

Development of patient experience key performance indicators

for local health districts in NSW



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

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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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Summary

The Bureau of Health Information (BHI) undertook a review of patient experience key performance indicators (KPIs) used for local health districts (LHD). The intention was to develop indicators that would focus attention on a broader range of measures of patient experience. These would create reliable and valid estimates of performance through, for example, the use of indices to support quarterly reporting. BHI also identified the points in these indicators where benchmarks of performance could be applied.

BHI analysed more than 28,000 adult admitted patient surveys from 2016 using a statistical method (i.e. factor analysis) to identify experiences important to patients and a subset of single survey questions that best measure those experiences. Analyses using more than 56,000 adult admitted patient surveys from 2015 and 2016 were then conducted to assess reliability, construct and concurrent validity of proposed measures and the reliability of quarterly measures for smaller LHDs and vulnerable populations. The performance of any proposed new KPI was compared to each LHD's performance in relation to the current KPI (i.e. % patients who report overall care was excellent or very good). A review of the literature and patient experience indicators used elsewhere in Australia was conducted, and Ministry staff and members of the NSW Patient Survey Program's Implementation Advisory Committee were consulted.

As a result of this work, BHI demonstrated that the following three measures provide a broad assessment of some of the most important elements of patient experience:

- an overall patient experience index which includes four survey questions (page 7), and
- a patient engagement index which includes six survey questions (page 11), and
- a respect and dignity single question score.

Analyses showed that both indices developed through factor analyses show good internal reliability (Cronbach's Alpha = 0.87, page 7, and Alpha=0.77, page 11), such that the survey items used to measure overall experiences and patient engagement reflect two types of experiences important to patients.

At LHD level, the overall experience and patient engagement indices are highly correlated ($r=0.89$, page 16), such that improvement on one index is related to improvement in the other. Both indices are correlated with the current KPI ($r=0.79$ and 0.83 , respectively, page 16), suggesting that the new indices will detect change in response to what LHDs do currently to improve their patient experience in ways that are similar to the current KPI (i.e. good concurrent validity). However, both indices are more reliable and stable estimates of performance than the current KPI (pages 13 and 14). This suggests that improvement (or decline) in performance in either index score is more likely to be related to 'true' improvements (or declines) in performance than the current KPI. That is, both indices are more likely to detect 'true, positive' and 'true, negative' shifts in performance. To support this hypothesis, BHI tested for significant improvements or declines in performance across each quarter in 2016 among LHDs with large sample sizes and good response rates. This would enable LHDs to assess concordance between significant statistical shifts in patient views on both indices and local knowledge about interventions likely responsible for those shifts (i.e. face validity) (pages 15 and 19).

BHI analyses revealed that the respect and dignity single question score was uniquely identified as its inclusion improved the internal reliability of multiple constructs important to patients (page 14). While there was a high correlation for this single item question compared to the indices when reviewing 12 months of data, this relationship was not consistent for quarterly reporting.

In relation to quarterly reporting for the smallest LHDs, districts with low response rates and vulnerable populations, BHI assessed the reliability and stability of estimates of performance. Smaller sample sizes in these areas suggest that smaller LHDs might be assessed on a six monthly rather than quarterly basis or with rolling averages. Due to smaller sample sizes for vulnerable populations, population group performance assessments for each LHD could be assessed annually (page 15).

In relation to the establishment of benchmarks, there was variation across LHDs in performance on both indices as well as the respect and dignity single item measure. BHI has analysed the variation across LHDs, as well as what's been demonstrated by districts to be achievable. Therefore, BHI advises a benchmark of 8.5 out of 10 to achieve 'performing' for the indices and a benchmark of 9.5 for the respect and dignity question (Table 1).

Following review of the BHI results, the NSW Ministry of Health adopted the use of the two index scores as KPIs for the 2018–19 Service Agreements with LHDs. The methods and benchmarks presented in this report will be used in discussions of performance between LHDs and the Ministry. The respect and dignity single score question will provide an interim improvement measure, pending investigation of additional index scores in the future.

Table 1 Summary of performance results for adult admitted patients for Q4, 2016

Measure	Questions in KPIs (n)	NSW score	LHD scores range	Recommended benchmarks		
				Not Performing	Under Performing	Performing
Overall patient experience index	4	8.62	8.27 – 9.05	<8.2	8.3 – 8.5	>8.5
Patient engagement index	6	8.43	8.19 – 8.99	<8.2	8.3 – 8.5	>8.5
Respect and dignity question	1	9.29	8.85 – 9.57	<9.0	9.0 – 9.5	>9.5

Setting the scene

About this report

Patients can provide key information on the performance of health services. As such, many jurisdictions use patient experience measures as key performance indicators (KPIs) for health system performance monitoring. Existing patient experience KPIs for local health districts (LHDs) in NSW are based on positive responses to a single question of overall ratings of care for admitted and ED patients based on survey data. These measures have limitations including:

- Measures are based on a single-item satisfaction-related question to reflect on the broad concept of patient experience.
- Only response options of 'very good' and 'good' are used, the combined level is reaching a ceiling and plateauing, and ignores any variation in response of neither good nor poor, poor, and very poor.
- The target is 'continual improvement' where LHD performance is beginning to plateau.

Accordingly, BHI undertook analysis of the adult admitted patient experience data to determine better quality indicators for future use.

The aim of this document is to:

- Outline methods used to score survey questions and define composite indices.
- Present results to support the validity of proposed composite indices.
- Put forward options for benchmarks used to define performance.
- Present considerations of validity of measures and variation in annual results by population group.

Data and methods

Data sources

The NSW Adult Admitted Patient Survey (AAPS) is used for a current patient experience KPI and is the basis of much of the development work for the NSW Patient Survey Program. It is also one of the largest surveys by patient volume and the longest running survey in the program. Because of this, AAPS data for 2015 and 2016 were selected as the basis of this KPI development work.

In 2015, the survey included 28,391 respondents (42.1% response rate) and in 2016 the survey included 28,693 respondents (42.5% response rate).

The average number of responses and response rates across LHD are described in Table 2. Technical Supplements provide further detail on the sampling methods and exclusions.

LHD results are calculated using survey data weighted to be representative of the age and stay type (overnight or same day) profile of patients at each hospital. Weights are also aggregated at LHD and NSW level to be representative at these levels.

The questionnaires are available on the BHI website at: bhi.nsw.gov.au/nsw_patient_survey_program

Table 2 Range in number of respondents and response rates, by LHD 2015 to 2016

Local health district (LHD)	Number of hospitals in scope (Peer groups A1 to C2)	Minimum number of responses per quarter (2015-2016)	Maximum number of responses per quarter (2015-2016)	Response rate 2015 (%)	Response rate 2016 (%)
Hunter New England (HNE)	15	1209	1363	43	44
Northern NSW (NNSW)	8	651	730	48	48
Western NSW (WNSW)	7	566	622	42	43
Southern NSW (SNSW)	6	554	596	49	34
Northern Sydney (NS)	5	465	492	41	41
South Western Sydney (SWS)	6	451	478	36	48
South Eastern Sydney (SES)	5	448	498	42	41
Mid North Coast (MNC)	5	445	496	43	42
Murrumbidgee (M)	5	382	419	49	50
Illawarra Shoalhaven (IS)	4	359	408	46	47
Western Sydney (WS)	4	328	362	34	34
Sydney (SYD)	3	276	300	36	37
Nepean Blue Mountains (NBM)	4	254	294	40	41
Central Coast (CC)	2	184	220	46	45
Far West (FW)	1	68	96	39	39
St. Vincent's (SV)	1	66	96	36	36

Creating survey question scores

For each survey question, the most positive response was assigned a score of 10, and the least positive response was assigned a score of 0. The remaining response options were allocated scores at even intervals between 0 and 10. 'Don't know' and missing values were not assigned a score. Only questions deemed to reflect on the quality of care were included in this analysis. This scoring system is consistent with the approach used in the UK and Canada, as well as a number of Australian jurisdictions.

Identifying constructs

Factor analysis methods were used to uncover possible underlying structure or themes across survey variables in AAPS 2016 survey questions to identify domains or constructs consistently responded to by patients. Factor analysis methods seek to explain observed variability in a set of data in terms of underlying, unobserved factors as one method of reducing the number of variables for reporting. The first factor analysis was conducted on a set of more than 40 questions with valid responses for at least 22,000 respondents. This resulted in six themes or domains. Additional factor analysis of the largest domains that included 10 or more questions resulted in the following eight themes or domains (Appendix 2).

1. Patient engagement (6 questions)
2. Overall experience (4 questions)
3. Experience with doctors (5 questions)
4. Experience with nurses (6 questions)
5. Cleanliness (2 questions)
6. Hand hygiene (2 questions)
7. Privacy (2 questions)
8. Complications (3 questions).

A review of the literature^{1,2,3,4,5} and patient experience indicators used elsewhere in Australia was conducted (Appendix 3), and Ministry staff and members of the NSW Patient Survey Program's Implementation Advisory Committee were consulted.

This engagement led to an increased focus on the 'overall experience' and 'patient engagement' domains for consideration as the new KPIs. These domains align with state and national priorities, and are comprised of survey questions that have been included in multiple NSW surveys in the past five years.

The question on respect and dignity was proposed as a single question measure, as it had a higher average score than others and it did not seem to fit with one single domain, rather it improved the reliability of other domains. Further, this question had high face validity among stakeholders as a single measure that could have an aspirational target. Respect is also seen as single measure score in performance reporting of other countries and states (see Appendix 3).

Data and methods

Calculating LHD results for composite questions

Composite scores for the overall experience and patient engagement domains were calculated using the 'patient level first' aggregation approach. A score for each completed patient survey question is calculated, then a mean score is calculated for each patient. 'Missing' values and non-specific response options were not scored. Next the LHD mean is calculated based on the resultant scores (Table 3). Sensitivity analyses were conducted using other approaches, specifically: 'question mean first' aggregation (mean score for each question in the group, then calculate an LHD mean as the mean of the question means) and a 'group mean' aggregation (LHD mean is based on pooling of all responses for all questions in the domain).

The patient first approach performed slightly better than the other two approaches. It also has the benefit of allowing respondent-level weighting to be applied (i.e. to account for the number of respondents that each record is meant to represent following sampling and non-response adjustment).

Assessment of reliability and validity

Annual and quarterly NSW and LHD-level performance information in 2015 and 2016 was used to assess the reliability and validity of the indices, as well as the respect and dignity single item question. The current KPI (i.e. percentage of patients who reported their overall care as 'very good' or 'good') was also calculated and converted to a 0-10 scale to compare with the scored results.

- Reliability of domains was assessed through calculation of Cronbach's alpha.
- Concurrent and predictive validity were assessed by testing hypotheses about the performance of state and LHDs for the indices, as well as the respect and dignity single item question, with the current KPI.
- Stability was assessed using quarterly state and LHD performance over two years. Tests of significant differences across time were conducted across LHDs with large sample sizes and good response rates to support LHDs' assessment of the face validity of the indices.
- Construct validity was assessed using a correlation matrix of proposed KPIs.

Options for benchmarking

Several options for benchmarking were considered. The focus of the analysis is percentile cut-offs based on quarterly results for LHDs, with confidence intervals shown and considered as context.

Note on presentation of data

Patients report moderate to high levels of approval for the questions comprising the two index scores and for the respect and dignity question. Therefore scores are skewed toward 10 and, for illustrative purposes, this report truncates the y-axis in most graphs to illustrate variation between LHDs.

Table 3 An example of overall experience composite score calculation for two hypothetical patients

Question	Responses (scores)	Patient 1	Patient 2
How would you rate how well the health professionals worked together?	Very good (10), Good (7.5), Neither good nor poor (5), Poor (2.5), Very poor (0)	7.5	Missing
Overall, how would you rate the care you received while in hospital?	Very good (10), Good (7.5), Neither good nor poor (5), Poor (2.5), Very poor (0)	5	7.5
How well organised was the care you received in hospital?	Very well organised (10), Fairly well organised (5), Not well organised (0)	5	10
If asked about your hospital experience by friends and family how would you respond?	I would speak highly of the hospital (10), I would neither speak highly nor be critical (5), I would be critical of the hospital (0)	5	10
		22.5 / 4 = 5.625	27.5 / 3 = 9.17

Results

The results section summarises the analysis conducted to validate the proposed KPI measures. We present results for each index separately, followed by a summary of how the index scores are correlated across local health districts and how results differ by population groups. Next, considerations for benchmark options are presented. The following is an outline of the results that are presented:

- overall patient experience index results and trends
- patient engagement index results and trends
- respect and dignity, a single item score, with trends
- summary of results by population group and correlation across measures.

Overall patient experience index

Four questions were identified in the factor analysis in relation to an overall experience domain. Each question (aggregated using the patient mean first approach) had a mean score higher than 8 out of 10. The combined score had good internal reliability, with a Cronbach's alpha of 0.87 (where a value of 1 is the highest possible score), and each of the four survey questions had a high correlation with the overall index (Table 4).

The concurrent validity of the overall patient experience index is good when compared with the current KPI, both as the aggregate index but also for each of the question components. Results for the composite measure follow a similar pattern as each question component with top, bottom and most middle-ranked LHDs similar in each.

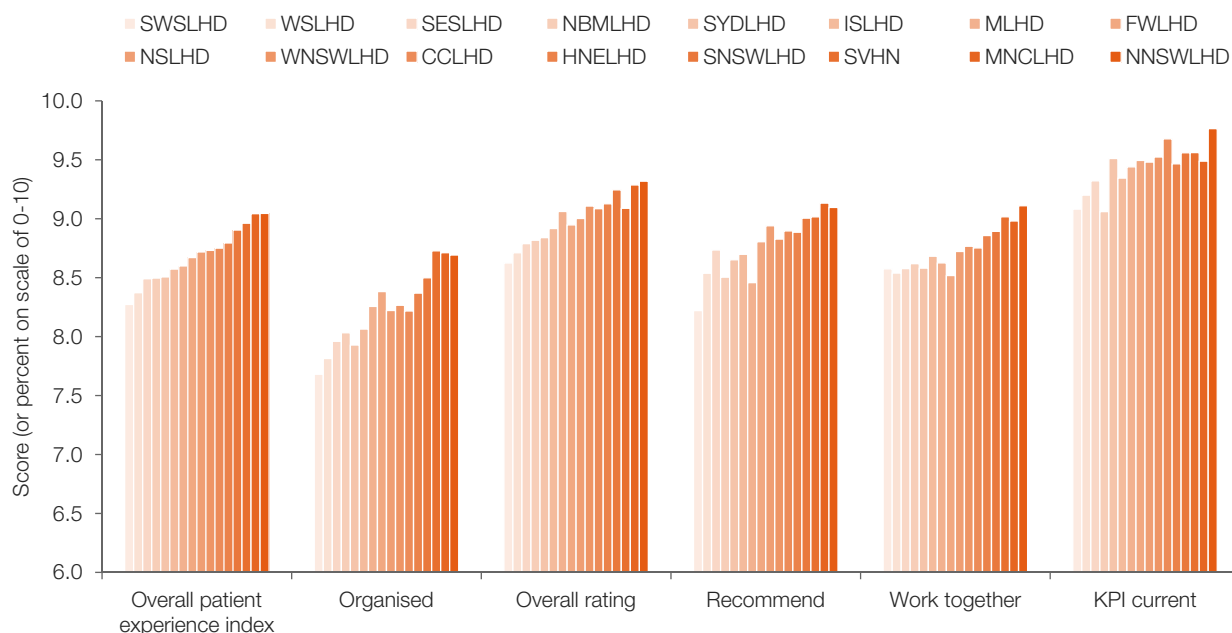
The rank of LHDs is also similar between the overall patient experience index and the current KPI used with LHDs (the percentage reporting overall ratings of care as 'very good' or 'good' presented on a scale of 0 to 10) (Figure 1). This suggests that the relative performance of each LHD will not change if the new index is used in place of the existing KPI.

The overall patient experience index and the current KPI show similar patterns over time for one randomly selected LHD (Figure 2). Results were considered for all LHDs throughout this report. This finding suggests that the new index will detect change in patient experiences across time in response to what LHDs do currently to improve performance in ways that are similar to the current KPI.

Table 4 Reliability of the overall patient experience index and four question components, 2016

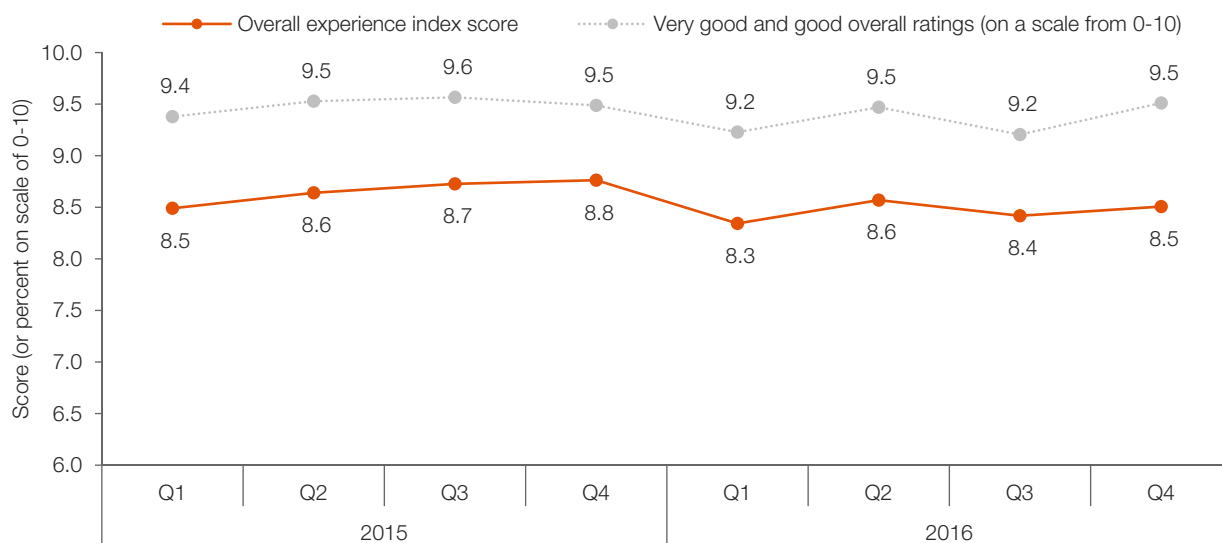
	Mean score	Correlation with index
Overall, how would you rate the care you received while in hospital?	8.90	0.88
If asked about your hospital experience by friends and family how would you respond?	8.62	0.87
How would you rate how well the health professionals worked together?	8.65	0.81
How well organised was the care you received in hospital?	8.05	0.88
Cronbach's Alpha		0.87

Figure 1 Results for overall patient experience index and components and current KPI, by LHD 2016 Q4



Notes: Results presented in ascending order by LHD for the overall care index, and using the same ordering for the other index components and current KPI. Organised = "How well was the care you received organised?" Overall rating = "Overall, how would you rate the care you received while in hospital?" (this question is the current KPI). Recommend = "If asked about your hospital experience by friends and family how would you respond?" Work together = "How would you rate how well the health professionals worked together?". See Appendix Table 11 for complete data.

Figure 2 Quarterly results for overall patient experience index, SYDLHD, quarterly results 2015 and 2016



Overall patient experience index

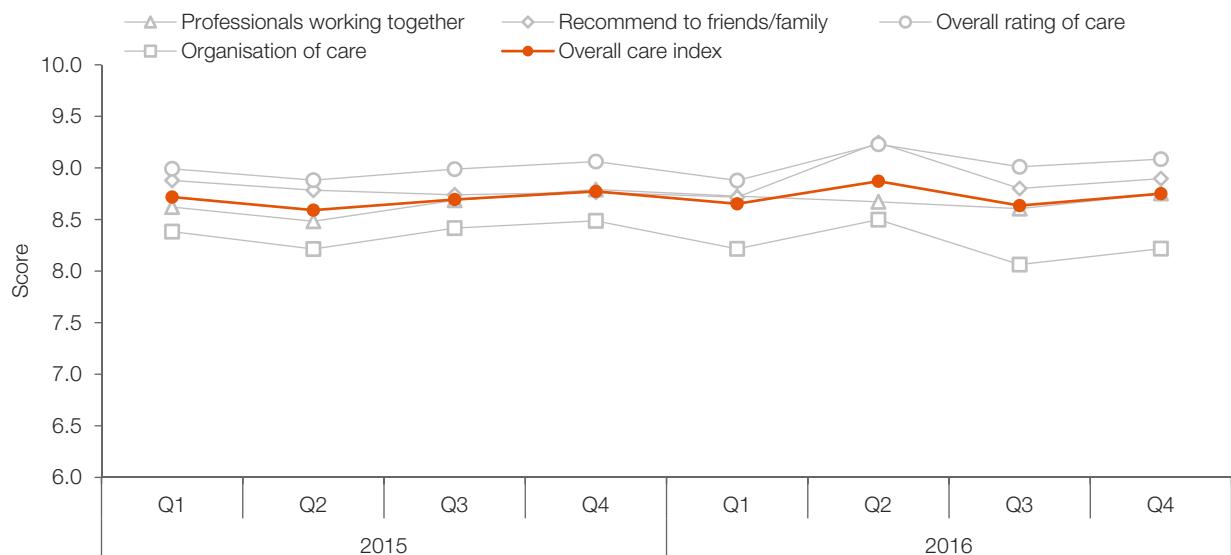
Quarterly trends

The overall patient experience index is less subject to quarterly fluctuations than the four single item survey questions that represent its components. This pattern was observed at both NSW and LHD levels – an example for one LHD is presented in Figure 3. At an LHD level, while quarterly fluctuations are attenuated in comparison to single item questions there are quarterly fluctuations in the overall patient experience index that may represent ‘true, positive’ or ‘true, negative’ signals of improvement or declines in performance. At the same time, they may represent an unreliable index score.

Accordingly, BHI conducted quarterly trend analyses separately for:

- LHDs with small samples sizes due to few hospitals and/or a low response rate (Figure 4a).
- LHDs that have large sample sizes where quarterly fluctuations should represent ‘true, positive’ (Figure 4b).
- ‘True, negative’ signals of improvement or declines in performance. There were no LHDs in this data that showed declines in performance at the established levels.

Figure 3 Overall patient experience index and question components, CCLHD, quarterly results 2015 and 2016

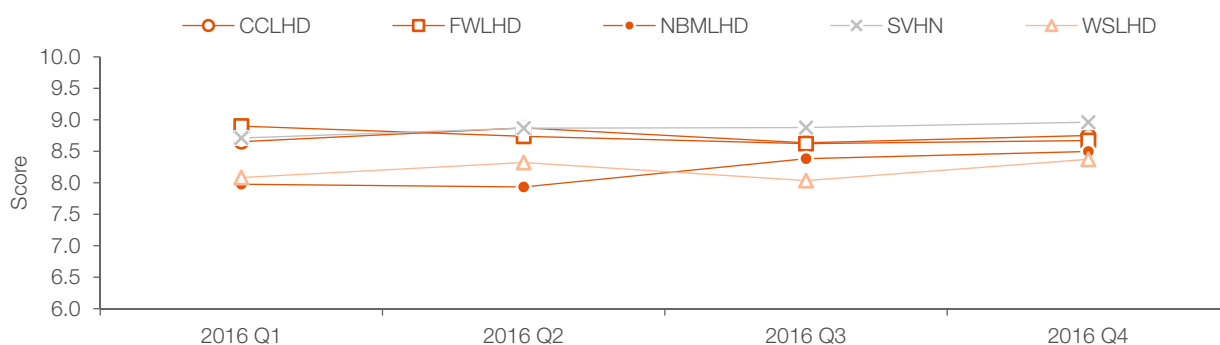


The degree of fluctuation is related to the number of respondents for each LHD, which is a function of both the number of hospitals in the LHD and the response rate for each. Therefore, LHDs with only one hospital (Far West and St Vincent's) have greater instability than larger LHDs. LHDs with lower survey response rates (e.g. Nepean Blue Mountains and Western Sydney) also present with higher instability compared over the four quarters (Figure 4a). Accordingly, smaller sample sizes in these areas suggest that smaller LHDs might be assessed on a six monthly rather than quarterly basis.

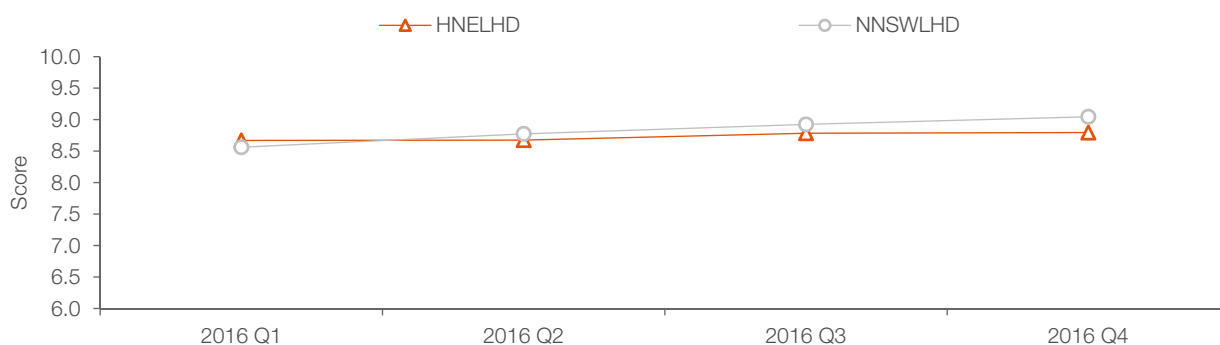
A majority of LHD scores would be based on responses of over 300 respondents (Table 2, page 6). In these LHDs, the overall patient experience index appears to be more reliable or stable as an estimate of performance. To enable LHDs to determine whether quarterly fluctuations are 'true, positive' or 'true, negative' reflections of historic shifts in performance in 2016 (i.e. face validity), BHI illustrates temporal shifts in the overall patient experience index across LHDs with large sample sizes for each quarter for 2016 and flags those LHDs that show statistically significant improvements (Figure 4b) or declines in performance across each quarter in 2016.

Figure 4 Overall patient experience index, by quarter and LHD, 2016

a) Low number of respondents (<300) or lower response rate (<35%)



b) Positive trends for LHDs with high number of respondents (>300)*



* Shows only those LHDs that had statistically significant trends based on four quarters of data and $p < 0.1$. Data for all LHDs is provided on page 23.

Patient engagement index

Six questions were identified in the factor analysis in relation to a patient engagement domain. Each question (aggregated using the patient mean first approach) had a mean score higher than 7.7 out of 10. The index score had good internal reliability, with a Cronbach's alpha of 0.77 (where a value of 1 is the highest possible score). As expected, all six questions correlated with the patient engagement index score although the strength of correlation was variable across the questions. The six questions included in the patient engagement index are presented in Table 5.

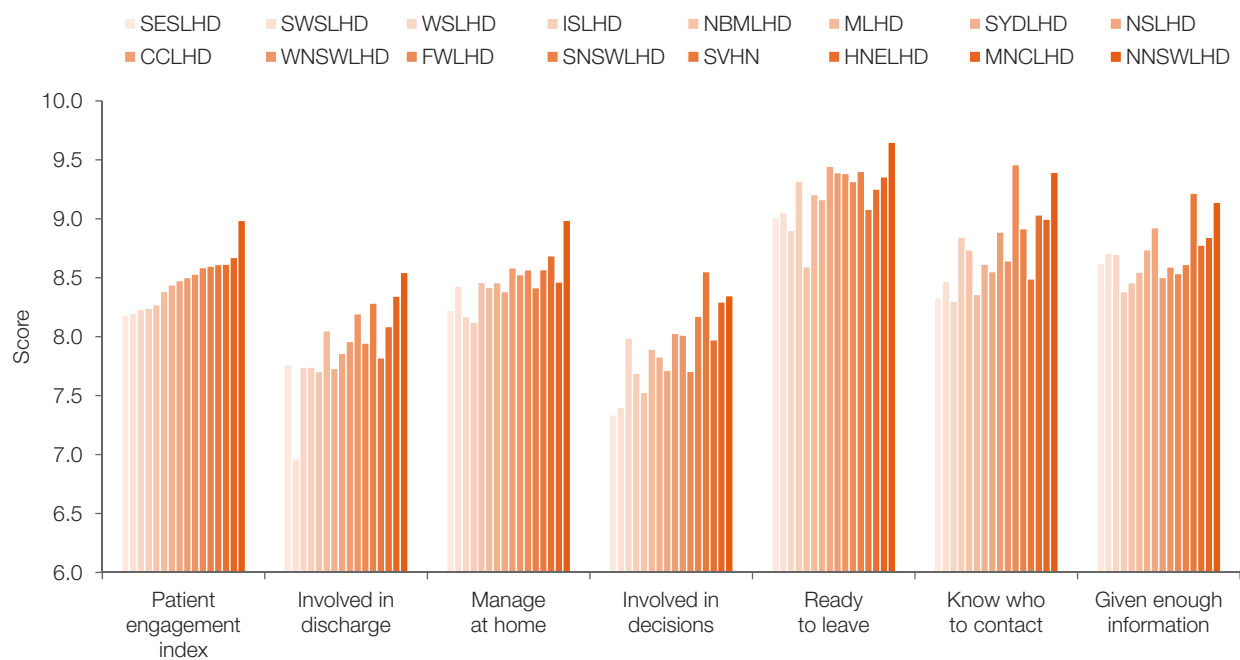
These questions were identified in the factor analysis as part of a single large factor that included many questions about experiences with doctors and nurses. As previously discussed, further analysis provided evidence to identify these as three distinct factors: interacting with doctors, nursing care and patient engagement. The patient engagement factor is suggested as the second indicator to be used to assess LHD performance due to the critical relevance of engagement to the patient experience.

Table 5 Reliability of the patient engagement index and six question components, AAPS 2016

	Mean score	Correlation with index
During your stay in hospital, how much information about your condition was given to you?	8.61	0.68
Were you involved, as much as you wanted to be, in decisions about your care?	7.71	0.70
Did you feel involved in decisions about your discharge from hospital?	7.72	0.70
At the time you were discharged, did you feel that you were well enough to leave hospital?	9.12	0.58
Were you given enough information about how to manage your care at home?	8.37	0.77
Did staff tell you who to contact if you were worried about your condition after you left?	8.65	0.65
Cronbach's Alpha		0.77

The concurrent validity of the patient engagement index appears good, in relation to its component parts. Quarterly results for the patient engagement index and the six questions that comprise the index are presented at LHD level (Figure 5). Results for the composite measure follow a similar pattern as each question component with top, bottom and most middle-ranked LHDs similar in each. However, there is significantly more variation observed in the overall order of LHDs for the patient engagement index than for the overall care index, reinforcing that these indices measure different constructs.

Figure 5 LHD results for patient engagement index and components, 2016 Q4



Notes: Results presented in ascending order by LHD for the patient engagement index, and using the same ordering for the other index components.
Involved in discharge = "Did you feel involved in decisions about your discharge from hospital?" Manage at home = "Were you given enough information about how to manage your care at home?" Involved in decisions = "Were you involved, as much as you wanted to be, in decisions about your care?" Ready to leave = "At the time you were discharged, did you feel that you were well enough to leave hospital?" Know who to contact = "Did staff tell you who to contact if you were worried about your condition after you left?" Given enough information = "During your stay in hospital, how much information about your condition was given to you?" .
See Appendix Table 11 for complete data.

Patient engagement index

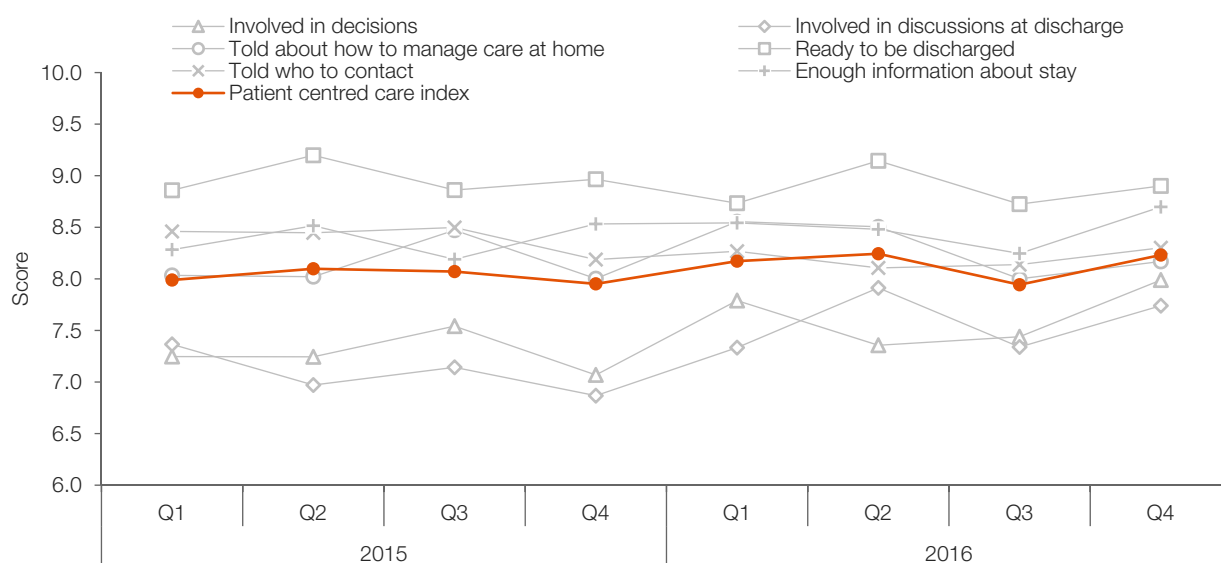
Quarterly trends

The patient engagement index is less subject to the quarterly fluctuations than the six single item survey questions that represent its components. This pattern was observed at both NSW and LHD levels – an example for one LHD is presented in Figure 6. At an LHD level, while quarterly fluctuations are attenuated in comparison to the single item questions, there are quarterly fluctuations in the overall patient experience index that may represent ‘true, positive’ or ‘true, negative’ signals of improvement or declines in performance. At the same time, they may also represent an unreliable index score.

As with the overall patient experience index, BHI conducted quarterly trend analyses separately for:

- LHDs with small samples sizes due to few hospitals and/or a low response rate (Figure 7a).
- LHDs that have large sample sizes where quarterly fluctuations should represent ‘true, positive’ (Figure 7b).
- ‘True, negative’ signals of improvement or declines in performance. As with the overall experience index, there were no LHDs in the two years of survey data that showed statistical decline in performance and therefore the graphs for ‘true, negative’ signals is not presented here.

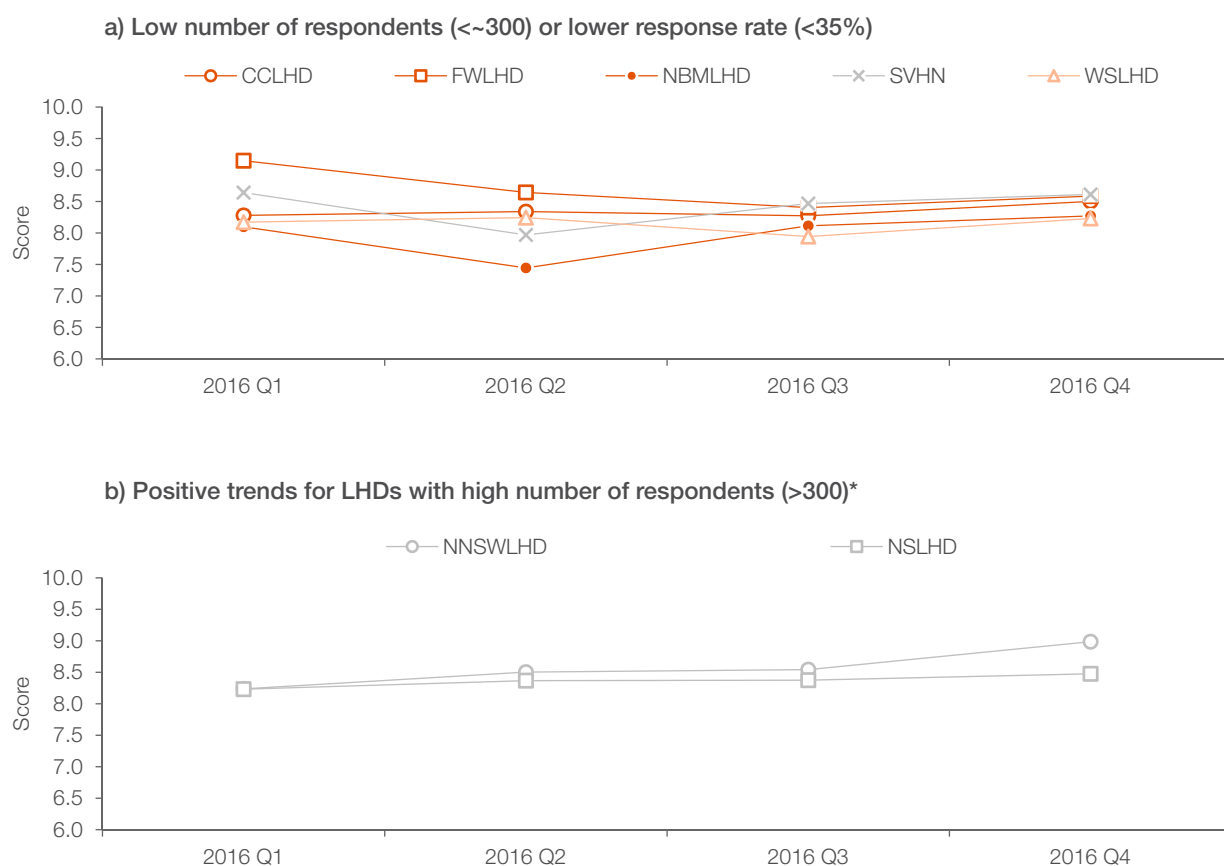
Figure 6 Patient engagement index and question components, CCLHD, quarterly results 2015 and 2016



As with the overall patient experience index, quarterly results for LHDs with only one hospital (i.e. Far West and St Vincent's) have greater instability than LHDs with many hospitals. LHDs with lower survey response rates (e.g. Nepean Blue Mountains and Western Sydney) also present with higher instability compared over these four quarters (Figure 7a). However, a majority of LHD scores would be based on responses of over 300 respondents (Table 2, page 6). In these LHDs, the patient engagement index is a more stable estimate of performance than that seen in LHDs with fewer patients, suggesting that the smaller LHDs might be assessed on a six monthly rather than quarterly basis.

To enable LHDs to determine whether quarterly fluctuations are 'true, positive' or 'true, negative' reflections of historic shifts in performance in 2016 (i.e. face validity), BHI illustrates temporal shifts in the patient engagement index across LHDs with large sample sizes for each quarter for 2016 and flags those LHDs that show statistically significant improvements (Figure 7b) or declines. There were no LHDs in this data that showed declines in performance at the established levels.

Figure 7 Patient engagement index, by quarter and LHD, 2016



* Shows only those LHDs that had statistically significant trends based on four quarters of data and $p < 0.1$. Data for all LHDs is provided on page 24.

Single item score: Respect and dignity

Treating patients in a way that is respectful and that preserves the patient's dignity is recognised as a key component of patient-centred care. It is a cornerstone of good 'bedside manner', as taught by the various medical, nursing and allied health colleges. A 2018 report from the Beryl Institute identified that being treated with respect and dignity is one of the three most important factors affecting patient experience.⁶ The KPI development work undertaken by BHI reinforces the high importance of this question.

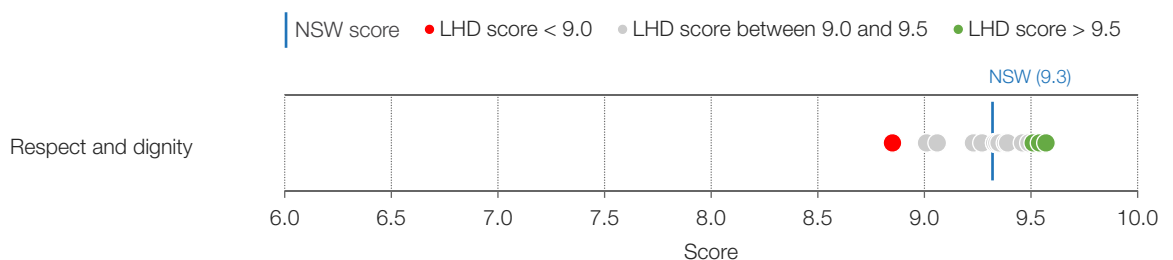
At a patient level, the question on respect and dignity is highly correlated with three of the domains identified in the factor analysis: overall experience, interactions with doctors and interactions with nurses. Furthermore, adding the respect and dignity question to any of these domains resulted in increased internal reliability for that domain.

Figure 8 Respect and dignity question, NSW and LHDs, 2016 Q4

a. NSW results for respect and dignity question, all responses



b. LHD scores for respect and dignity question

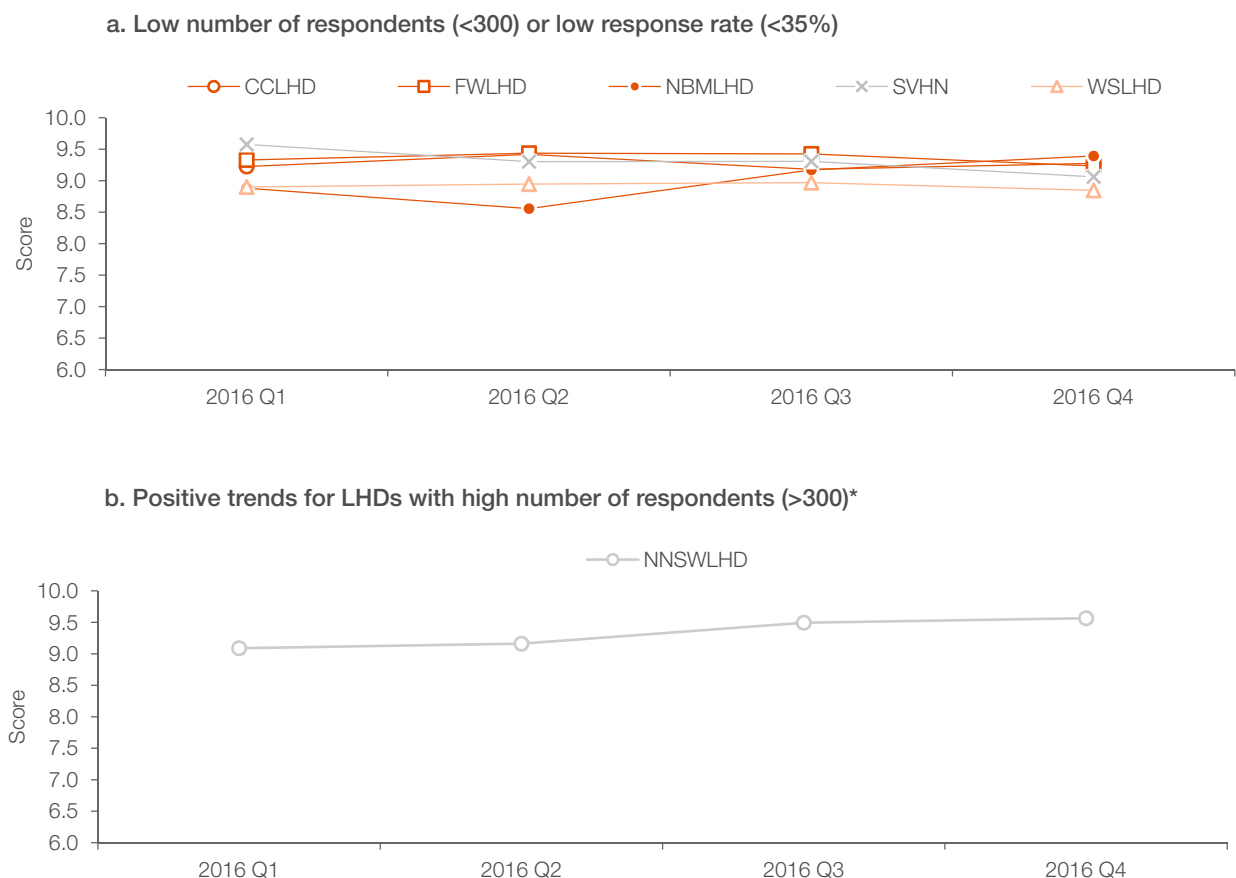


Note: NSW score = $0.87 \times 10 + 0.11 \times 5 + 2 \times 0 = 9.3$

At a NSW level, the score for respect and dignity would be 9.3 out of 10 (Figure 8a). Despite being a single question rather than an index, the stability of this measure is good. For quarterly results between for 2016, most LHDs had a score between 9 and 9.5 (Figure 8b). Those LHDs where the greatest change was seen were from those with low respondent numbers or below average response rates (Figure 9a).

To enable LHDs to determine whether quarterly fluctuations are 'true, positive' or 'true, negative' reflections of historic shifts in performance in 2016 (i.e. face validity), BHI illustrates temporal shifts in the respect and dignity question across LHDs with large sample sizes for each quarter for 2016 and flags those LHDs that show statistically significant improvements or declines. This measure, despite being skewed toward 10 and reaching a ceiling, still shows some sensitivity to changes over time with one LHD exhibiting a positive trend (Figure 9b). There were no LHDs in this data that showed declines in performance at the established levels.

Figure 9 **Respect and dignity single question score, by quarter and LHD, 2016**



* Shows only those LHDs that had statistically significant trends based on four quarters of data and $p < 0.1$. Data for all LHDs is provided on page 25.

Relationship between measures at an LHD level

In order to assess construct and concurrent validity, a correlation matrix was created using LHD results for the proposed overall experience and patient engagement indices, the respect and dignity question score and the current KPI results (Table 6). The overall patient experience index is correlated with the existing KPI ($r=0.79$, $p<0.05$), which suggests good concurrent validity as measured against the current standard. The overall experience and patient engagement indices are more highly correlated ($r=0.89$, $p<0.01$), suggesting that these indices are more strongly related at LHD level than they are at individual level.

At the LHD level and over 12 months, the single item question was highly correlated with the two indices ($r=0.90$, $p<0.01$; $r=0.82$, $p<0.01$). However, when analysed for quarterly reporting, there was inconsistent correlation observed. For example, in the final quarter of 2016, there was correlation indicated with the overall index ($r=0.49$, $p<0.05$) but this was not observed for the patient engagement index ($r=0.38$, $p=0.15$) (Table 6: LHD correlations).

Table 6 Correlation matrix between overall experience and patient engagement indices, the respect and dignity survey question and the current KPI, by LHD, 2016 Q4

	Overall patient experience index	Patient engagement index	Respect and dignity score	Very good and good ratings of care (on 10 pt. scale)
SWSLHD	8.27	8.20	9.01	9.08
WSLHD	8.37	8.23	8.85	9.20
SESLHD	8.49	8.19	9.51	9.32
NBMLHD	8.50	8.27	9.39	9.06
SYDLHD	8.51	8.44	9.35	9.51
ISLHD	8.57	8.24	9.46	9.34
MLHD	8.60	8.38	9.33	9.44
FWLHD	8.67	8.59	9.23	9.49
NSLHD	8.72	8.48	9.38	9.48
WNSWLHD	8.73	8.53	9.33	9.52
CCLHD	8.75	8.50	9.27	9.68
HNELHD	8.79	8.61	9.34	9.47
SNSWLHD	8.90	8.60	9.49	9.56
SVHN	8.96	8.61	9.06	9.56
MNCLHD	9.04	8.67	9.54	9.49
NNSWLHD	9.05	8.99	9.57	9.76
LHD correlations (p-value)				
Overall exp. Index	1.00	0.89 (<0.001)	0.49 (0.049)	0.79 (0.002)
Pt engage. Index		1.00	0.38 (0.15)	0.83(<0.001)
Respect and dignity			1.00	0.40 (0.13)
Very good/good KPI				1.00

Benchmark options for composite scores

There are a number of ways to identify potential benchmark levels using data, including use of statistical tests, deciles and interquartile ranges. Following review of initial data and discussions with the Ministry, interquartile ranges were selected to investigate benchmark levels. This section looks at mean scores for the proposed KPIs and how they relate to the interquartile ranges across LHDs.

Overall patient experience index

In 2016, the mean score for the overall patient experience index for NSW was 8.62 with 25th and 75th percentile score of 8.5 and 8.8 respectively (Table 7). The NSW range across quarters was 8.45 in the first quarter of 2016 to 8.62 in the last quarter of 2016. This suggests that a NSW benchmark to support continued improvement could be set at 8.60. This is approximately at the NSW state performance level in the last quarter of 2016 and within the 25th and 75th percentiles at that time. However, as the 'natural' target of the patient engagement index sits at 8.40, a target which supports continued improvement could be set at 8.50.

Table 7 Overall patient experience index scores, by LHD and quarter, 2015 and 2016

	< 8.2 Not performing		> 8.5 Performing					
LHD	2015 Q1	2015 Q2	2015 Q3	2015 Q4	2016 Q1	2016 Q2	2016 Q3	2016 Q4
WSLHD	8.2	8.23	8.38	8.25	8.08	8.32	8.03	8.37
NBMLHD	8.28	8.04	8.18	8.35	7.98	7.93	8.38	8.5
FWLHD	8.48	8.38	7.88	8.51	8.9	8.74	8.62	8.67
ISLHD	8.41	8.32	8.64	8.43	8.38	8.4	8.43	8.57
SWSLHD	8.27	8.36	8.21	8.43	8.04	8.31	8.21	8.27
SYDLHD	8.49	8.64	8.73	8.76	8.34	8.57	8.42	8.51
CCLHD	8.72	8.59	8.69	8.77	8.65	8.87	8.63	8.75
HNELHD	8.53	8.73	8.62	8.79	8.67	8.67	8.78	8.79
NSLHD	8.63	8.74	8.44	8.56	8.65	8.8	8.66	8.72
NNSWLHD	8.75	8.96	8.95	8.68	8.56	8.77	8.92	9.05
SESLHD	8.66	8.6	8.52	8.52	8.62	8.52	8.65	8.49
MNCLHD	8.93	8.95	8.89	8.92	8.77	8.75	8.73	9.04
SVHN	8.99	8.45	8.79	8.87	8.71	8.87	8.88	8.96
MLHD	8.67	8.59	8.5	8.43	8.59	8.52	8.57	8.6
SNSWLHD	8.79	8.83	8.91	8.94	8.83	8.75	8.94	8.9
WNSWLHD	8.88	8.72	8.72	8.94	8.73	8.74	8.85	8.73
NSW	8.54	8.57	8.55	8.6	8.45	8.56	8.54	8.62
25th Percentile	8.5	8.4	8.4	8.4	8.4	8.5	8.4	8.5
75th Percentile	8.7	8.7	8.7	8.8	8.7	8.7	8.8	8.8

Benchmark options for composite scores

Patient engagement index

Table 7 highlights quarterly index results for the patient engagement index across all LHDs between 2015 and 2016.

For the most recent quarter, the NSW score was 8.43 with the 25th and 75th percentile score of 8.3 and 8.6, respectively. The NSW score range, across each quarter of 2015 and 2016, was from a low of 8.30 in the second quarter of 2016 to 8.43 in the last quarter of 2016.

On review of these results, BHI advises that a NSW benchmark to support continued improvement could be set as 8.50, which is slightly higher than the NSW state performance level in the last quarter of 2016 and within the 25th and 75th percentiles for all reported quarters.

Table 8 Patient engagement index scores, by LHD and quarter, 2015 and 2016

	< 8.2	Not performing	> 8.5	Performing				
LHD	2015 Q1	2015 Q2	2015 Q3	2015 Q4	2016 Q1	2016 Q2	2016 Q3	2016 Q4
WSLHD	7.99	8.1	8.07	7.95	8.17	8.24	7.94	8.23
NBMLHD	8.09	7.95	8.12	8.08	8.1	7.45	8.11	8.27
FWLHD	8.14	8.23	7.75	8.32	9.15	8.64	8.4	8.59
ISLHD	8.17	8.03	8.34	8.43	8.3	8.28	8.01	8.24
SWSLHD	8.19	8.02	8.13	8.29	8.04	8.25	8.18	8.2
SYDLHD	8.28	8.46	8.61	8.53	8.17	8.5	8.42	8.44
CCLHD	8.28	8.02	8.21	8.14	8.28	8.34	8.27	8.5
HNELHD	8.36	8.53	8.46	8.54	8.63	8.45	8.59	8.61
NSLHD	8.38	8.4	8.22	8.25	8.23	8.37	8.37	8.48
NNSWLHD	8.49	8.73	8.76	8.47	8.24	8.5	8.54	8.99
SESLHD	8.53	8.43	8.22	8.2	8.38	8.16	8.37	8.19
MNCLHD	8.54	8.68	8.68	8.59	8.77	8.43	8.53	8.67
SVHN	8.56	7.71	8.23	8.58	8.64	7.97	8.47	8.61
MLHD	8.59	8.64	8.35	8.45	8.58	8.25	8.46	8.38
SNSWLHD	8.59	8.67	8.81	8.78	8.65	8.56	8.61	8.6
WNSWLHD	8.63	8.53	8.42	8.58	8.33	8.54	8.54	8.53
NSW	8.33	8.32	8.34	8.35	8.32	8.3	8.34	8.43
25th Percentile	8.2	8.0	8.2	8.3	8.2	8.2	8.3	8.3
75th Percentile	8.5	8.5	8.5	8.5	8.6	8.5	8.5	8.6

Benchmark options: single measure of respect and dignity

The respect and dignity question was identified as a possible single question item for either a KPI or an improvement measure. If a question on respect and dignity were included as either of these, a high benchmark would be necessary to achieve face validity with consumers and staff. BHI advises that a benchmark of 9.50 is appropriate for this single question score due to the aspirational nature of this indicator.

The resultant performance for each LHD across each quarter of 2015 and 2016 are provided (Table 9).

Table 9 Patient experiences with respect & dignity scores, by LHD and quarter, 2015 and 2016

	< 9.0 Not performing		> 9.5 Performing					
LHD	2015 Q1	2015 Q2	2015 Q3	2015 Q4	2016 Q1	2016 Q2	2016 Q3	2016 Q4
WSLHD	8.93	8.77	9.05	9.16	8.90	8.95	8.97	8.85
NBMLHD	9.00	9.13	9.03	9.25	9.14	9.09	9.17	9.01
FWLHD	8.94	9.44	9.76	9.33	9.58	9.30	9.31	9.06
ISLHD	9.30	8.92	8.65	9.29	9.33	9.44	9.43	9.23
SWSLHD	9.30	9.22	9.19	9.47	9.23	9.42	9.18	9.27
SYDLHD	9.32	9.15	9.45	9.04	9.36	9.20	9.29	9.33
CCLHD	9.43	9.33	9.24	9.51	9.31	9.27	9.40	9.33
HNELHD	9.26	9.35	9.31	9.39	9.34	9.35	9.39	9.34
NSLHD	9.05	9.38	9.42	9.28	8.96	9.18	9.12	9.35
NNSWLHD	9.32	9.47	9.25	9.48	9.27	9.33	9.23	9.38
SESLHD	9.23	9.01	9.10	9.26	8.88	8.56	9.17	9.39
MNCLHD	9.21	8.95	9.42	9.28	9.12	9.06	9.32	9.46
SVHN	9.46	9.45	9.57	9.55	9.36	9.33	9.40	9.49
MLHD	9.32	9.27	9.20	9.35	9.36	9.14	9.36	9.51
SNSWLHD	9.49	9.47	9.47	9.62	9.46	9.24	9.36	9.54
WNSWLHD	9.28	9.39	9.43	9.30	9.09	9.16	9.49	9.57
NSW	9.21	9.23	9.26	9.34	9.19	9.17	9.25	9.29
25th Percentile	9.2	9.1	9.2	9.3	9.1	9.1	9.2	9.3
75th Percentile	9.3	9.4	9.4	9.5	9.4	9.3	9.4	9.5

Analysis by population groups

KPIs reported as part of the NSW Health Service Level Agreements with LHDs are required to be reported by three key population groups to provide data on equity of care. These groups and how they are defined for the purposes of the NSW Patient Survey Program are:

- Aboriginal status: defined by patient reported Aboriginal status included in all survey questionnaires
- Deprivation: defined as quintile of deprivation using the Index of Relative and Social Deprivation (IRSD), based on patient postcode of residence
- Remoteness: defined as rurality using the Accessibility and Remoteness Index of Australia (ARIA), based on patient postcode of residence.

BHI conducted analysis of LHD and NSW results for quarterly KPI reporting and identified that small patient numbers are an issue when reporting by population, particularly for Aboriginal status (n=170 at NSW level, Q4, 2016). Due to this, results for the three population groups should be reviewed only on an annual basis at LHD level and on both quarterly and annual basis at NSW level.

Table 10 presents the number of survey respondents in each population group for Q4, 2016 at NSW level. In addition, results are presented to provide indicative levels of performance for each group. The results align with other BHI survey reporting that has identified a substantial gap in experiences between Aboriginal and non-Aboriginal patients, and in rural vs metro patients. As seen in many surveys of public hospital care, there was no strong pattern of results by deprivation.

Table 10 Eligible respondents and mean scores by proposed and current KPIs by population group, Q4 2016

	n	Patient engagement index	Overall exp. index	Respect and dignity	Overall care (% vg+g)
Aboriginal and/or Torres Strait Islander	169	7.9	8	8.3	0.88
Non-Aboriginal	6,676	8.4	8.6	9.3	0.94
Quintile 1: Most disadvantaged	1,436	8.4	8.6	9.3	0.93
Quintile 2	2,032	8.5	8.7	9.3	0.95
Quintile 3	1,663	8.4	8.7	9.4	0.95
Quintile 4	1,064	8.5	8.6	9.2	0.93
Quintile 5: Least disadvantaged	823	8.4	8.5	9.2	0.94
Major cities	3,224	8.4	8.5	9.2	0.94
Inner regional	2,689	8.6	8.8	9.5	0.95
Outer regional/remote	1,108	8.6	8.8	9.4	0.95

Appendix

Appendix 1: Most recent quarterly results

Table 11 Quarterly results for each index and its components, respect and dignity measure, and current KPI, by LHD, 2016 Q4

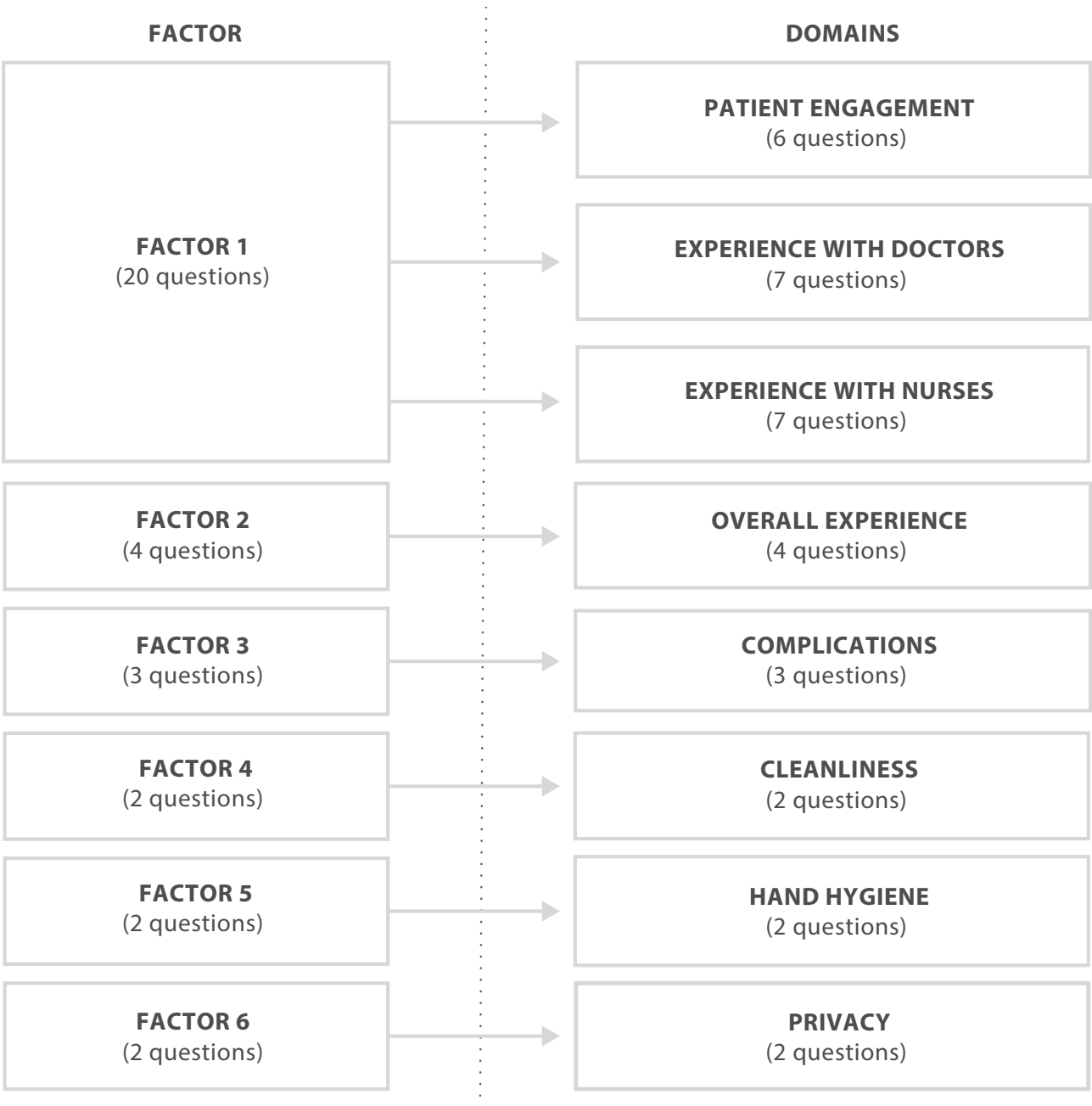
	Overall patient experience index	Organised	Overall rating	Recommend	Work together	Patient engagement index	Involved in discharge	Manage at home	Involved in decisions	Ready to leave	Know who to contact	Given enough information	Respect and dignity score	KPI current
CCLHD	8.75	8.22	9.09	8.90	8.75	8.50	7.96	8.58	8.03	9.39	8.89	8.50	9.27	9.68
FWLHD	8.67	8.38	8.95	8.81	8.52	8.59	7.95	8.57	7.71	9.32	9.46	8.54	9.23	9.49
HNELHD	8.79	8.37	9.13	8.89	8.86	8.61	8.09	8.69	7.97	9.25	9.03	8.78	9.34	9.47
ISLHD	8.57	8.06	8.92	8.70	8.68	8.24	7.74	8.12	7.69	9.32	8.84	8.38	9.46	9.34
MLHD	8.60	8.26	9.06	8.46	8.63	8.38	8.05	8.42	7.89	9.21	8.36	8.55	9.33	9.44
MNCLHD	9.04	8.71	9.29	9.13	8.98	8.67	8.34	8.46	8.29	9.36	9.00	8.84	9.54	9.49
NBMLHD	8.50	8.03	8.82	8.50	8.62	8.27	7.70	8.46	7.53	8.59	8.74	8.46	9.39	9.06
NNSWLHD	9.05	8.69	9.32	9.10	9.11	8.99	8.55	8.99	8.35	9.65	9.39	9.14	9.57	9.76
NSLHD	8.72	8.22	9.00	8.94	8.72	8.48	7.86	8.38	7.71	9.45	8.55	8.92	9.38	9.48
SESLHD	8.49	7.96	8.79	8.74	8.58	8.19	7.76	8.22	7.34	9.01	8.33	8.62	9.51	9.32
SNSWLHD	8.90	8.50	9.25	9.01	8.89	8.60	8.28	8.42	8.17	9.40	8.92	8.61	9.49	9.56
SVHN	8.96	8.73	9.09	9.02	9.02	8.61	7.82	8.57	8.55	9.08	8.49	9.22	9.06	9.56
SWSLHD	8.27	7.68	8.62	8.22	8.58	8.20	6.96	8.43	7.40	9.05	8.47	8.71	9.01	9.08
SYDLHD	8.51	7.93	8.84	8.65	8.58	8.44	7.73	8.46	7.83	9.16	8.62	8.74	9.35	9.51
WNSWLHD	8.73	8.27	9.11	8.83	8.77	8.53	8.19	8.53	8.01	9.38	8.64	8.59	9.33	9.52
WSLHD	8.37	7.81	8.71	8.54	8.54	8.23	7.74	8.17	7.99	8.90	8.30	8.70	8.85	9.20

Appendix 2: Summary of factor analysis

Exploratory factor analysis was completed using SAS v9.4 in multiple iterations; including and excluding outcomes and overall ratings measures. The resulting themes and questions outlined are based on interpretation of the results in the context of the literature (Figure 10). Single measures (e.g. respect and outcomes of care) were part of resulting factors in some analysis but are not included in the

domains. Instead some measures were considered as possible single measure scores. Further analysis was completed on the resulting themes overall experience and patient engagement and the single score on respect. Confirmatory factor analysis is often used in the literature to confirm a set of domains and single measure scores. Confirmatory factor analysis was not conducted.

Figure 10 Factor analysis and interpretation resulting in eight domains



Questions associated with the domains

Patient engagement

1. Did hospital staff tell you who to contact if you were worried about your condition or treatment after you left hospital?
2. During your stay in hospital, how much information about your condition or treatment was given to you?
3. Were you involved, as much as you wanted to be, in decisions about your care and treatment?
4. Thinking about when you left hospital, were you given enough information about how to manage your care at home?
5. Did you feel involved in decisions about your discharge from hospital?
6. At the time you were discharged, did you feel that you were well enough to leave the hospital?

Doctors

1. If you needed to talk to a doctor, did you get the opportunity to do so?
2. Overall, how would you rate the doctors who treated you?
3. Did you have confidence and trust in the doctors treating you?
4. Were the doctors kind and caring towards you?
5. When you had important questions to ask a doctor, did they answer in a way you could understand?
6. In your opinion, did the doctors who treated you know enough about your medical history?
7. Did the health professionals explain things in a way you could understand?

Nurses

1. In your opinion, did the nurses who treated you know enough about your care and treatment?
2. When you had important questions to ask a nurse, did they answer in a way you could understand?
3. Overall, how would you rate the nurses who treated you?
4. Did you have confidence and trust in the nurses treating you?
5. Were the nurses kind and caring towards you?

6. If you needed to talk to a nurse, did you get the opportunity to do so?
7. Did nurses ask your name or check your identification band before giving you any medications, treatments or tests?

Overall experience

1. How would you rate how well the health professionals worked together?
2. How well organised was the care you received in hospital?
3. If asked about your hospital experience by friends and family how would you respond?
4. Overall, how would you rate the care you received while in hospital?

Complications

1. Not including the reason, you came to hospital, during your hospital stay, or soon afterwards, did you experience any of the following complications or problems?
2. In the month following your discharge, were you re-admitted to any hospital because of complications related to the care you received?
3. In the month following your discharge, did you go to an emergency department because of complications related to the care you received.

Cleanliness

1. How clean were the wards or rooms you stayed in while in hospital?
2. How clean were the toilets and bathrooms that you used while in hospital?

Hand hygiene

1. Did you see doctors wash their hands, or use hand gel to clean their hands, before touching you?
2. Did you see nurses wash their hands, or use hand gel to clean their hands, before touching you?

Privacy

1. Were you given enough privacy when discussing your condition or treatment?
2. Were you given enough privacy when being examined or treated?

Appendix 3: Examples of Australian and international reporting of survey measures

Table 12 Australian jurisdictional examples of composite measures

Place/link	Composite measures used	Benchmark
South Australia 2016 report	<p>Involvement in care KPI as a composite score of 5 questions out of 100:</p> <ol style="list-style-type: none"> 1. "Were you asked about your dietary needs when you arrived on the ward?" 2. "When you gave your consent for medical treatment, did you understand the risks, benefits and alternatives of recommended treatment?" 3. "Did anyone ask whether you had any cultural or religious beliefs that might affect the way you were treated in hospital?" 4. "If you needed one, did you have access to an interpreter?" 5. "Was your right to have an opinion respected?" <p>Also, annually report on 10 Picker domains, including 8 composites measures and 2 single questions (respect, pain), as well as scores for 8 'areas of care' environment, feedback, workforce, cleanliness, and hygiene. No outcomes or single overall rating.</p>	<p>70 = Below average</p> <p>80 = Average of domains</p> <p>85 = Benchmark</p> <p>For all measures, out of a 100 point maximum</p>
Victorian healthcare experience survey	<p>Discharge Index, composite of four questions:</p> <ol style="list-style-type: none"> 1. "Before leaving hospital did the doctors and nurses give you sufficient information about managing your healthcare at home?" 2. "Did hospital staff take your family and home situation into account when planning your discharge?" 3. "Thinking about when you left hospital, were adequate arrangements made by the hospital for any services you needed?" 4. "If follow-up with your general practitioner was required, was he or she given all the necessary information about the treatment or advice you received while in hospital?" <p>Overall experience 'very good' + 'good' (overall ratings single question)</p> <p>Report quarterly on these two measures in online tool.</p>	<p>75 = Discharge index target</p> <p>95 = Overall ratings target</p>
Western Australia	<p>Reporting on scored results from survey since early 2000.</p> <p>Report on 7 domains and ask patients to rate the importance of domains.</p> <p>Report an overall 'summary', weighted by importance placed on each domain by patients.</p> <ol style="list-style-type: none"> 1. Access – getting into hospital 2. Time and care – the time and attention paid to patient care 3. Consistency – continuity of care 4. Needs – meeting the patient's personal needs 5. Informed – information and communication 6. Involvement – involvement in decisions about care and treatment 7. Residential – residential aspects of the hospital <p>Overall score – average of all domains</p>	<p>No benchmarks</p>

Table 13 International examples of composite measures

Place/link	Composite measures used	Benchmark
United States (AHRQ)	<p>Six composite measures (doctors, nurses, pain management, medication communication, responsiveness of staff, pain, discharge), two individual items (cleanness, quietness) and two global ratings (overall care, recommend)</p> <p>Scores calculated at aggregate (area/facility) level and not at a patient level.</p>	Cannot easily find public reporting results online for these
Canadian Institute for Health Information	<p>Preliminary core set of 22 measures (10 composite, 8 single and 4 overall hospital rating measures + 1 outcome)</p> <p>Based on HCAHPS (the US survey), hospital reporting and benchmarking is planned by CIHI</p> <p>Of note - only other jurisdiction reporting on one outcome measure, and overall ratings mix.</p>	No reporting publicly or mention of benchmarks.
NHS England	<p>Preliminary core set of 22 measures (10 composite, 8 single and 4 overall hospital rating measures + 1 outcome)</p> <p>Based on HCAHPS (the US survey), hospital reporting and benchmarking is planned by CIHI</p> <p>Of note - only other jurisdiction reporting on one outcome measure, and overall ratings mix.</p> <p>Domain reporting similar across services (inpatient, ED, MH, outpatient). Domains comprised of slightly different questions depending on service (PICKER questions). Core domains are: Access and waiting (time to admission, surgery depends on survey); Safe, high quality, coordinated care (conflicting information, discharge delay and main reason, danger signals to watch for); Better information, more choice (involved, side effects, medication); Building closer relationships (understandable answers doctors and nurses, talk about you as if you weren't there); Clean, comfortable, friendly place to be (noise, clean, privacy, respect, pain)</p> <p>Report overall domain score and under it individual questions, discussing the most positive percentage most often.</p> <p>Online reports containing several years of data for the four services.</p>	Benchmarking to top 20% or bottom 20% of trusts.

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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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