2016 Children and young people's inpatient and day case survey

Identifying outliers within trust-level results

Contents

Summary

The 2016 Children and young people's inpatient and day case survey received feedback from 34,708 patients who received care in 132 NHS acute trusts during November and December 2016.[a] A total of 11,166 young patients aged 8-15 told us directly about their experiences through questionnaires designed especially for them, and we received feedback from parents and carers for all experiences.

Analysis of the national results is published on our website. In this separate analysis, we identify the trusts whose patients' experience of care is either better, or worse, than expected when we compare the survey results across all trusts.

In this survey, we use the same analysis methodology to identify variation in results at trust level as the one we use across the NHS Patient Survey Programme (see details in Appendix A and B).

This methodology is considered to be more robust than that used before the 2016 Inpatient survey, as all scored questions are analysed simultaneously and trust performance is no longer assessed using mean scores, which can mask where experience is highly polarised. For more information on the difference between approaches, see the section on outlier analysis and trust-level benchmark reports.

Each trust has been categorised into one of five bands: 'much worse than expected', 'worse than expected', 'about the same, 'better than expected' or 'much better than expected'. We produced two bands for each trust, one for experiences of children aged 15 days to seven years and another for children and young people aged eight to 15.

One acute trust (Queen Victoria Hospital NHS Foundation Trust) was categorised in the highest band as it was identified as 'much better than expected' for both age groups. A further five trusts were categorised as 'much better than expected' for one age group only: Moorfields Eye Hospital NHS Foundation Trust, Northern Devon Healthcare NHS Trust, Royal Brompton & Harefield NHS Foundation Trust, Salisbury NHS Foundation Trust and St Helens and Knowsley Teaching Hospitals NHS Trust.

Three trusts have been identified as achieving 'much worse than expected' results for one age group: East Cheshire NHS Trust, The Royal Wolverhampton NHS Trust and Yeovil District Hospital NHS Foundation Trust. The Pennine Acute Hospitals NHS Trust was categorised in the 'much worse than expected' band for both age groups.

a. Five trusts included patients discharged in October 2016 in their sample as they had fewer patient admissions than other trusts. Responses from these patients accounted for 0.7% of total responses.

CQC's Chief Inspector of Hospitals, Professor Ted Baker, has written to all trusts that the survey identified as being better or worse than average and these letters have been shared with NHS Improvement.[b] We recognise that trusts may have been working locally to improve services since the survey took place. However, the trusts identified as worse or much worse, have been asked to review their results and to outline what actions they will take to continue to address the areas of concern.

CQC will continue to reflect each trust's performance in this survey in our CQC Insight monitoring as part of the wider information we hold on their performance. We will review trusts' progress on the actions they take to improve during their next planned inspection. As part of inspections, our inspection teams will focus on the areas raised in the survey where results suggest that people's experiences were worse than we would expect, and they will look for reassurance that trusts are taking appropriate action.

b. NHS Improvement oversees NHS trusts and independent providers that provide NHS-funded care. It supports providers to give patients consistently safe, high-quality, compassionate care within local health systems.

Interpreting the results

We have calculated the overall proportion of responses that each trust received for the 'most negative', 'middle' and 'most positive' answer option(s) across all of the scored questions in the survey.[c]

The following example is a question from the 2016 Children and young people's inpatient and day case survey to show how responses are categorised as either 'most negative', 'middle' and 'most positive'.

Did hospital staff play with you or do any activities with you while you were in hospital?

- Yes, a lot – **most positive**
- Yes, a little – **middle**
- No – **most negative**

Where a trust's patient experience is either better or worse than elsewhere, there will be a significant difference between that trust's result and the average result across all trusts. Each trust is then assigned a banding of either 'much worse than expected', 'worse than expected', 'about the same', 'better than expected' or 'much better than expected' depending on how significant that variation is. Consistent with our trust-level benchmarking methodology, we have compared specialist trusts with non-specialist trusts.

Taking a hypothetical trust as an example, the trust's proportion of responses for those aged 8-15 breaks down as: 'most negative' 8%, 'middle' 20% and 'most positive' 72%. This is then compared with the trust average of 'most negative' 6%, 'middle' 18% and 'most positive' 75%. The adjusted z-score for the difference between the hypothetical trust's 'most negative' proportion (8%) and the trust's average 'most negative' proportion (6%) is -1.76. This means that despite a higher proportion of most negative responses than the trust average, this is not considered significant and the hypothetical trust is categorised as 'about the same'.

To provide more granular analysis, a banding has been assigned for 2016 results to separate the experiences of children and young people aged 15 days to 7 years and 8-15 years separately. Feedback for those aged 15 days to 7 years was received entirely from parents and carers, whereas questionnaires sent to those aged 8-15 included sections for both the child and their parent or carer to complete.[d]

Finally, each table in the report includes the most recent trust-wide CQC rating and rating for the core service of Services for children and young people for individual hospital sites where available. See appendix B for details of the analytical method used to calculate these results.

c. Filter questions, such as *'Was your child's visit to hospital planned or an emergency?'* were not included in this analysis.

d. This survey used, under licence, questionnaires originally developed and owned by Picker Institute Europe.

Outlier analysis and trust-level benchmark reports

The approach used to analyse trust variation in this report is focused on identifying significantly higher levels of better or worse patient experience **across the entire survey**.

This holistic approach is different to the technique used to analyse results in trust benchmarking reports, which have been made available to each trust separately. Within those reports, trust results, for each scored question, are assigned bands of either 'better', 'worse' or 'about the same' when compared with the findings for all other trusts. However, trust benchmark reports do not attempt to look across all questions concurrently and therefore do not provide an overall assessment of the proportion of positive or negative patient experience reported across the entire survey.

Furthermore, being assigned a band of 'better' for an overall experience question is not the same as being 'better than expected' across the entire survey. For comparison, Appendix C details all trusts that were assigned a band of 'worse' or 'better' for the overall experience question asked for all parents and carers.

Historically, any trust that received a banding of 'worse' or 'better' for at least 20% of scored survey questions was considered as being 'worse/better than expected' across the entire survey. The analysis methodology used in this report replaces the 20% better/worse rules based method.

While both approaches are useful, analysis of individual questions can hide variation in people's experience as the scores are 'averaged' in that analysis. This new approach allows CQC to identify that variation and highlight potential concerns raised by some people across the survey.

Results

Trusts achieving 'much better than expected' results

One trust, Queen Victoria Hospital NHS Foundation Trust, was classed as 'much better than expected' for experiences of both 0-7 and 8-15 year-olds. A further five trusts were categorised in the highest band for one age group.

	Aged 0-7				Aged 8-15				Overall CQC rating	Core service rating Site 1
	Band	Most Negative (0/10)	Middle	Most Positive (10/10)	Band	Most Negative (0/10)	Middle*	Most Positive (10/10)		
Trust average		**7**	**20**	**74**		**6**	**18**	**75**		
Moorfields Eye Hospital NHS Foundation Trust	S	4	17	79	MB	3	9	88	G	G
Northern Devon Healthcare NHS Trust	MB	2	11	87	S	3	16	81	RI	G
Queen Victoria Hospital NHS Foundation Trust	MB	3	9	88	MB	2	11	87	G	G
Royal Brompton and Harefield NHS Foundation Trust	B	3	14	83	MB	4	12	85	RI	G
Salisbury NHS Foundation Trust	B	4	15	81	MB	3	13	84	RI	RI
St Helens and Knowsley Teaching Hospitals NHS Trust	S	6	19	75	MB	3	11	86	G	G

Key:

Trust performance	Much worse (MW)	Worse (W)	About the same (S)	Better (B)	Much better (MB)
CQC rating	Inadequate (I)	Requires improvement (RI)	Good (G)	Outstanding (O)	No rating (NR)

*Where a number of options lay between the negative and positive responses, they are placed at equal intervals along the scale. For example 'Quite clean' and 'Not very clean' are the middle options (scored as 6.6/10 and 3.3/10) for the question *'How clean do you think the hospital room or ward was that your child was in?'*

Trusts achieving 'better than expected' results

In addition to Royal Brompton and Harefield NHS Foundation Trust and Salisbury NHS Foundation Trust, shown in the table above, three further trusts were categorised as 'better than expected' for experiences of 0-7 year-olds.

Seven other trusts were categorised as 'better than expected' for experiences of 8-15 year-olds. It is evident from the results that very few trusts demonstrated consistently high levels of positive patient experience across both age groups.

	Aged 0-7				Aged 8-15				Overall CQC rating	Core service rating	
	Band	Most Negative (0/10)	Middle	Most Positive (10/10)	Band	Most Negative (0/10)	Middle	Most Positive (10/10)		Site 1	Site 2
Trust average		**7**	**20**	**74**		**6**	**18**	**75**			
Alder Hey Children's NHS Foundation Trust	S	5	16	79	B	4	15	81	G	NR	
Great Ormond Street Hospital for Children NHS Foundation Trust	B	3	14	83	S	4	19	77	G	G	
Homerton University Hospital NHS Foundation Trust	S	7	20	73	B	2	14	84	G	G	
Mid Essex Hospital Services NHS Trust	S	5	15	80	B	4	14	82	G	G	
North Tees and Hartlepool NHS Foundation Trust	W	10	19	71	B	5	14	82	RI	G	G
Royal Devon and Exeter NHS Foundation Trust	B	4	16	81	S	5	18	77	G	G	
Surrey and Sussex Healthcare NHS Trust	S	5	26	69	B	4	14	82	G	G	
Tameside and Glossop Integrated Care NHS Foundation Trust	S	5	17	78	B	4	14	82	G	G	
The Royal Marsden NHS Foundation Trust	S	2	20	77	B	3	13	84	G	G	
University Hospitals Bristol NHS Foundation Trust	B	4	14	82	S	5	15	80	O	G	

Key:

Trust performance	Much worse (**MW**)	Worse (**W**)	About the same (**S**)	Better (**B**)	Much better (**MB**)
CQC rating	Inadequate (**I**)	Requires improvement (**RI**)	Good (**G**)	Outstanding (**O**)	No rating (**NR**)

Trusts achieving 'worse than expected' results

Two trusts, Lancashire Teaching Hospitals NHS Foundation Trust and North Middlesex University Hospital NHS Trust were categorised as 'worse than expected' for experiences of both 0-7 and 8-15 year-olds.

	Aged 0-7				Aged 8-15				Overall CQC rating	Core service rating	
	Band	Most Negative (0/10)	Middle	Most Positive (10/10)	Band	Most Negative (0/10)	Middle	Most Positive (10/10)		Site 1	Site 2
Trust average		**7**	**20**	**74**		**6**	**18**	**75**			
Barking, Havering and Redbridge University Hospitals NHS Trust	S	7	19	74	W	9	20	71	RI	RI	G
Blackpool Teaching Hospitals NHS Foundation Trust	S	6	20	74	W	10	22	68	RI	G	
Croydon Health Services NHS Trust	W	10	27	63	S	7	20	73	RI	G	
Great Western Hospitals NHS Foundation Trust	S	7	22	72	W	10	21	69	RI	RI	
Heart of England NHS Foundation Trust	S	8	22	70	W	9	19	72	RI	RI	G
Lancashire Teaching Hospitals NHS Foundation Trust	W	9	25	66	W	10	22	68	RI	RI	
North Middlesex University Hospital NHS Trust	W	11	23	66	W	10	24	66	RI	RI	
Plymouth Hospitals NHS Trust	S	8	22	70	W	9	18	72	RI	G	
Portsmouth Hospitals NHS Trust	S	7	18	75	W	10	18	73	RI	RI	
Sheffield Children's NHS Foundation Trust	S	6	20	74	W	9	20	70	G	NR	

Key:

Trust performance	Much worse (**MW**)	Worse (**W**)	About the same (**S**)	Better (**B**)	Much better (**MB**)
CQC rating	Inadequate (**I**)	Requires improvement (**RI**)	Good (**G**)	Outstanding (**O**)	No rating (**NR**)

Trusts achieving 'worse than expected' results (continued)

	Aged 0-7				Aged 8-15				Overall CQC rating	Core service rating	
	Band	Most Negative (0/10)	Middle	Most Positive (10/10)	Band	Most Negative (0/10)	Middle	Most Positive (10/10)		Site 1	Site 2
Trust average		**7**	**20**	**74**		**6**	**18**	**75**			
Southend University Hospital NHS Foundation Trust	W	11	24	65	S	7	20	73	RI	RI	
The Dudley Group NHS Foundation Trust	W	10	24	66	S	8	23	69	RI	G	G
University Hospitals Coventry and Warwickshire NHS Trust	W	9	20	70	S	6	19	75	RI	RI	
Warrington and Halton Hospitals NHS Foundation Trust	W	10	25	65	S	7	20	73	RI	G	

Key:

Trust performance	Much worse (**MW**)	Worse (**W**)	About the same (**S**)	Better (**B**)	Much better (**MB**)
CQC rating	Inadequate (**I**)	Requires improvement (**RI**)	Good (**G**)	Outstanding (**O**)	No rating (**NR**)

Trusts achieving 'much worse than expected' results

One trust, The Pennine Acute Hospitals NHS Trust, was categorised in the lowest band of 'much worse than expected' for experiences of both 0-7 and 8-15 year-olds. A further three trusts were categorised in this band for one age group only.

	Aged 0-7				Aged 8-15				Overall CQC rating	CYP core service	
	Band	Most Negative (0/10)	Middle	Most Positive (10/10)	Band	Most Negative (0/10)	Middle	Most Positive (10/10)		Site 1	Site 2
Trust average		**7**	**20**	**74**		**6**	**18**	**75**			
East Cheshire NHS Trust	S	6	20	74	MW	13	24	63	RI	RI	
The Pennine Acute Hospitals NHS Trust	MW	11	23	66	MW	11	22	67	I	I	I
The Royal Wolverhampton NHS Trust	MW	13	23	64	S	7	22	71	RI	G	
Yeovil District Hospital NHS Foundation Trust	S	6	23	71	MW	11	21	68	RI	RI	

Key:

Trust performance	Much worse (**MW**)	Worse (**W**)	About the same (**S**)	Better (**B**)	Much better (**MB**)
CQC rating	Inadequate (**I**)	Requires improvement (**RI**)	Good (**G**)	Outstanding (**O**)	No rating (**NR**)

Appendix A: Analysis methodology

Identifying worse than expected patient experience

The analytical approach to identifying those trusts where patient experience was 'worse than expected' uses responses for all scored questions (except the overall experience question asked to parents).[e]

For each trust, a count of the number of responses scored as '0' (the most negative option) is calculated. This is then divided by the total number of responses scored as 0-10 to calculate the trust-level proportion of poor experience. A higher percentage of negative responses indicates poor patient experience.

The analysis uses z-scores to indicate the difference between the proportion of poor experience in a trust and the average.

There are two thresholds for flagging trusts with concerning levels of poor patient experience:

- **Worse than expected**: z-score lower than -1.96
- **Much worse than expected**: z-score lower than -3.09

Appendix B provides full technical detail of the analytical process.

Identifying better than expected patient experience

To identify 'better than expected' patient experience, we calculate a count of the number of responses scored as '10' (the most positive option) for each trust.

This is then divided by the total number of responses scored as 0-10 to calculate the trust-level proportion of poor experience. A higher percentage of positive responses indicates good patient experience.

Our analysis has found that those trusts with the highest proportion of positive responses also have the lowest proportion of negative responses.

There are two thresholds for identifying trusts with high levels of good patient experience:

- **Better than expected**: z-score lower than -1.96
- **Much better than expected**: z-score lower than -3.09

e. Overall experience is excluded from the analysis due to the ambiguity around what should be categorised as the 'most negative' (and 'most positive') option(s).

Weighting

Results have been standardised by the age, length of stay and admission method of respondents to ensure that no trust will appear better or worse than another because of its respondent profile.

Standardisation enables a more accurate comparison of results from trusts with different population profiles. In most cases this will not have a large impact on a trust's results, but it does make comparisons between trusts as fair as possible.

Scoring

For each question in the survey, the individual (standardised) responses are converted into scores on a scale from 0 to 10. A score of 10 represents the best possible response and a score of 0 the worst. The higher the score for each question, the better the trust is performing.

It is not appropriate to score all questions in the questionnaire as not all of the questions assess the trust's performance. For example, they may be descriptive questions such as asking respondents if their child's attendance was planned in advance or an emergency.

Appendix B: Analytical stages of the outlier model

The analytical approach to identifying outliers is based on all evaluative items in the survey; these are the questions that are scored for benchmarking purposes. The scored variables are the source data, and are required at individual respondent level. These variables take values between 0 (representing the worst rating of experience) and 10 (representing the best rating). The approach also makes use of the standardisation weight for the survey.

As outlier analysis was conducted on two sub-sets of data (0-7 and 8-15), the 'PSAweights' used to standardise responses within benchmark reports were normalised. To do this each respondent weight in the subset of data being analysed was divided by the mean weight for the trust in the subset. The impact of this is to ensure that the weighted total responses are equal to the unweighted total.

1. Count the poor-care ratings made by each respondent[f]

Count of the '0' responses across the scored questions answered by each respondent (excluding the "Overall…" question).

2. Count the questions given specific (scored) answers by each respondent

Count of all '0-10' responses across the scored questions answered by each respondent (excluding the "Overall…" question).

3. Weight the data

Apply the standardisation weight for respondents. The weight adjusts the population of respondents within each trust to the national average proportions for age, length of stay (zero overnight stays vs. one or more overnight stays) and admission type (emergency vs. elective).

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f. The analytical approach used to identify positive patient experience uses a numerator count of the '10' responses across all scored questions (excluding the "overall…" question) to calculate the 'good-care ratings'. There are no other differences between the analytical approaches for identifying poor and good patient experience.

4. Aggregate to trust-level and compute proportion of poor ratings

Obtain a weighted numerator and denominator for each trust. Divide the numerator by the denominator to obtain the trust-level proportion of poor care ratings, i.e. the overall percentage of responses which were scored as 0.

5. Compute the mean of the trust-level proportions

Sum all proportions and divide by the number of trusts to obtain the average trust-level proportion of poor care ratings.

6. Compute the z-score for the proportion

The Z-score formula used is:

$$z_i = -2\sqrt{n_i}\left\{sin^{-1}\left(\sqrt{p_i}\right) - sin^{-1}\left(\sqrt{p_0}\right)\right\} \qquad (1)$$

where: n_i is the denominator for the trust

               p_i is the trust proportion of poor care ratings

               p_0 is the mean proportion for all trusts

7. Winsorize the z-scores

Winsorizing consists of shrinking in the extreme Z-scores to some selected percentile, using the following method:

1. Rank cases according to their naive Z-scores.

2. Identify Z_q and $Z_{(1-q)}$, the 100q% most extreme top and bottom naive Z-scores. For this work, we used a value of q=0.1

3. Set the lowest 10% of Z-scores to Z_q, and the highest 10% of Z-scores to $Z_{(1-q)}$. These are the Winsorized statistics.

This retains the same number of Z-scores but discounts the influence of outliers.

8. Calculate dispersion using Winsorized z-scores

An over dispersion factor $\hat{\phi}$ is estimated which allows us to say if the data are over dispersed or not:

$$\hat{\phi} = \frac{1}{I}\sum_{i=1}^{I} z_i^2 \quad (2)$$

Where I is the sample size (number of trusts) and z_i is the Z score for the ith trust given by (1). The Winsorized Z scores are used in estimating $\hat{\phi}$.

9. Adjust for overdispersion

If I $\hat{\phi}$ is greater than (I - 1) then we need to estimate the expected variance between trusts. We take this as the standard deviation of the distribution of p_i (trust proportions) for trusts, which are on target, we give this value the symbol $\hat{\tau}$, which is estimated using the following formula:

$$\hat{\tau}^2 = \frac{I\hat{\phi} - (I-1)}{\sum_i w_i - \sum_i w_i^2 / \sum_i w_i} \quad (3)$$

where $s_i = (p_i - p_o)/z_i$, $w_i = 1/s_i^2$ and $\hat{\phi}$ is from (2). Once $\hat{\tau}$ has been estimated, the Z_D score is calculated as:

$$z_i^D = \frac{p_0 - p_i}{\sqrt{s_i^2 + \hat{\tau}^2}} \quad (4)$$

Appendix C: Overall experience questions – 'better' and 'worse' trusts

Twelve trusts were identified as being **'better than expected'** for the overall experience question answered by parents and carers:

- Alder Hey Children's NHS Foundation Trust
- Dorset County Hospital NHS Foundation Trust
- Great Ormond Street Hospital for Children NHS Foundation Trust
- Mid Essex Hospital Services NHS Trust
- Moorfields Eye Hospital NHS Foundation Trust
- Northern Devon Healthcare NHS Trust
- Oxford University Hospitals NHS Foundation Trust
- Queen Victoria Hospital NHS Foundation Trust
- Royal Brompton and Harefield NHS Foundation Trust
- Salisbury NHS Foundation Trust
- The Royal Marsden NHS Foundation Trust
- University Hospitals Bristol NHS Foundation Trust.

Nine trusts were identified as being **'worse than expected'** for the overall experience question answered by parents and carers:

- Bradford Teaching Hospitals NHS Foundation Trust
- Heart of England NHS Foundation Trust
- Lancashire Teaching Hospitals NHS Foundation Trust
- Luton and Dunstable University Hospital NHS Foundation Trust
- Milton Keynes University Hospital NHS Foundation Trust
- North Middlesex University Hospital NHS Trust
- The Dudley Group NHS Foundation Trust
- The Pennine Acute Hospitals NHS Trust
- The Royal Wolverhampton NHS Trust.

Appendix D: Further information

The results for England and trust level benchmark results are available on CQC's website. You can also find a technical document here, which describes the methodology for analysing the trust level benchmark results:
www.cqc.org.uk/childrenssurvey

Full details of the methodology for the survey, including questionnaires, scored questionnaire, letters sent to patients, instructions on how to carry out the survey and the survey development report, are available at:
http://www.nhssurveys.org/surveys/953

More information on the patient survey programme, including results from other surveys and a programme of current and forthcoming surveys are at:
www.cqc.org.uk/surveys

More information about how CQC monitors hospitals is available at:
http://www.cqc.org.uk/what-we-do/how-we-use-information/monitoring-nhs-acute-hospitals

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