

Care Quality Commission (CQC)

Technical details – patient survey information 2011 Inpatient survey March 2012

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1. Introduction

This document outlines the methods used by the Care Quality Commission to score and analyse the results for the 2011 Inpatient Survey, as available on the Care Quality Commission website, and in the benchmark report for each trust.

The survey results are available for each trust on the CQC website. The survey data is shown in a simplified way, identifying whether a trust performed 'better' or 'worse' or 'about the same' as the majority of other trusts for each question. On publication of the survey, an A-to-Z list of trust names will be available at the link below, containing further links to the survey data for all NHS trusts that took part in the survey:

www.cqc.org.uk/Inpatientsurvey2011

The CQC webpage also contains the national results for England, comparing against the results for the previous survey.

Results displayed in the benchmark report for each trust are a graphical representation of the results displayed for the public on the CQC website (see further information section). These have been provided to all trusts and will be available on the survey co-ordination centre website from 24th April, at:
www.nhssurveys.org

2. Selecting data for the reporting

The survey information used and published by the Care Quality Commission consists of the 'core questions' - i.e. those questions where results are available from every trust. There is a question bank from which trusts can select questions and add them into the questionnaire, though this information is not collected by the Care Quality Commission.

Of the core questions, scores are assigned to responses to questions that are of an evaluative nature: in other words, those questions where results can be used to assess the performance of a trust (see "5. Scoring individual questions" for more detail). Questions that are not presented in this way tend to be those included solely for 'filtering' respondents past any questions that may not be relevant to them (such as: 'Did you have an operation or procedure?') or those used for descriptive or information purposes.

The scores for each question are grouped on the website and in the benchmark reports according to the sections of the questionnaire as completed by respondents. For example, the Inpatients survey includes sections on 'waiting in the hospital', 'the hospital and ward', 'care and treatment', amongst others. The average score for each trust, for each section, was calculated and will be presented on the website and in the benchmark report for each trust.

Alongside both the question and the section scores on the website are one of three statements:

- Better
- About the same
- Worse

3. The CQC organisation search tool

The organisation search tool was previously referred to as the Care Directory, and survey data has been displayed in it since 2007. It is intended for a public audience, and contains information from various areas within the Care Quality Commission's functions. The presentation of the survey data was designed using feedback from people who use the data, so that as well as meeting their needs, it presents the groupings of the trust results in a simple and fair way, to show where we are more confident that a trust's score is 'better' or 'worse' than most other trusts.

The survey data can be found from the A to Z link available at:
www.cqc.org.uk/Inpatientsurvey2011

Or by searching for a hospital from the CQC home page, then clicking on 'Patient survey information' on the right hand side, or searching for an NHS trust, then selecting the survey under the 'Reports and surveys about this organisation' tab.

4. The trust benchmark reports

Benchmark reports should be used by NHS trusts to identify how they are performing in relation to all other trusts that took part in the survey. From this, areas for improvement can be identified. The reports are available from the survey co-ordination centre website: www.nhssurveys.org

The graphs included in the reports display the scores for a trust, compared with the full range of results from all other trusts that took part in the survey. Each bar represents the range of results for each question across all trusts that took part in the survey. In the graphs, the bar is divided into three sections:

- If a trust score lies in the orange section of the graph, the trust result is 'about the same' as most other trusts in the survey
- If a trust scores lies in the red section of the graph, the trust result is 'worse' compared with most other trusts in the survey.
- If your a score lies in the green section of the graph, the trust result is 'better' compared with most other trusts in the survey

A black diamond represents the score for this trust. The black diamond (score) is not shown for questions answered by fewer than 30 people because the uncertainty around the result would be too great.

5. Interpreting the data

5.1 Scoring

The questions are scored on a scale from 0 to 10. Details of the scoring for this survey are available in Appendix A at the end of this document.

The scores represent the extent to which the patient's experience could be improved. A score of 0 was assigned to all responses that reflect considerable scope for improvement, whereas a response that was assigned a score of 10 referred to the most positive possible reported patient experience. Where a number of options lay between the negative and positive responses, they were placed at equal intervals

along the scale. Where options were provided that did not have any bearing on the trust's performance in terms of patient experience, the responses were classified as "not applicable" and a score was not given. Where respondents stated they could not remember or did not know the answer to a question, a score was not given.

5.2 Standardisation

Results are based on 'standardised' data. We know that the views of a respondent can reflect not only their experience of NHS services, but can also relate to certain demographic characteristics, such as their age and sex. For example, older respondents tend to report more positive experiences than younger respondents, and women tend to report less positive experiences than do men. Because the mix of patients varies across trusts (for example, one trust may serve a considerably older population than another), this could potentially lead to the results for a trust appearing better or worse than they would if they had a slightly different profile of patients. To account for this we 'standardise' the data. Standardising data adjusts for these differences and enables the results for trusts to be compared more fairly than could be achieved using non-standardised data.

The inpatients survey is standardised by age, gender and method of admission (emergency or elective).

5.3 Expected range

The better / about the same / worse categories are based on the 'expected' range that is calculated for each question for each trust. This is the range within which we would expect a particular trust to score if it performed about the same as most other trusts in the survey. The range takes into account the number of respondents from each trust as well as the scores for all other trusts, and allows us to identify which scores we can confidently say are 'better' or 'worse' than the majority of other trusts (see Appendix B for more details). Analysing the survey information in such a way allows for fairer conclusions to be made in terms of each trust's performance. This approach presents the findings in a way that takes account of all necessary factors, yet is presented in a simple manner.

As the 'expected range' calculation takes into account the number of respondents at each trust who answer a question, it is not necessary to present confidence intervals around each score for the purposes of comparing across all trusts.

5.4 Comparing scores across or within trusts

The expected range statistic is used to arrive at a judgement of how a trust is performing compared with all other trusts that took part in the survey. However, if you want to use the scored data in another way, to compare scores (either as trend data for an individual trust or between different trusts) you will need to undertake an appropriate statistical test to ensure that any changes are 'statistically significant'. 'Statistically significant' means that we are very confident that any change between scores is real and not due to chance.

5.5 Conclusions made on performance

It should be noted that the data only show performance relative to other trusts: there are no absolute thresholds for 'good' or 'bad' performance. Thus, a trust may score lowly relative to others on a certain question whilst still performing very well on the

whole. This is particularly true on questions where the majority of trusts score very highly.

The better / worse categories are intended to help trusts identify areas of good or poor performance. However, when looking at scores within a trust over time, it is important to be aware that they are relative to the performance of other trusts. If, for example, a trust was 'better' for one question, then 'about the same' the following year, it may not indicate an actual decrease in the performance of the trust, but instead may be due to an improvement in many other trusts' scores, leaving the trust to appear more 'average'. Hence it is more accurate to look at actual changes in scores and to test for statistically significant differences.

It is also important to remember that there is no overall indicator or figure for 'patient experience', so it is not accurate to say that a trust is the 'best in the country' or 'best in the region' *overall*. Adding up the number of 'better' and 'worse' categories to find out which trust did better or worse overall is misleading. The number of questions on each topic in the survey varies, and often so does trusts performance across these. So if you counted across all of them, some topics will have more influence on the overall average than others, when in fact some might not be so important.

6. Further information

The full national results are available on the CQC website, together with an A to Z list to view the results for each trust:

www.cqc.org.uk/Inpatientsurvey2011

The results for the adult inpatient surveys from 2002 to 2010 can be found at:

www.nhssurveys.org/surveys/292

The 2002 survey of adult inpatient results (published by the Department of Health) can also be found at:

www.dh.gov.uk/en/Publicationsandstatistics/PublishedSurvey/NationalsurveyofNHSpatients/Nationalsurveyinpatients/index.htm

Full details of the methodology of the survey can be found at:

www.nhssurveys.org/

More information on the programme of NHS patient surveys is available at:

www.cqc.org.uk/public/reports-surveys-and-reviews/surveys

Appendix A: Scoring for the 2011 Inpatients survey results

The following describes the scoring system applied to the evaluative questions in the survey. Taking question 31 as an example (Figure 3.1), it asks respondents whether the doctor answered their questions in a way they could understand. The option of “No” was allocated a score of 0, as this suggests that the experiences of the patient need to be improved. A score of 10 was assigned to the option ‘Yes, always’, as it reflects a positive patient experience. The remaining option, ‘Yes, sometimes’, was assigned a score of 5 as the patient had their questions answered, they answer was not always understandable. Hence it was placed on the midpoint of the scale.

If the patient did not have any questions to ask, this was classified as a ‘not applicable’ response, as this option was not a direct measure of the explanations that had been given.

**Figure 3.1 Scoring example:
Question 31 (2011 Inpatient Survey)**

Q31. When you had important questions to ask a doctor, did you get answers that you could understand?

Yes, always	10
Yes, sometimes	5
No	0
I had no need to ask	Not applicable

Where a number of options lay between the negative and positive responses, they were placed at equal intervals along the scale. For example, question 22 asks respondents how clean the hospital room or ward they were in was, in their opinion (Figure 3.2). The following response options were provided:

- Very clean
- Fairly clean
- Not very clean
- Not at all clean

A score of 10 was assigned to the option ‘Very clean’, as this represents best outcome in terms of patient experience. A response that the room or ward was ‘not at all clean’ was given a score of 0. The remaining two answers were assigned a score that reflected their position in terms of quality of experience, spread evenly across the scale. Hence the option ‘fairly clean’ was assigned a score of 6.7, and ‘not very clean’ was given a score of 3.3.

**Figure 3.2 Scoring example:
Question 22 (2011 Inpatient Survey)**

Q22. In your opinion, how clean was the hospital room or ward that you were in?

Very clean	10
Fairly clean	6.7
Not very clean	3.3
Not at all clean	0

Details of the method used to calculate the scores for each trust, for individual questions and each section of the questionnaire, are available in Appendix B. This

also includes an explanation of the technique used to identify scores that are better, worse or about the same as most other trusts.

Section 1: The Accident and Emergency Department (A&E)

3. While you were in the A&E Department, how much information about your condition or treatment was given to you?

Not enough	5
Right Amount	10
Too much	5
I was not given any information about my condition or treatment	0
Don't know / Can't remember	Not applicable
Answered by those who went to the A&E department	

4. Were you given enough privacy when being examined or treated in the A&E Department?

Yes definitely	10
Yes, to some extent	5
No	0
Don't know / Can't remember	Not applicable
Answered by those who went to the A&E department	

5. Following arrival at the hospital, how long did you wait before being admitted to a bed on a ward?

Less than 1 hour	10
At least 1 hour but less than 2 hours	7.5
At least 2 hours but less than 4 hours	5
At least 4 hours but less than 8 hours	2.5
8 hours or longer	0
Can't remember	Not applicable
I did not have to wait	10
Answered by those who went to the A&E department	

Section 2: waiting lists and planned admissions

8. Overall, from the time you first talked to this health professional about being referred to a hospital, how long did you wait to be admitted to hospital?

Up to 1 month	10
1 to 2 months	7.5
3 to 4 months	5
5 to 6 months	2.5
More than 6 months	0
Don't know / Can't remember	Not applicable
Answered by those who had a planned admission, or who did not go to the A&E Department	

Filtered to exclude those not referred for a planned admission to hospital by a GP or health professional in England (i.e. their care was not bought or 'commissioned' in England but in Northern Ireland, Scotland or Wales). This is because waiting time policies differ outside of England.

9. How do you feel about the length of time you were on the waiting list before your admission to hospital?

I was admitted as soon as I thought was necessary	10
I should have been admitted a bit sooner	5
I should have been admitted a lot sooner	0

Answered by those who had a planned admission, or who did not go to the A&E Department

10. Were you given a choice of admission dates?

Yes	10
No	0
Don't know / Can't remember	Not applicable

Answered by those who had a planned admission, or who did not go to the A&E Department

11. Was your admission date changed by the hospital?

No	10
Yes, once	6.7
Yes, 2 or 3 times	3.3
Yes, 4 times or more	0

Answered by those who had a planned admission, or who did not go to the A&E Department

Section 3: waiting to get to a bed on a ward

12. From the time you arrived at the hospital, did you feel that you had to wait a long time to get to a bed on a ward?

Yes, definitely	0
Yes, to some extent	5
No	10

Answered by all

Section 4: the hospital and ward

14. When you were first admitted to a bed on a ward, did you share a sleeping area, for example a room or bay, with patients of the opposite sex? AND 17. After you moved to another ward (or wards), did you ever share a sleeping area, for example a room or bay, with patients of the opposite sex?

Yes	0
No	10

Filtered to exclude respondents who said that they stayed in a critical care area at Q13 as the majority of patients in these areas are exempt from the mixed sex accommodation guidelines due to the necessity for clinical needs to be prioritised.

Q14 and Q17 are scored together to provide a single score on whether patients who have not stayed in a critical care area have ever shared a sleeping area with members of the opposite sex.

Q14 and Q17 are not scored if option 1 ("Yes") is selected to Q13.

Q14 and Q17 score “10” if the respondent did not ever share a sleeping area with patients of the opposite sex, i.e. selected option 2 (“No”) to Q14 AND option 2 (“No”) to Q17.

If option 1 (“Yes”) is selected for EITHER Q14 or Q17 then a score of “0” is assigned.

If ONE of Q14 & Q17 is missing, the other is used for scoring.

The two trusts providing services for women only are excluded from this question

19. While staying in hospital, did you ever use the same bathroom or shower area as patients of the opposite sex?

Yes	0
Yes, because it had special bathing equipment that I needed	10
No	10
I did not use a bathroom or shower	Not applicable
Don't know / Can't remember	Not applicable

Answered by all

Note: the two trusts providing services for women only are excluded from this question

20. Were you ever bothered by noise at night from other patients?

Yes	0
No	10

Answered by all

21. Were you ever bothered by noise at night from hospital staff?

Yes	0
No	10

Answered by all

22. In your opinion, how clean was the hospital room or ward that you were in?

Very clean	10
Fairly clean	6.7
Not very clean	3.3
Not at all clean	0

Answered by all

23. How clean were the toilets and bathrooms that you used in hospital?

Very clean	10
Fairly clean	6.7
Not very clean	3.3
Not at all clean	0

I did not use a toilet or bathroom

Not applicable

Answered by all

24. Did you feel threatened during your stay in hospital by other patients or visitors?

Yes	0
No	10
Answered by all	

25. Did you have somewhere to keep your personal belongings whilst on the ward?

Yes, and I could lock it if I wanted to	10
Yes, but I could not lock it	5
No	0
I did not take any belongings to hospital	Not applicable
Don't know / Can't remember	Not applicable
Answered by all	

26. Did you see any posters or leaflets on the ward asking patients and visitors to wash their hands or to use hand-wash gels?

Yes	10
No	0
Can't remember	Not applicable
Answered by all	

27. Were hand-wash gels available for patients and visitors to use?

Yes	10
Yes, but they were empty	0
I did not see any hand-wash gels	0
Don't know / Can't remember	Not applicable
Answered by all	

28. How would you rate the hospital food?

Very good	10
Good	6.7
Fair	3.3
Poor	0
I did not have any hospital food	Not applicable
Answered by all	

29. Were you offered a choice of food?

Yes always	10
Yes sometimes	5
No	0
Answered by all	

30. Did you get enough help from staff to eat your meals?

Yes, always	10
Yes, sometimes	5
No	0
I did not need help to eat meals	Not applicable
Answered by all	

Section 5: Doctors

31. When you had important questions to ask a doctor, did you get answers that you could understand?

Yes, always	10
Yes, sometimes	5
No	0
I had no need to ask	Not applicable
Answered by all	

32. Did you have confidence and trust in the doctors treating you?

Yes, always	10
Yes, sometimes	5
No	0
Answered by all	

33. Did doctors talk in front of you as if you weren't there?

Yes, often	0
Yes, sometimes	5
No	10
Answered by all	

34. As far as you know, did doctors wash or clean their hands between touching patients?

Yes, often	10
Yes, sometimes	5
No	0
Don't know / can't remember	Not applicable
Answered by all	

Section 6: Nurses

35. When you had important questions to ask a nurse, did you get answers that you could understand?

Yes, always	10
Yes, sometimes	5
No	0
I had no need to ask	Not applicable
Answered by all	

36. Did you have confidence and trust in the nurses treating you?

Yes, always	10
Yes, sometimes	5
No	0
Answered by all	

37. Did nurses talk in front of you as if you weren't there?

Yes, often	0
Yes, sometimes	5
No	10
Answered by all	

38. In your opinion, were there enough nurses on duty to care for you in hospital?

There were always or nearly always enough nurses	10
There were sometimes enough nurses	5
There were rarely or never enough nurses	0
Answered by all	

39. As far as you know, did nurses wash or clean their hands between touching patients?

Yes, often	10
Yes, sometimes	5
No	0
Don't know / can't remember	Not applicable
Answered by all	

Section 7: Care and Treatment

40. Sometimes in a hospital, a member of staff will say one thing and another will say something quite different. Did this happen to you?

Yes, often	0
Yes, sometimes	5
No	10
Answered by all	

41. Were you involved as much as you wanted to be in decisions about your care and treatment?

Yes, definitely	10
Yes, to some extent	5
No	0
Answered by all	

42. How much information about your condition or treatment was given to you?

Not enough	0
The right amount	10
Too much	0
Answered by all	

43. If your family or someone else close to you wanted to talk to a doctor, did they have enough opportunity to do so?

Yes, definitely	10
Yes, to some extent	5
No	0
No family or friends were involved	Not Applicable
My family did not want or need information	Not Applicable
I did not want my family or friends to talk to a doctor	Not Applicable
Answered by all	

44. Did you find someone on the hospital staff to talk to about your worries and fears?

Yes definitely	10
Yes, to some extent	5
No	0
I had no worries or fears	Not applicable
Answered by all	

45. Do you feel you got enough emotional support from hospital staff during your stay?

Yes, always	10
Yes, sometimes	5
No	0
I did not need any emotional support	Not applicable
Answered by all	

46. Were you given enough privacy when discussing your condition or treatment?

Yes, always	10
Yes, sometimes	5
No	0
Answered by all	

47. Were you given enough privacy when being examined or treated?

Yes, always	10
Yes, sometimes	5
No	0
Answered by all	

49. Do you think the hospital staff did everything they could to help control your pain?

Yes definitely	10
Yes, to some extent	5
No	0

Answered by those who said they were ever in any pain at Q48

50. How many minutes after you used the call button did it usually take before you got the help you needed?

0 minutes / right away	10
1-2 minutes	7.5
3-5 minutes	5.0
More than 5 minutes	2.5
I never got help when I used the call button	0
I never used the call button	Not Applicable

Answered by all

Section 8: Operations and Procedures

52. Beforehand, did a member of staff explain the risks and benefits of the operation or procedure in a way you could understand?

Yes, completely	10
Yes, to some extent	5
No	0
I did not want an explanation	Not Applicable

Answered by those who said that they had an operation or procedure during their stay in hospital at Q51

53. Beforehand, did a member of staff explain what would be done during the operation or procedure?

Yes, completely	10
Yes, to some extent	5
No	0
I did not want an explanation	Not Applicable

Answered by those who said that they had an operation or procedure during their stay in hospital at Q51

54. Beforehand, did a member of staff answer your questions about the operation or procedure in a way you could understand?

Yes, completely	10
Yes, to some extent	5
No	0
I did not have any questions	Not Applicable

Answered by those who said that they had an operation or procedure during their stay in hospital at Q51

55. Beforehand, were you told how you could expect to feel after you had the operation or procedure?

Yes, completely	10
Yes, to some extent	5
No	0

Answered by those who said that they had an operation or procedure during their stay in hospital at Q51

57. Before the operation or procedure, did the anaesthetist or another member of staff explain how he or she would put you to sleep or control your pain in a way you could understand?

Yes, completely	10
Yes, to some extent	5
No	0

Answered by those who said that they had an operation or procedure during their stay in hospital at Q51, and said that they were given an anaesthetic or medication to put them to sleep or control their pain at Q56

58. After the operation or procedure, did a member of staff explain how the operation or procedure had gone in a way you could understand?

Yes, completely	10
Yes, to some extent	5
No	0

Answered by those who said that they had an operation or procedure during their stay in hospital at Q51

Section 9: Leaving Hospital

59. Did you feel you were involved in decisions about your discharge from hospital?

Yes definitely	10
Yes, to some extent	5
No	0
I did not need to be involved	Not Applicable

Answered by all

60. On the day you left hospital, was your discharge delayed for any reason?

Yes	0
No	10

Answered by all

61. What was the MAIN reason for the delay? (Tick ONE only)

I had to wait for medicines	0
I had to wait to see the doctor	0
I had to wait for an ambulance	0
Something else	Not Applicable

Answered by those who said that their discharge was delayed at Q60

If response to Q60 is 2 (discharge WAS NOT delayed), Q61 is scored 10.

If response to Q60 is 1 (discharge WAS delayed), and response to Q61 is 1, 2, 3 or 4, the scores above are assigned to Q61. If Q60 is missing, Q61 is not scored. If Q61 is missing, scoring is as per Q60.

62. How long was the delay?

Up to 1 hour	7.5
Longer than 1 hour but no longer than 2 hours	5
Longer than 2 hours but no longer than 4 hours	2.5
Longer than 4 hours	0

Answered by those who said that their discharge was delayed at Q60

If response to Q61 is 4 (some other reason for the delay), Q62 is not scored.

If response to Q60 is 2 (discharge WAS NOT delayed), Q62 is scored 10.

If response to Q60 is 1 (discharge WAS delayed) AND the response to Q61 is 1, 2 or 3, the scores above are assigned to Q62.

If response to Q60 is 1 (discharge WAS delayed) AND the response to Q61 is missing, the scores above are assigned to Q62.

If response to Q60 is 1 (discharge WAS delayed) AND the response to Q62 is missing, Q62 is not scored.

If response to Q60 is missing, Q62 is not scored

63. Before you left hospital, were you given any written or printed information about what you should or should not do after leaving hospital?

Yes	10
No	0

Answered by all

64. Did a member of staff explain the purpose of the medicines you were to take at home in a way you could understand?

Yes, completely	10
Yes, to some extent	5
No	0
I did not need an explanation	Not Applicable
I had no medicines	Not Applicable

Answered by all

65. Did a member of staff tell you about medication side effects to watch for when you went home?	
Yes, completely	10
Yes, to some extent	5
No	0
I did not need an explanation	Not Applicable
Answered by those who said that they were prescribed medication to take home at Q64	

66. Were you told how to take your medication in a way you could understand?	
Yes, definitely	10
Yes, to some extent	5
No	0
I did not need to be told how to take my medication	Not Applicable
Answered by those who said that they were prescribed medication to take home at Q64	

67. Were you given clear written or printed information about your medicines?	
Yes, completely	10
Yes, to some extent	5
No	0
Don't know / Can't remember	Not Applicable
Answered by those who said that they were prescribed medication to take home at Q64	

68. Did a member of staff tell you about any danger signals you should watch for after you went home?	
Yes, completely	10
Yes, to some extent	5
No	0
It was not necessary	Not Applicable
Answered by all	

69. Did the doctors or nurses give your family or someone close to you all the information they needed to help care for you?	
Yes, definitely	10
Yes, to some extent	5
No	0
No family or friends were involved	Not Applicable
My family or friends did not want or need information	Not Applicable
Answered by all	

70. Did hospital staff tell you who to contact if you were worried about your condition or treatment after you left hospital?	
Yes	10
No	0
Don't know / Can't remember	Not Applicable
Answered by all	

71. Did you receive copies of letters sent between hospital doctors and your family doctor (GP)?

Yes, I received copies	10
No, I did not receive copies	0
Not sure / don't know	Not Applicable
Answered by all	

72. Were the letters written in a way that you could understand?

Yes, definitely	10
Yes, to some extent	5
No	0
Not sure / don't know	Not Applicable
Answered by those who said that they received copies of letters sent between the hospital doctor and their GP at Q71	

Section 10: Overall Experiences

73. Overall, did you feel you were treated with respect and dignity while you were in the hospital?

Yes, always	10
Yes, sometimes	5
No	0
Answered by all	

74. How would you rate how well the doctors and nurses worked together?

Excellent	10
Very good	7.5
Good	5.0
Fair	2.5
Poor	0
Answered by all	

75. Overall, how would you rate the care you received?

Excellent	10
Very good	7.5
Good	5.0
Fair	2.5
Poor	0
Answered by all	

76. During your hospital stay, were you ever asked to give your views on the quality of your care?

Yes	10
No	0
Don't know / Can't remember	Not Applicable
Answered by all	

77. While in hospital, did you ever see any posters or leaflets explaining how to complain about the care you received?

Yes	10
No	0
Don't know / Can't remember	Not Applicable
Answered by all	

Appendix B: Calculating the trust score and category

Calculating trust scores

The scores for each question and section in each trust were calculated using the method described below.

Weights were calculated to adjust for any variation between trusts that resulted from differences in the age, sex and method of admission (planned or elective) of respondents. A weight was calculated for each respondent by dividing the national proportion of respondents in their age/sex/admission type group by the corresponding trust proportion. The reason for weighting the data was that younger people and women tend to be more critical in their responses than older people and men. If a trust had a large population of young people or women, their performance might be judged more harshly than if there was a more consistent distribution of age and sex of respondents.

Weighting survey responses

The first stage of the analysis involved calculating national age/ sex/ admission method proportions. It must be noted that the term “national proportion” is used loosely here as it was obtained from pooling the survey data from all trusts, and was therefore based on the respondent population rather than the entire population of England.

All respondents at both Birmingham and Liverpool Women’s NHS Foundation Trusts are coded as ‘female’, even where self-reported gender is coded as male. These trusts are then weighted using the national all female population as a reference.

The questionnaire asked respondents to state their year of birth. The approximate age of each patient was then calculated by subtracting the figure given from 2011. The respondents were then grouped according to the categories shown in Figure B1.

If a patient did not fill in their year of birth or sex on the questionnaire, this information was inputted from the sample file. If information on a respondent’s age and/or sex was missing from both the questionnaire and the sample file, the patient was excluded from the analysis.

Question 1 asked “Was your most recent hospital stay planned in advance or an emergency?”. Respondents that ticked “emergency or urgent” were classed as emergency patients for the purpose of the weightings. Those that ticked “waiting list or planned in advance” were classed as elective patients. However, if respondents ticked “something else” or did not answer question 1, information was taken from other responses to the questionnaire to determine the method of admission.

Emergency admission:

- If the respondent answered "emergency or urgent" at question 1.
- Or
- If the respondent answered “something else” or did not respond to question 1, and answered ‘yes’ to question 2.
- Or

- If the respondent answered "something else" or did not respond to question 1, did not answer question 2, but responded to one or more of questions 3, 4 and 5.

Elective admission:

- If the respondent answered "waiting list or planned in advance" at question 1.
- Or
- If the respondent answered "something else" or did not respond to question 1, did not answer questions 2, 3, 4 and 5 and gave at least one response to questions 6,7,8,9,10 and 11.

All other combinations of responses for questions 1 to 11 resulted in the respondent being excluded from the analysis, as it was not possible to determine admission method.

The national age/sex/admission method proportions relate to the proportion of men, and women of different age groups who had emergency or elective admission. As shown in Figure B1, the proportion of respondents who were male, admitted as emergencies, and aged 51 to 65 years is 0.072; the proportion who were women, admitted as emergencies, and aged 51 to 65 years is 0.063, etc.

Figure B1 National Proportions

Admission Method	Sex	Age Group	National proportion 2011
Emergency	Men	≤35	0.018
		36-50	0.032
		51-65	0.072
		66+	0.158
	Women	≤35	0.033
		36-50	0.041
		51-65	0.063
		66+	0.174
Elective	Men	≤35	0.009
		36-50	0.019
		51-65	0.053
		66+	0.101
	Women	≤35	0.019
		36-50	0.040
		51-65	0.066
		66+	0.102

Note: All proportions are given to three decimals places for this example. The analysis included these figures to nine decimal places, and can be provided on request from the CQC surveys team at patient.survey@cqc.org.uk.

These proportions were calculated for each trust, using the same procedure.

The next step was to calculate the weighting for each individual. Age/sex/admission type weightings were calculated for each respondent by dividing the national

proportion of respondents in their age/sex/admission type group by the corresponding trust proportion.

If, for example, a lower proportion of men who were admitted as emergencies aged between 51 and 65 years within Trust A responded to the survey, in comparison with the national proportion, then this group would be under-represented in the final scores. Dividing the national proportion by the trust proportion results in a weighting greater than “1” for members of this group (Figure B2). This increases the influence of responses made by respondents within that group in the final score, thus counteracting the low representation.

Figure B2 Proportion and Weighting for Trust A

Sex	Admission	Age Group	National Proportion	Trust A Proportion	Trust A Weight (National/Trust A)
Men	Emergency	≤35	0.018	0.018	1.000
		36-50	0.032	0.035	0.914
		51-65	0.072	0.047	1.532
		66+	0.158	0.095	1.663
Women	Emergency	≤35	0.033	0.045	0.733
		36-50	0.041	0.057	0.719
		51-65	0.063	0.085	0.741
		66+	0.174	0.117	1.487
Men	Elective	≤35	0.009	0.018	0.500
		36-50	0.019	0.035	0.543
		51-65	0.053	0.047	1.128
		66+	0.101	0.095	1.063
Women	Elective	≤35	0.019	0.045	0.422
		36-50	0.040	0.057	0.702
		51-65	0.066	0.085	0.776
		66+	0.102	0.119	0.857

Note: All proportions are given to three decimal places for this example. The analysis included these figures to nine decimal places, and can be provided on request from the CQC surveys team at patient.survey@cqc.org.uk.

Likewise, if a considerably higher proportion of women admitted as emergency patients aged between 36 and 50 years from Trust B responded to the survey (Figure B3), then this group would be over-represented within the sample, compared with national representation of this group. Subsequently this group would have a greater influence over the final score. To counteract this, dividing the national proportion by the proportion for Trust B results in a weighting of less than one for this group.

Figure B3 Proportion and Weighting for Trust B

Sex	Admission	Age Group	National Proportion	Trust B Proportion	Trust B Weight (National/Trust B)
Men	Emergency	≤35	0.018	0.016	1.125
		36-50	0.032	0.029	1.103
		51-65	0.072	0.062	1.161
		66+	0.158	0.091	1.736
Women	Emergency	≤35	0.033	0.034	0.971
		36-50	0.041	0.075	0.547
		51-65	0.063	0.080	0.788
		66+	0.174	0.110	1.582
Men	Elective	≤35	0.009	0.016	0.563
		36-50	0.019	0.029	0.655
		51-65	0.053	0.062	0.855
		66+	0.101	0.097	1.041
Women	Elective	≤35	0.019	0.034	0.559
		36-50	0.040	0.075	0.533
		51-65	0.066	0.080	0.825
		66+	0.102	0.110	0.927

Note: All proportions are given to three decimals places for this example. The analysis included these figures to nine decimal places, and can be provided on request from the CQC surveys team at patient.survey@cqc.org.uk.

To prevent the possibility of excessive weight being given to respondents in an extremely underrepresented group, the maximum value for any weight was set at five.

Calculating question scores

The trust score for each question displayed on the website was calculated by applying the weighting for each respondent to the scores allocated to each response.

The responses given by each respondent were entered into a dataset using the 0-10 scale described in section 3. Each row corresponded to an individual respondent, and each column related to a survey question. For those questions that the respondent did not answer (or received a “not applicable” score for), the relevant cell remained empty. Alongside these were the weightings allocated to each respondent (Figure B6).

Figure B6 Scoring for the ‘A&E Department’ section, 2011 Inpatients survey, Trust B

Respondent	Scores			Weight
	Q3	Q4	Q5	
1	10	5	.	1.125
2	5	10	10	0.971
3	.	5	0	0.788

Respondents' scores for each question were then multiplied individually by the relevant weighting, in order to obtain the numerators for the trust scores (Figure B7).

Figure B7 Numerators for the 'A&E' section, 2011 Inpatients survey, Trust B

Respondent	Numerators			Weight
	Q3	Q4	Q5	
1	11.25	5.625		1.125
2	4.855	9.71	9.71	0.971
3		3.94	0	0.788

Obtaining the denominators for each domain score

A second dataset was then created. This contained a column for each question, grouped into domains, and again with each row corresponding to an individual respondent. A value of one was entered for the questions where a response had been given by the respondent, and all questions that had been left unanswered or allocated a scoring of "not applicable" were set to missing (Figure B8).

Figure B8 Values for non-missing responses, 'A&E' section, 2011 Inpatients survey, Trust B

Respondent	Numerators			Weight
	Q3	Q4	Q5	
1	1	1		1.125
2	1	1	1	0.971
3		1	1	0.788

The denominators were calculated by multiplying each of the cells within the second dataset by the weighting allocated to each respondent. This resulted in a figure for each question that the respondent had answered (Figure B9). Again, the cells relating to the questions that the respondent did not answer (or received a 'not applicable' score for) remained set to missing (Figure B8).

Figure B9 Denominators for the "A&E" section, 2011 Inpatients survey, Trust B

Respondent	Denominators			Weight
	Q3	Q4	Q5	
1	1.125	1.125		1.125
2	0.971	0.971	0.971	0.971
3		0.788	0.788	0.788

The weighted mean score for each trust, for each question, was calculated by dividing the sum of the weighted scores for a question (i.e. numerators), by the weighted sum of all eligible respondents to the question (i.e. denominators) for each trust.

Using the example data for Trust B, we first calculated weighted mean scores for each of the three questions that contributed to the 'A&E' section of the questionnaire.

$$\text{Q3: } \frac{11.25 + 4.855}{1.125 + 0.971} = 7.684$$

$$\text{Q4: } \frac{5.625 + 9.71 + 3.94}{1.125 + 0.971 + 0.788} = 6.683$$

$$\text{Q5: } \frac{9.71 + 0.000}{0.971 + 0.788} = 5.520$$

Calculating section scores

A simple arithmetic mean of each trust's question scores was then taken to give the score for each section. Continuing the example from above, then, Trust B's score for the 'Information' section of the Inpatients survey would be calculated as:

$$(7.682 + 8.166 + 5.520)/3 = 6.629$$

Calculation of the expected ranges

Z statistics (or Z scores) are standardized scores derived from normally distributed data, where the value of the Z score translates directly to a p-value. That p-value then translates to what level of confidence you have in saying that a value is significantly different from the mean of your data (or your 'target' value).

The Z_D score for each question and section was calculated as the trust score minus the national mean score, divided by the standard error of the trust score plus the variance of the scores between trusts. This method of calculating a Z_D score differs from the standard method of calculating a Z score in that it recognizes that there is likely to be natural variation between trusts which one should expect, and accept. Rather than comparing each trust to one point only (i.e. the national mean score), it compares each trust to a distribution of acceptable scores. This is achieved by adding some of the variance of the scores between trusts to the denominator.

Under this banding scheme, a trust with a Z_D score of < -1.96 is labeled as "Worse" (significantly below average; $p < 0.025$ that the trust score is below the national average), $-1.96 < Z_D < 1.96$ as "About the same", and $Z_D > 1.96$ as "Better" (significantly above average; $p < 0.025$ that the trust score is above the national average) than what would be expected based on the national distribution of trust scores.

A standard Z score for a given item is calculated as:

$$z_i = \frac{y_i - \theta_0}{s_i} \quad (1)$$

where: s_i is the standard error of the trust score¹,
 y_i is the trust score
 θ_0 is the mean score for all trusts

¹ Calculated using the method in Appendix C.

However, for measures where there is a high level of precision (the survey indicators sample sizes average around 400 to 500 per trust) in the estimates, the standard Z score may give a disproportionately high number of trusts in the significantly above/below average bands (because s_i is generally so small). This is compounded by the fact that all the factors that may affect a trust's score cannot be controlled. For example, if trust scores are closely related to economic deprivation then there may be significant variation between trusts due to this factor, not necessarily due to factors within the trusts' control. In this situation, the data are said to be 'over dispersed'. That problem can be partially overcome by the use of an 'additive random effects model' to calculate the Z score (we refer to this modified Z score as the Z_D score). Under that model, we accept that there is natural variation between trust scores, and this variation is then taken into account by adding this to the trust's local standard error in the denominator of (1). In effect, rather than comparing each trust simply to one national target value, we are comparing them to a national distribution.

The steps taken to calculate Z_D scores are outlined below.

Winsorising Z-scores

The first step when calculating Z_D is to 'Winsorise' the standard Z scores (from (1)). Winsorising 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 $q=0.2$
3. Set the lowest 100q% of Z-scores to Z_q , and the highest 100q% of Z-scores to $Z_{(1-q)}$. These are the Winsorised statistics.

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

Estimation of over-dispersion

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 i th trust given by (1). The Winsorised Z scores are used in estimating $\hat{\phi}$.

An additive random effects model

If $\hat{\phi}$ 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 θ_i (trust means) 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 $w_i = 1 / s_i^2$ and $\hat{\phi}$ is from (2). Once $\hat{\tau}$ has been estimated, the Z_D score is calculated as:

$$Z_i^D = \frac{y_i - \theta_0}{\sqrt{s_i^2 + \hat{\tau}^2}} \quad (4)$$

Appendix C: Calculation of standard errors

Calculation of standard errors

In order to calculate statistical bandings from the data, it is necessary for CQC to have both trusts' scores for each question and section and the associated standard error. Since each section is based on an aggregation of question mean scores that are based on question responses, a standard error needs to be calculated using an appropriate methodology.

For the patient experience surveys, the z-scores are scores calculated for section and question scores, which combines relevant questions making up each section into one overall score, and uses the pooled variance of the question scores.

Assumptions and notation

The following notation will be used in formulae:

- X_{ijk} is the score for respondent j in trust i to question k
 Q is the number of questions within section d
 w_{ij} is the standardization weight calculated for respondent j in trust i
 Y_{ik} is the overall trust i score for question k
 Y_{id} is the overall score for section d for trust i

Associated with the subject or respondent is a weight w_{ij} corresponding to how well the respondent's age/sex is represented in the survey compared with the population of interest.

Calculating mean scores

Given the notation described above, it follows that the overall score for trust i on question k is given as:

$$Y_{ik} = \frac{\sum w_{ij} X_{ijk}}{\sum w_{ij}}$$

The overall score for section d for trust i is then the average of the trust-level question means within section d . This is given as:

$$Y_{id} = \frac{\sum Y_{ikd}}{Q}$$

Calculating standard errors

Standard errors are calculated for both sections and questions.

The variance of question X_{ijk} at the individual level is given by:

$$V_{ijk} = \frac{\sum w_{ij} \left(X_{ijk} - Y_{ik} \right)^2}{\sum w_{ij}}$$

For ease of calculation, and as the sample size is large, we have used the biased estimate for variance.

The variance of the trust level average question score, is then given by:

$$V_{ik} = \frac{\sum w_{ij} \left(X_{ijk} - Y_{ik} \right)^2}{\left(\sum w_{ij} \right)^2}$$

Covariances between pairs of questions (here, k and m) can be calculated in a similar way:

$$COV_{ik.im} = \frac{\sum w_{ij} \left(X_{ijk} - Y_{ik} \right) \left(X_{ijm} - Y_{im} \right)}{\left(\sum w_{ij} \right)^2}$$

Note: w_{ij} is set to zero in cases where patient j in trust i did not answer both questions k and m .

If questions k and m comprise a two-item section d , then the score for section d is a weighted sum of the separate question scores, with each question weighted by $\frac{1}{2}$. The trust level variance for the section score d for trust i is therefore given by:

$$V_{id} = \frac{V_{ik}}{(2)^2} + \frac{V_{im}}{(2)^2} + 2 \cdot \frac{COV_{ik.im}}{(2)^2}.$$

The standard error of the section score is then:

$$SE_{id} = \sqrt{V_{id}}$$

This simple case can be extended to cover sections of greater length.