49	When you had pain, was it usually severe, moderate or mild?	2.94		2.94
50	Do you think the hospital staff did everything they could to help manage your pain?	2.03		2.03
51	During your stay in hospital, did you have any tests, X-rays or scans?	4.00		4.00
52	Did a health professional discuss the purpose of these tests, X-rays or scans with you?	3.08		3.08
53	Did you receive test, X-ray or scan results while you were still in hospital?	3.81		3.81
54	Did a health professional explain the test, X-ray or scan results in a way that you could understand?	2.01		2.01
55	During your stay in hospital, did you have an operation or surgical procedure?	4.06		4.06
56	Was your operation or surgical procedure planned before you went to hospital?	2.66		2.66
57	Thinking back to when you first tried to book an appointment with a specialist, how long did you have to wait to see that specialist?	4.26	13.17	17.42
58	From the time a specialist said you needed the operation or surgical procedure, how long did you have to wait to be admitted to hospital?	3.93	4.86	8.79
59	Do you think the total time between when you first tried to book an appointment with a specialist and when you were admitted to hospital was...?	4.01	3.74	7.75
60	Before your arrival, how much information about your operation or surgical procedure was given to you by the hospital?	3.78	3.70	7.48
61	Before your operation or surgical procedure began, did a health professional explain what would be done in a way you could understand?	3.47		3.47
62	After the operation or procedure, did a health professional explain how the operation or surgical procedure had gone in a way you could understand?	3.31	2.46	5.77
63	Did you feel involved in decisions about your discharge from hospital?	4.28		4.28
64	At the time you were discharged, did you feel that you were well enough to leave the hospital?	4.22		4.22
65	Thinking about when you left hospital, were you given enough information about how to manage your care at home?	3.95		3.95
66	Did hospital staff take your family and home situation into account when planning your discharge?	4.11	2.51	6.63

Number	Question	Missing %	'Don't know'/'Can't remember' %	Missing + 'Don't know'/'Can't remember' %*
67	Thinking about when you left hospital, were adequate arrangements made by the hospital for any services you needed?	4.31		4.31
68	Did hospital staff tell you who to contact if you were worried about your condition or treatment after you left hospital?	4.54	9.24	13.79
69	Were you given or prescribed any new medication to take at home?	4.57		4.57
70	Did a health professional in the hospital explain the purpose of this medication in a way you could understand?	3.92		3.92
71	Did a health professional in the hospital tell you about medication side effects to watch for?	4.63		4.63
72	Did you feel involved in the decision to use this medication in your ongoing treatment?	4.82		4.82
73	Did the hospital provide you with a document summarising the care you received in hospital (e.g. a copy of the letter to your GP, a discharge summary)?	5.25	10.98	16.23
74	On the day you left hospital, was your discharge delayed?	4.22		4.22
75	How long was the delay? [in discharge]	2.82	5.23	8.05
76	Did a member of staff explain the reason for the delay? [in discharge]	3.37		3.37
77	What were the main reasons for the delay? [in discharge]	4.17	6.53	10.71
78	Overall, how would you rate the care you received while in hospital?	1.37		1.37
79	How well organised was the care you received in hospital?	1.56		1.56
80	If asked about your hospital experience by friends and family how would you respond?	1.79		1.79
81	Did you want to make a complaint about something that happened in hospital?	3.60		3.60
82	Did the care and treatment received in hospital help you?	2.45		2.45
83	Is the problem you went to hospital for...?	3.83		3.83
84	In the week before your hospital stay, how difficult was it for you to carry out your normal daily activities (e.g. physical activity, going to work, caring for children)?	4.85		4.85
85	About one month after your discharge from hospital, how difficult was it for you to carry out your normal daily activities?	4.30		4.30
86	In the month following your discharge, did you go to an emergency department because of complications related to the care you received?	3.89	1.18	5.08
87	In the month following your discharge, were you re-admitted to any hospital because of complications related to the care you received?	3.78	0.99	4.77
88	What year were you born?	2.32		2.32
89	What is your gender?	1.40		1.40
90	Which language do you mainly speak at home?	1.66		1.66
91	Did you need, or would you have liked, to use an interpreter at any stage while you were at the hospital?	1.18		1.18

Number	Question	Missing %	'Don't know'/'Can't remember' %	Missing + 'Don't know'/'Can't remember' %*
92	Did the hospital provide an interpreter when you needed one?	2.04		2.04
93	Are you of Aboriginal origin, Torres Strait Islander origin, or both?	4.04		4.04
94	Did you receive support, or the offer of support, from an Aboriginal Health Worker while you were in hospital?	5.22	8.79	14.01
95	What is the highest level of education you have completed?	4.28		4.28
96	In general, how would you rate your health?	2.32		2.32
97	Which, if any, of the following longstanding conditions do you have (including age-related conditions)?	5.12		5.12
98	Does this condition(s) cause you difficulties with your day-to-day activities?	4.01		4.01
99	Are you a participant of the National Disability Insurance Scheme (NDIS)?	4.79	6.10	10.89
100	Who completed this survey?	2.34		2.34
101	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)?	12.63		12.63

* 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 3

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', which is not listed in Table 8, 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/__data/assets/pdf_file/0016/300616/Quintile_of_Disadvantage.pdf**

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' option, to which the missing responses are combined to create a 'none reported' variable).

Interpretation of indicator

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

The table below shows the questions and responses used in the construction of the derived measures.

Table 7 Derived measures for AAPS 2020

Derived measure	Original question	Derived measure categories	Original question responses
Needed to talk to a doctor	Q13. If you needed to talk to a doctor, did you get the opportunity to do so?	Needed to talk to doctor	Yes, always
			Yes, sometimes
			No, I did not get the opportunity
		No need to talk to doctor	I had no need to talk to a doctor
Had important questions to ask a doctor	Q14. When you had important questions to ask a doctor, did they answer in a way you could understand?	Asked doctor questions	Yes, always
			Yes, sometimes
			No, I did not get answers I could understand
		Didn't ask any questions	I did not ask any questions
Needed to talk to a nurse	Q19. If you needed to talk to a nurse, did you get the opportunity to do so?	Needed to talk to nurse	Yes, always
			Yes, sometimes
			No, I did not get the opportunity
		No need to talk to nurse	I had no need to talk to a nurse
Had important questions to ask a nurse	Q20. When you had important questions to ask a nurse, did they answer in a way you could understand?	Asked nurse questions	Yes, always
			Yes, sometimes
			No, I did not get answers I could understand
		Didn't ask any questions	I did not ask any questions
Received information about condition or treatment during stay	Q32. During your stay in hospital, how much information about your condition or treatment was given to you?	Received information	Not enough
			The right amount
			Too much
		Not applicable	Not applicable to my situation
Had family/someone close who received information about condition or treatment	Q36. How much information about your condition or treatment was given to your family, carer or someone close to you?	Received information	Not enough
			Right amount
			Too much
		Not applicable	It was not necessary to provide information to any family or friends
Had religious or cultural beliefs to consider	Q40. Were your cultural or religious beliefs respected by the hospital staff?	Had beliefs to consider	Yes, always
			Yes, sometimes
			No, my beliefs were not respected
		Beliefs not an issue	My beliefs were not an issue

Derived measure	Original question	Derived measure categories	Original question responses
Treated unfairly	Q41. Were you ever treated unfairly for any of the reasons below?	Treated unfairly	Age
			Sex
			Aboriginal background
			Ethnic background
			Religion
			Sexual orientation
			A disability that you have
			Marital status
			Something else
		Not treated unfairly	I was not treated unfairly
Experienced a complication	Q45. Not including the reason you went to hospital, during your hospital stay, or soon afterwards, did you experience any of the following complications or problems?	Experienced complication	An infection
			Uncontrolled bleeding
			A negative reaction to medication
			A complication as a result of an operation or surgical procedure
			A complication as a result of tests, X-rays or scans
			A blood clot
			A pressure wound or bed sore
			A fall
			Any other complication or problem
		None reported	None of these
			Missing
Complication or problem occurred during hospital admission	Q47. In your opinion, were the health professionals open with you about this complication or problem?	Occurred in hospital	Yes, completely
			Yes, to some extent
			No
		Occurred after left	Not applicable, as it happened after I left
Wanted explanation of what would be done before operation or procedure	Q61. Before your operation or surgical procedure began, did a health professional explain what would be done in a way you could understand?	Wanted explanation	Yes, completely
			Yes, to some extent
			No
		Didn't want explanation	I did not want or need an explanation

Derived measure	Original question	Derived measure categories	Original question responses
Wanted to be involved in decisions about discharge	Q63. Did you feel involved in decisions about your discharge from hospital?	Wanted involvement	Yes, definitely
			Yes, to some extent
			No, I did not feel involved
		Didn't want involvement	I did not want or need to be involved
Needed information on how to manage care at home	Q65. Thinking about when you left hospital, were you given enough information about how to manage your care at home?	Needed information	Yes, completely
			Yes, to some extent
			No, I was not given enough
		Didn't need information	I did not need this type of information
Needed family and home situation taken into account when planning discharge	Q66. Did hospital staff take your family and home situation into account when planning your discharge?	Had situation to consider	Yes, completely
			Yes, to some extent
			No, staff did not take my situation into account
		Not necessary	It was not necessary
Needed services after discharge	Q67. Thinking about when you left hospital, were adequate arrangements made by the hospital for any services you needed?	Needed services	Yes, completely
			Yes, to some extent
			No, arrangements were not adequate
		Didn't need services	It was not necessary
Wanted to be involved in decision to use newly prescribed medication in ongoing treatment	Q72. Did you feel involved in the decision to use this medication in your ongoing treatment?	Wanted involvement	Yes, completely
			Yes, to some extent
			No, I did not feel involved
		Didn't want involvement	I did not want or need to be involved

References

1. Burnham, K. P., & Anderson, D. R. Model selection and multi-model inference: a practical information-theoretic approach (2nd ed.): New York: Springer, 2002.

2. SAS Documentation: Example Weighted Multilevel Model for Survey Data. [online] Available from: **documentation.sas.com/ doc/en/pgmsascdc/9.4_3.4/statug/statug_ glimmix_examples23.htm**

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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