National Inpatient Experience Survey 2019

Portiuncula University Hospital

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National Inpatient Experience Survey

Portiuncula University Hospital

2019 survey results

Respondents

183
Number of respondents

66.2
Average age

44%
Participation rate

Overall experience

2019

| Very Good 56% | Good 30% | Fair to Poor 14% |

2018

| Very Good 44% | Good 33% | Fair to Poor 23% |

Values in figures do not always add up to 100% due to rounding.

Stages of care

8.2 out of 10

Admission to hospital
Patient ratings of admission to the hospital were similar to the national average and to the hospital's 2018 score.

8.5 out of 10

Care on the ward
Patient ratings of 'care on the ward' in the hospital were similar to the national average and above last year's survey.

8.2 out of 10

Examination, diagnosis and treatment
Ratings of 'examination, diagnosis and treatment' were similar to the national average and to last year's survey.

6.9 out of 10

Discharge or transfer
Participant ratings of 'discharge or transfer' were similar to both the national average and to last year's survey.

Structure and content of this report

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About the National Inpatient Experience Survey 2019

The National Inpatient Experience Survey[1] is a nationwide survey that offers patients the opportunity to describe their experiences of public acute healthcare in Ireland. The survey is a partnership between the Health Information and Quality Authority (HIQA), the Health Service Executive (HSE) and the Department of Health. It was conducted for the first time in 2017 and repeated in 2018 and 2019.

Nationally, 26,897 people were invited to participate in the third National Inpatient Experience Survey. In total, 12,343 people responded, resulting in a response rate of 46%. 183 patients from Portiuncula University Hospital took part.

The aim of the survey is to find out about patients' experiences in public acute hospitals and to use their feedback to identify areas of good experience, and areas needing improvement. The HSE responded to the 2017 and 2018 survey results by producing detailed quality improvement plans at national, hospital group and hospital levels. The implementation of these plans is coordinated by an oversight group, and a wide range of initiatives have already been introduced across Ireland's public acute hospitals. Some examples of these initiatives can be seen at https://yourexperience.ie/inpatient/hospital-initiatives/.

What were the main findings for Portiuncula University Hospital?

The majority of participants from Portiuncula University Hospital reported positive experiences in hospital. 86% of participants said they had good or very good overall experiences, compared with 84% nationally. The hospital scored around the same as the national average for every stage of care and also for overall experience.[2]

Three areas of good experience were identified. These were areas that were related to participants' overall experiences and where participants gave significantly above-average ratings. For example, most patients said that the wards and bathrooms in the hospital were very clean. Patients also gave positive ratings of the hospital food.

One area needing improvement, where the hospital scores significantly below the national average, was identified. A number of patients said they were not given

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[1] The survey was previously entitled the 'National Patient Experience Survey'. The name was updated in 2019 to more accurately reflect the target population.
[2] When there is no statistically significant difference between the hospital's score and the national average, it is described as 'about the same'.

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written or printed information on what they should or should not do after leaving hospital.

Patient ratings of the 'care on the ward' stage of care were significantly higher than in the 2018 survey. Ratings of the other stages of care and overall experience were about the same.

The findings of the 2019 survey will help Portiuncula University Hospital to improve patients' experiences of care in the hospital.

Hospital and participant profile

Portiuncula University Hospital is located in Co. Roscommon. There were 168 inpatient beds available in the hospital during the survey period of May 2019.

423 people discharged from Portiuncula University Hospital during the month of May 2019 were invited to participate in the survey. 183 people completed the survey, achieving a response rate of 44%. 49.2% of participants were male and 50.8% were female. 171 respondents (93.4%) said that their stay in hospital was due to an emergency. Figure 1 below provides information on the respondents who took part in the survey from Portiuncula University Hospital.

Figure 1 Participants from Portiuncula University Hospital by sex, age group and admission route

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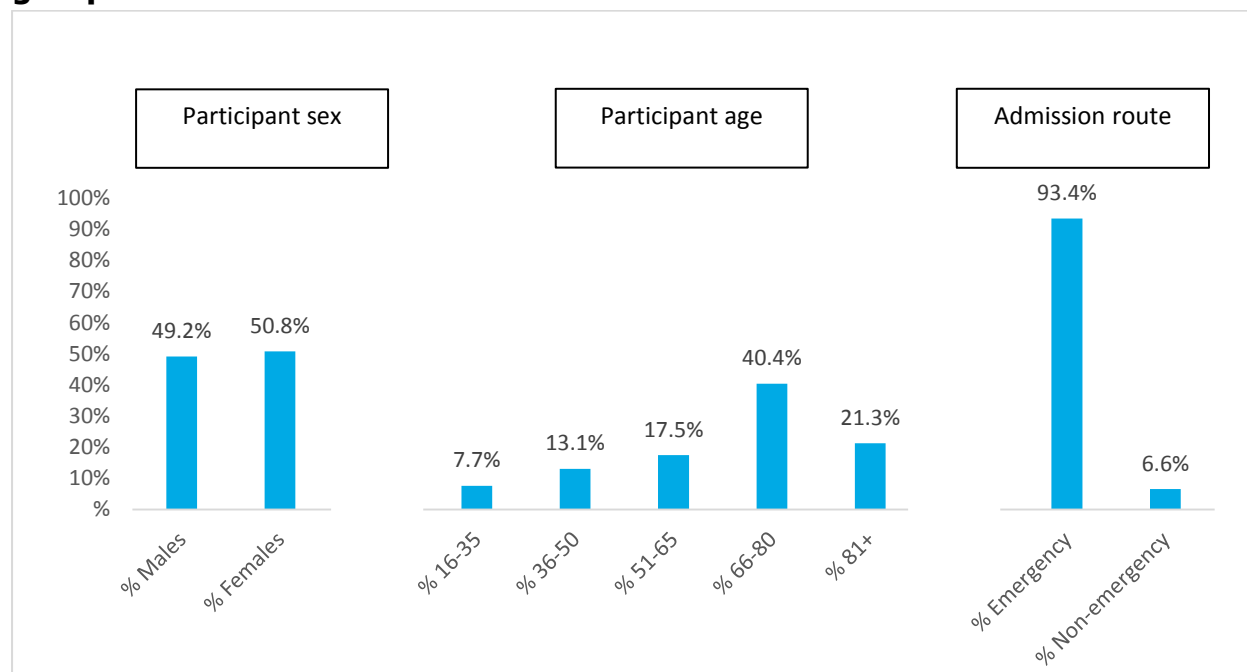
Areas of good experience and areas needing improvement

This section lists the areas where most patients had positive experiences, and those areas where there is the most room for improvement. The list includes the relevant stage of care and question number for each area. Appendix 1 explains how these areas were identified.

The areas of good experience in Portiuncula University Hospital are:

Care on the ward
Cleanliness of room or ward | Q10
140 (82%) of the 170 people who answered this question said that their room or ward was very clean.

Other aspects of care
Cleanliness of toilets and bathrooms | Q11
Of the 165 people who answered this question, 117 (71%) said that the toilets and bathrooms were very clean.

Care on the ward
Food rating | Q15
Of the 167 people who answered this question, 139 (83%) said that the hospital food was good or very good.

The areas needing improvement in Portiuncula University Hospital are:

Discharge or transfer
Written or printed information| Q43
Of the 113 people who answered this question, 59 (52%) said that they received written or printed information on what they should or should not do after leaving hospital. The hospital scored below the national average on this question.

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Survey results for the stages of care along the patient journey

The National Inpatient Experience Survey 2019 follows the patient journey through hospital from admission to discharge. The 2019 questionnaire is available to download from www.yourexperience.ie. The survey questions were grouped into five stages along the patient journey:

ADMISSIONS

Experiences in the emergency department such as waiting time before being admitted to a ward, communication with staff and respect for privacy.

5 QUESTIONS

CARE ON THE WARD

Experiences while on the ward such as communication with hospital staff, privacy, pain management, cleanliness and food.

14 QUESTIONS

EXAMINATIONS, DIAGNOSIS AND TREATMENT

Experiences while undergoing or receiving results of tests, treatments, operations and procedures.

13 QUESTIONS

DISCHARGE OR TRANSFER

Experiences relating to discharge such as sufficient notice of discharge, and provision of information, advice and support.

11 QUESTIONS

OTHER ASPECTS OF CARE

Other, more general experiences of care such as cleanliness of bathrooms and toilets, trust and confidence in hospital staff.

4 QUESTIONS

Interpreting the results for the stages of care

Scores out of 10 are given for each question belonging to a stage of care or to a stage as a whole. A score of 0 indicates a very negative experience and a score of 10 indicates a very positive experience. Sometimes questions are described as high- or low-ranking questions. These are questions with the highest or lowest score when compared to a set of questions.

Statistical tests were carried out to examine if there were significant differences in patient experience between 2018 and 2019, as well as between a hospital and the national average. Throughout this report, when the hospital scored significantly above the national average, this is described as 'higher'. When a hospital scored significantly below the national average, it is described as 'lower'. When there is no

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statistically significant difference between the hospital's score and the national average, it is described as 'about the same'. For further information on the analyses please consult Appendix 3 of the 2019 national report, available from www.yourexperience.ie.

Changes in patient experience over time

Patient ratings of 'care on the ward' were significantly higher than in the 2018 survey. There were no other significant changes in patient ratings. Figure 2 shows a comparison of scores for individual stages of care.

It is important that these changes are interpreted with caution as scores will naturally vary from year to year for a variety of reasons. Several rounds of survey data will be required before meaningful trends and changes in patient experience can be accurately identified.

Figure 2 Annual comparison of stage of care scores[3] for Portiuncula University Hospital

	2017	2018	2019
Admissions	8.0	8.0	8.2
Care on the ward	8.4	8.1	8.5
Examinations, diagnosis and treatment	8.0	7.8	8.2
Discharge or transfer	7.1	6.6	6.9
Overall experience	8.3	7.9	8.3

Comparison with previous year
■ About the same   ■ Higher   ■ N/A

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[3] Scores for the stages of care were constructed by calculating the average scores for all the questions belonging to that stage.

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ADMISSIONS →

Experiences in the emergency department such as waiting time before being admitted to a ward, communication with staff and respect for privacy.

5 QUESTIONS

Admissions

Figure 3 compares the hospital's overall score for 'admissions' with the national average. Figure 4 shows the hospital's scores for questions on this stage of care.

Figure 3 Comparison of Portiuncula University Hospital with the national average score for 'admissions' (out of a maximum of 10).

National	7.9
Portiuncula University Hospital	8.2

Comparison with national average
■ About the same   ■ National

Figure 4 Portiuncula University Hospital scores for questions on 'admissions'*

Q3. When you had important questions to ask doctors and nurses in the emergency department, did you get answers that you could understand? — 8.4

Q4. While you were in the emergency department, did a doctor or nurse explain your condition and treatment in a way you could understand? — 7.7

Q5. Were you given enough privacy when being examined or treated in the emergency department? — 8.3

Q6. Overall, did you feel you were treated with respect and dignity while you were in the emergency department? — 8.9

Q8. Following arrival at the hospital, how long did you wait before being admitted to a ward? — 7.5

Comparison with national average
■ About the same   ■ Higher

*The black line represents the national average

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Emergency department waiting times[4]

The HSE sets targets for the performance of acute hospitals, including targets on waiting times in emergency departments, such as:

- 75% of people attending the emergency department are discharged or admitted to a ward within six hours of registration and none should wait for longer than nine hours.

- 95% of people attending the emergency department aged 75 years or older are discharged or admitted to a ward within six hours of registration and none should wait for longer than nine hours.

In Portiuncula University Hospital, 47 respondents (31%) said they were admitted to a ward within six hours of arriving at the emergency department, while 96 respondents (63%) reported waiting between six and 24 hours. 9 respondents (6%) said that they waited 24 hours or more before being admitted to a ward in Portiuncula University Hospital, with one of these saying they waited more than 48 hours. As outlined in Appendix 1, the relationship between waiting times and overall experience was relatively weak. This means that patients who had long waiting times did not always say they had a negative overall experience. Figure 5 outlines the emergency department waiting times, as reported by patients in Portiuncula University Hospital, compared with the national average.

Figure 5 Emergency department waiting times, as reported by patients for Portiuncula University Hospital and nationally

	<6 hours	6-24 hours	>24 hours
National	30%	56%	14%
Portiuncula University Hospital	31%	63%	6%
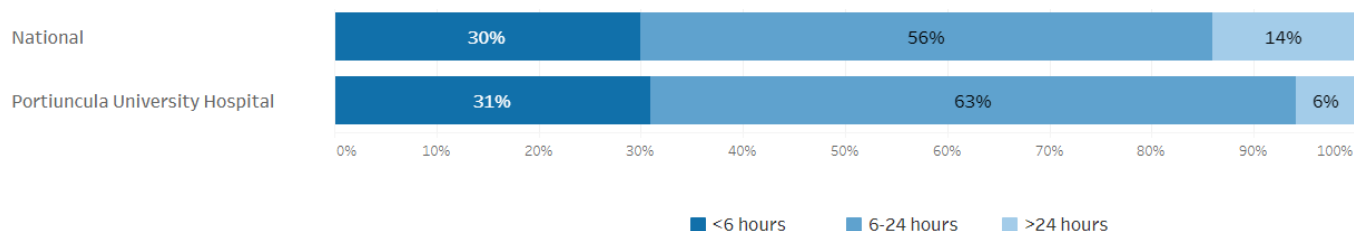
Admissions: what do these results mean?

Patient ratings of admission to Portiuncula University Hospital were similar to the national average and to the hospital's 2018 score. Most patients said they were treated with respect and dignity in the emergency department. The lowest scoring question for this stage related to waiting times, though the hospital performed better than the national average for this question.

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[4] The HSE measures emergency department waiting times differently to the survey, namely from the time a patient registers at the emergency department until they leave it. It is likely that there are some differences between survey findings and the official HSE figures. The HSE 2019 targets can be viewed at: https://www.hse.ie/eng/services/publications/kpis/acute-hospitals-metadata-2019.pdf

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CARE ON THE WARD

Experiences while on the ward such as communication with hospital staff, privacy, pain management, cleanliness and food.

14 QUESTIONS

Care on the ward

Figure 6 compares the hospital's overall score for 'care on the ward' with the national average. Figure 7 shows the hospital's scores for questions on this stage of care.

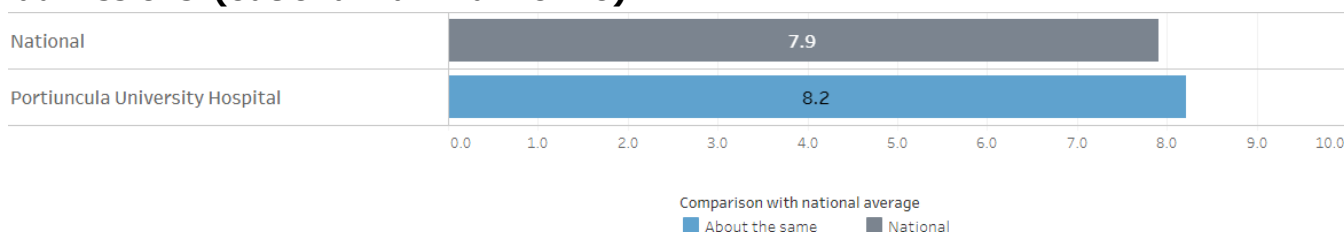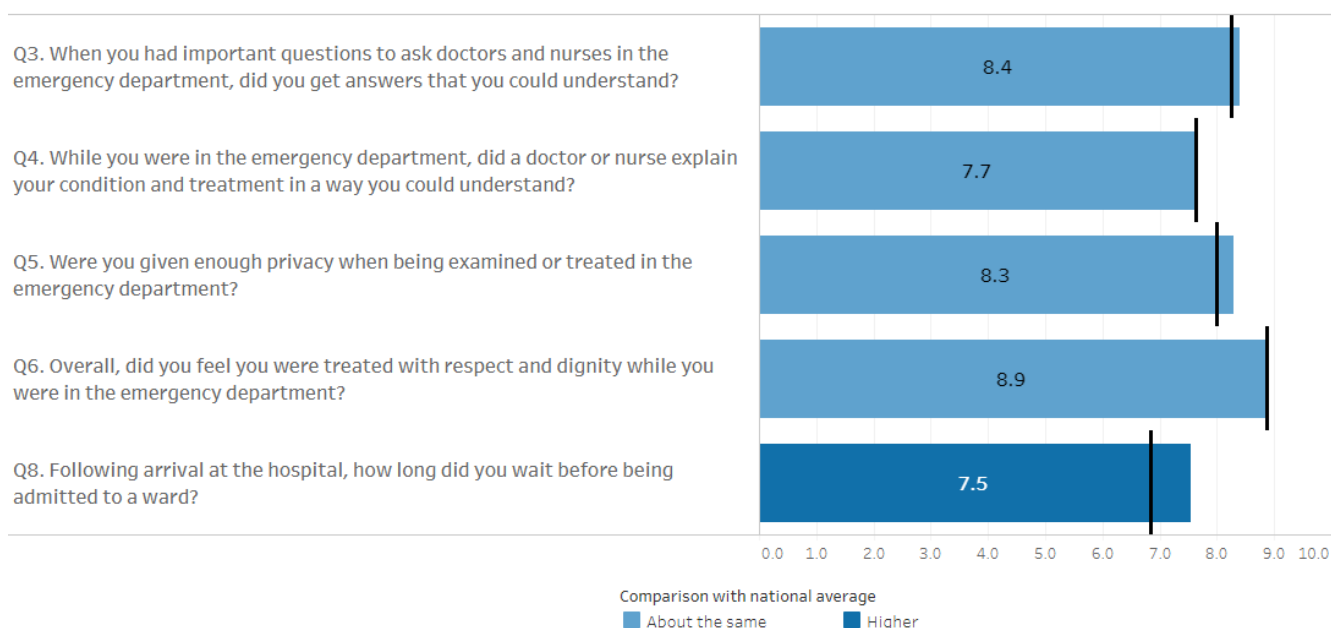**Figure 6 Comparison of Portiuncula University Hospital with the national average score for 'care on the ward' (out of a maximum of 10).**
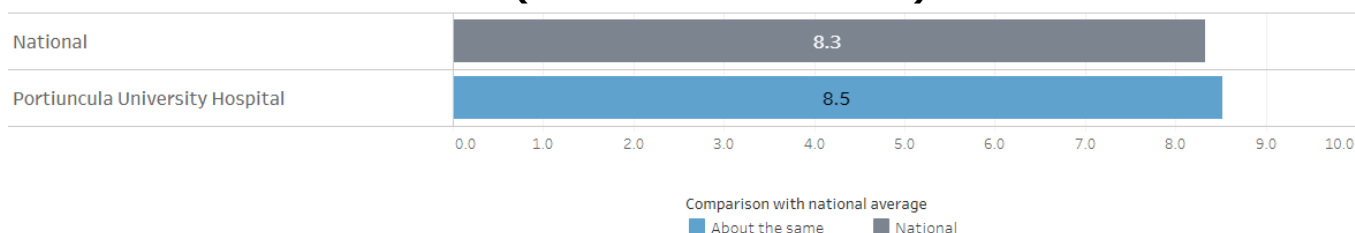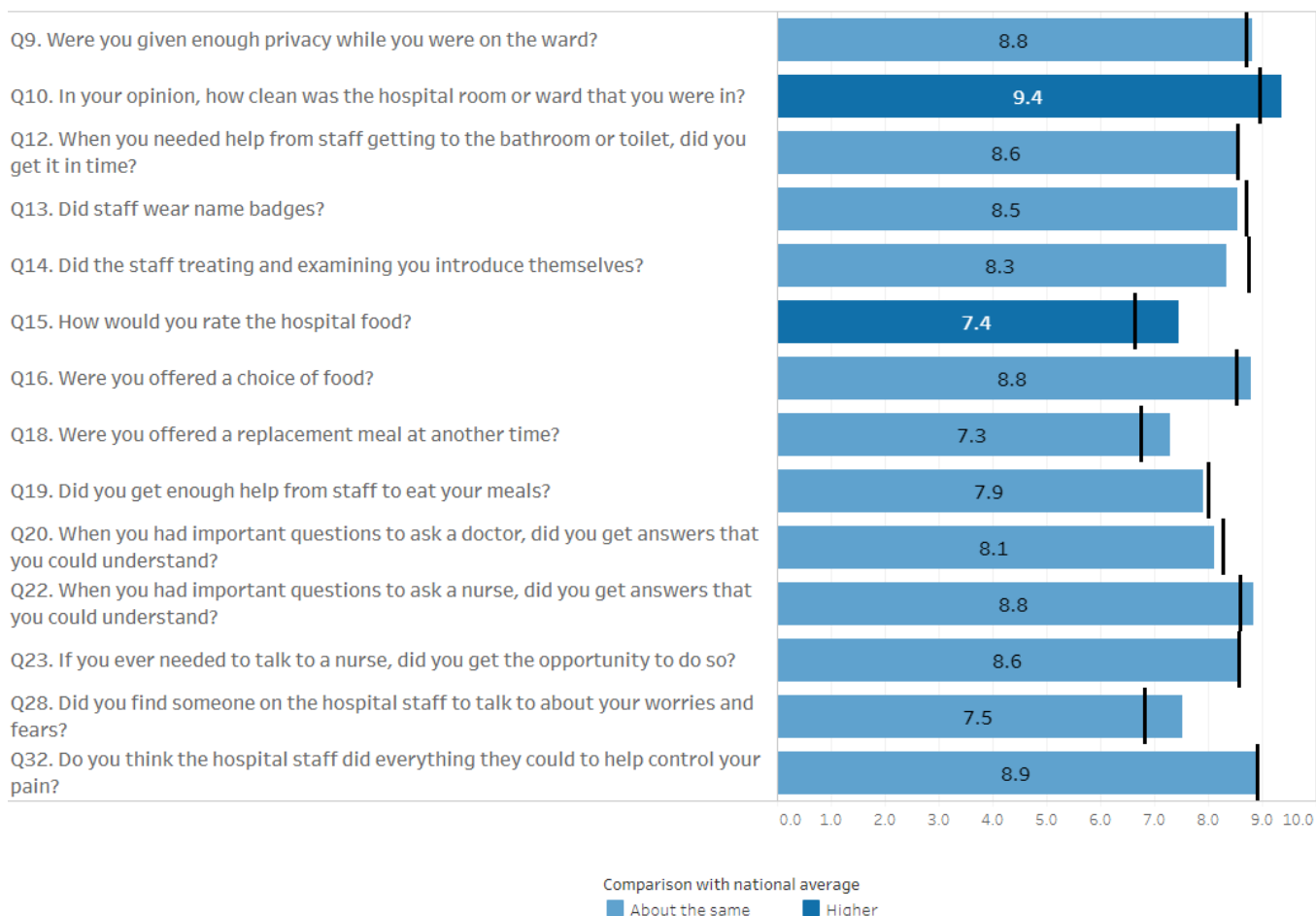
	Score
National	8.3
Portiuncula University Hospital	8.5

Comparison with national average
■ About the same ■ National

Figure 7 Portiuncula University Hospital scores for questions on 'care on the ward'*

Question	Score
Q9. Were you given enough privacy while you were on the ward?	8.8
Q10. In your opinion, how clean was the hospital room or ward that you were in?	9.4
Q12. When you needed help from staff getting to the bathroom or toilet, did you get it in time?	8.6
Q13. Did staff wear name badges?	8.5
Q14. Did the staff treating and examining you introduce themselves?	8.3
Q15. How would you rate the hospital food?	7.4
Q16. Were you offered a choice of food?	8.8
Q18. Were you offered a replacement meal at another time?	7.3
Q19. Did you get enough help from staff to eat your meals?	7.9
Q20. When you had important questions to ask a doctor, did you get answers that you could understand?	8.1
Q22. When you had important questions to ask a nurse, did you get answers that you could understand?	8.8
Q23. If you ever needed to talk to a nurse, did you get the opportunity to do so?	8.6
Q28. Did you find someone on the hospital staff to talk to about your worries and fears?	7.5
Q32. Do you think the hospital staff did everything they could to help control your pain?	8.9

Comparison with national average
■ About the same ■ Higher

*The black line represents the national average

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Care on the ward: what do these results mean?

Patient ratings of 'care on the ward' in Portiuncula University Hospital were similar to the national average and above last year's survey. Most patients gave a positive rating of the cleanliness of rooms and wards. The lowest scoring question for this stage related to whether patients were offered a replacement meal when they missed one.

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EXAMINATIONS, DIAGNOSIS AND TREATMENT

Experiences while undergoing or receiving results of tests, treatments, operations and procedures.

13 QUESTIONS

Examinations, diagnosis and treatment

Figure 8 compares the hospital's overall score for 'examinations, diagnosis and treatment' with the national average. Figure 9 shows the hospital's scores for questions on this stage of care.

Figure 8 Comparison of Portiuncula University Hospital with the national average score for 'examinations, diagnosis and treatment' (out of a maximum of 10).
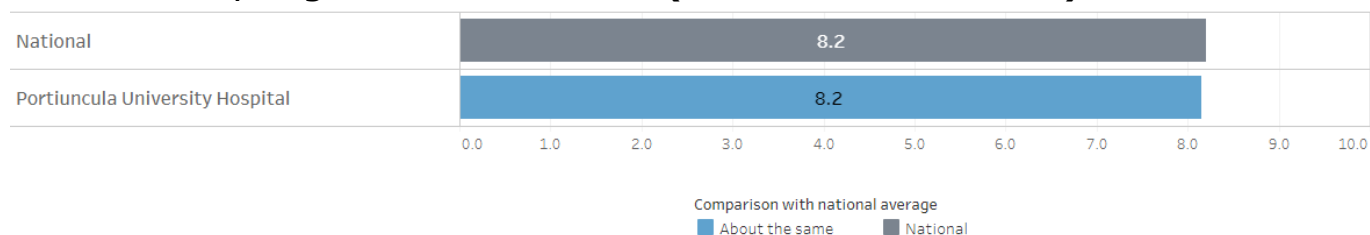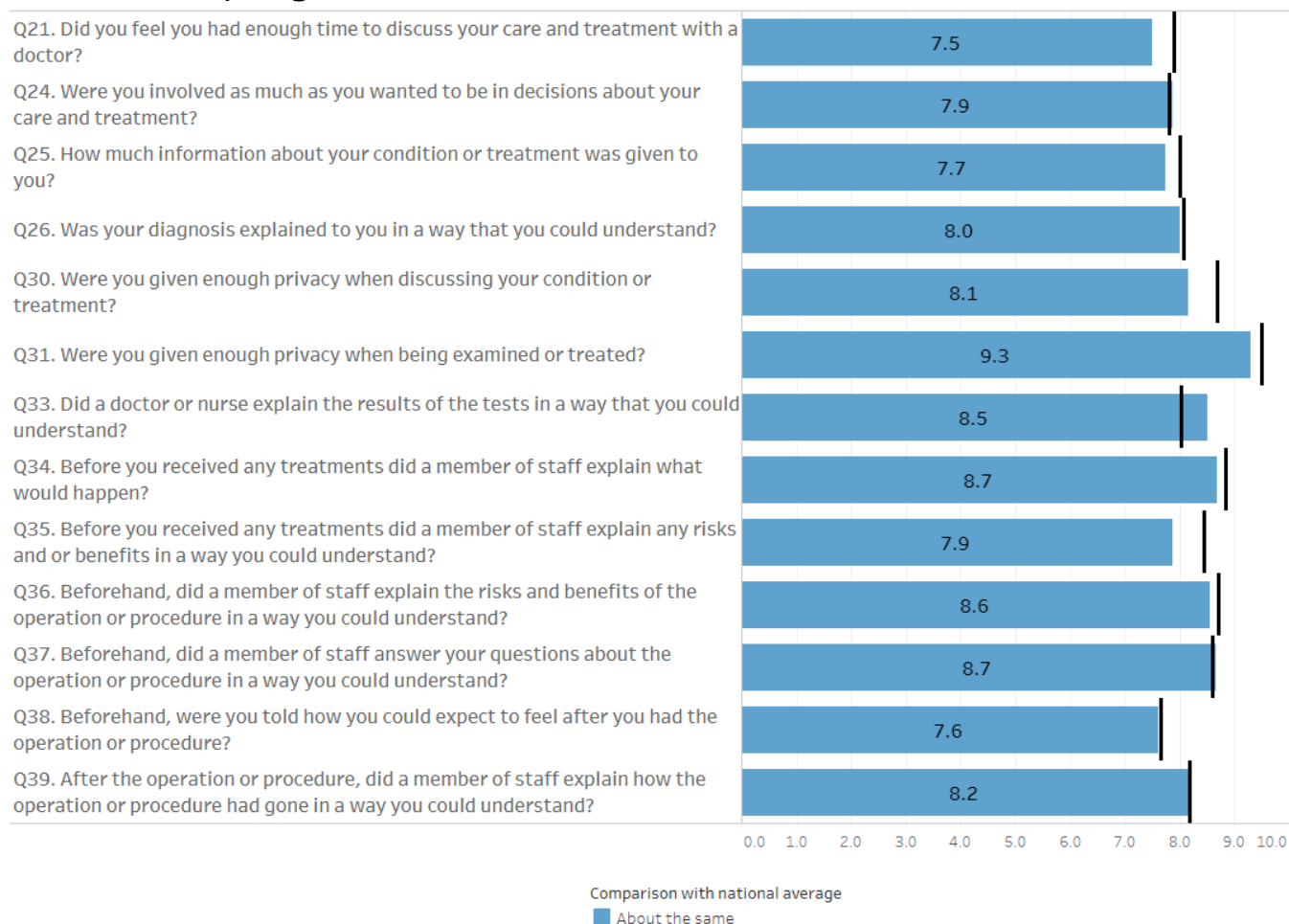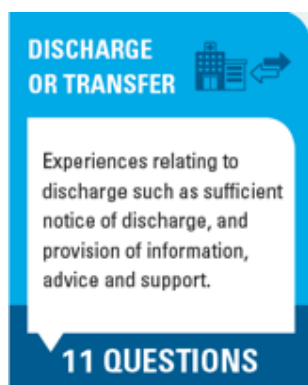
	Score
National	8.2
Portiuncula University Hospital	8.2

Comparison with national average
■ About the same ■ National

Figure 9 Portiuncula University Hospital scores for questions on 'examinations, diagnosis and treatment'*

Question	Score
Q21. Did you feel you had enough time to discuss your care and treatment with a doctor?	7.5
Q24. Were you involved as much as you wanted to be in decisions about your care and treatment?	7.9
Q25. How much information about your condition or treatment was given to you?	7.7
Q26. Was your diagnosis explained to you in a way that you could understand?	8.0
Q30. Were you given enough privacy when discussing your condition or treatment?	8.1
Q31. Were you given enough privacy when being examined or treated?	9.3
Q33. Did a doctor or nurse explain the results of the tests in a way that you could understand?	8.5
Q34. Before you received any treatments did a member of staff explain what would happen?	8.7
Q35. Before you received any treatments did a member of staff explain any risks and or benefits in a way you could understand?	7.9
Q36. Beforehand, did a member of staff explain the risks and benefits of the operation or procedure in a way you could understand?	8.6
Q37. Beforehand, did a member of staff answer your questions about the operation or procedure in a way you could understand?	8.7
Q38. Beforehand, were you told how you could expect to feel after you had the operation or procedure?	7.6
Q39. After the operation or procedure, did a member of staff explain how the operation or procedure had gone in a way you could understand?	8.2

Comparison with national average
■ About the same

*The black line represents the national average

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Examinations, diagnosis and treatment: what do these results mean?

Ratings of 'examination, diagnosis and treatment' were similar to the national average and to last year's survey. Most patients said that they were given enough privacy while being examined or treated. The lowest scoring question for this stage related to the time patients had to discuss their care and treatment with a doctor.

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DISCHARGE OR TRANSFER

Experiences relating to discharge such as sufficient notice of discharge, and provision of information, advice and support.

11 QUESTIONS

Discharge or transfer

Figure 10 compares the hospital's overall score for discharge or transfer with the national average. Figure 11 shows the hospital's scores for questions on this stage of care.

Figure 10 Comparison of Portiuncula University Hospital with the national average score for 'discharge or transfer' (out of a maximum of 10).

National	7.0
Portiuncula University Hospital	6.9

Comparison with national average
■ About the same ■ National
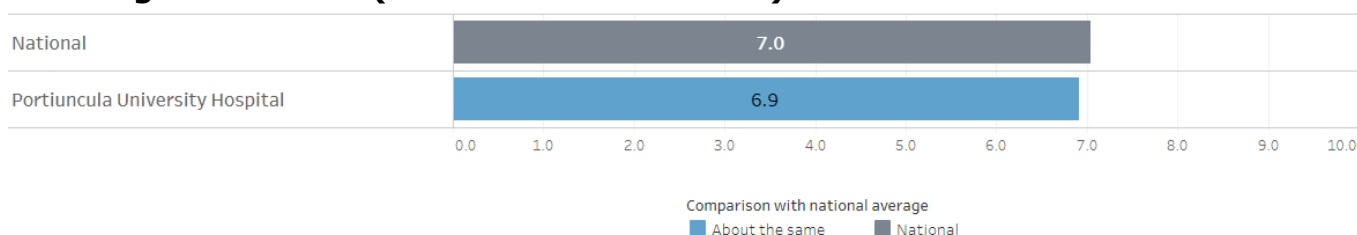
Figure 11 Portiuncula University Hospital scores for questions on 'discharge or transfer'*

Question	Score
Q40. Did you feel you were involved in decisions about your discharge from hospital?	7.7
Q41. Were you or someone close to you given enough notice about your discharge?	8.0
Q42. Before you left hospital, did the healthcare staff spend enough time explaining about your health and care after you arrive home?	7.6
Q43. Before you left hospital, were you given any written or printed information about what you should or should not do after leaving hospital?	5.1
Q44. Did a member of staff explain the purpose of the medicines you were to take at home in a way you could understand?	7.6
Q45. Did a member of staff tell you about medication side effects to watch for when you went home?	5.3
Q46. Did a member of staff tell you about any danger signals you should watch for after you went home?	5.6
Q47. Did hospital staff take your family or home situation into account when planning your discharge?	7.0
Q48. Did the doctors or nurses give your family or someone close to you all the information they needed to help care for you?	6.2
Q49. Did hospital staff tell you who to contact if you were worried about your condition or treatment after you left hospital?	6.8
Q50. Do you feel that you received enough information from the hospital on how to manage your condition after your discharge?	6.9

Comparison with national average
■ About the same ■ Lower

*The black line represents the national average

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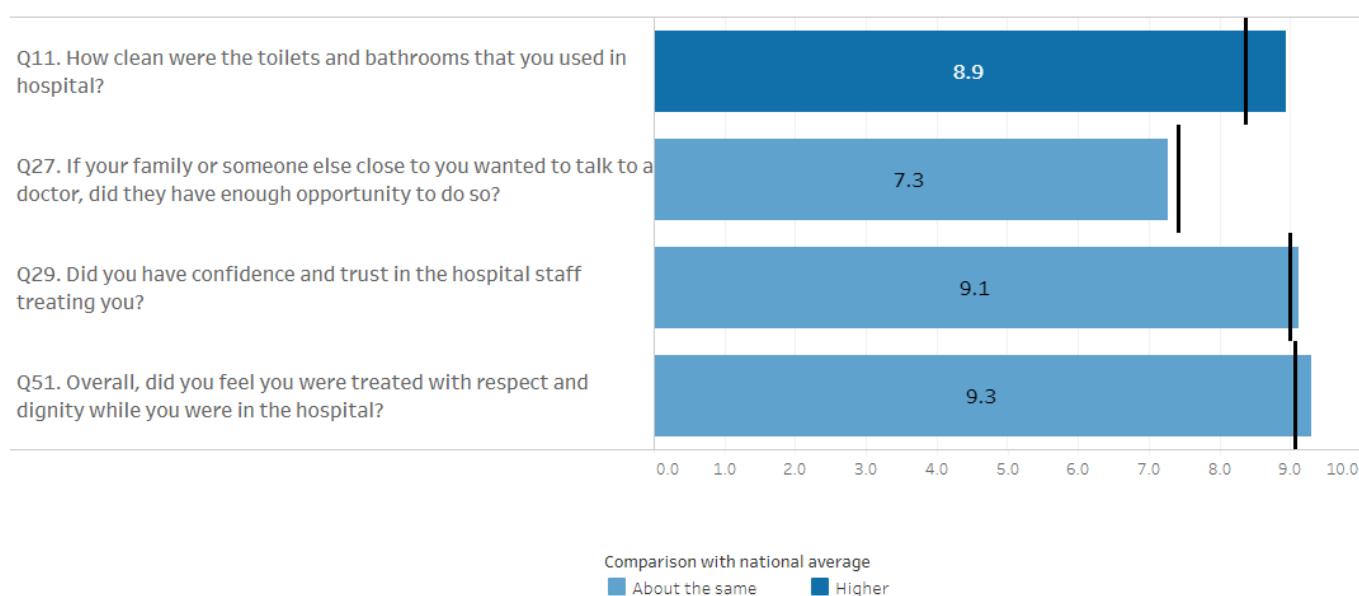## Discharge or transfer: what do these results mean?

Participant ratings for this stage of care were similar to both the national average and to last year's survey. Most patients said that they, or someone close to them, were given enough notice of their discharge from hospital. The lowest scoring question for this stage related to whether patients were given written or printed information about what they should or should not do after leaving hospital.

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OTHER ASPECTS OF CARE

Other, more general experiences of care such as cleanliness of bathrooms and toilets, trust and confidence in hospital staff.

4 QUESTIONS

Other aspects of care

Figure 12 shows the hospital's scores for questions on this stage of care.

Figure 12 Portiuncula University Hospital scores for 'other aspects of care'

Q11. How clean were the toilets and bathrooms that you used in hospital? — 8.9

Q27. If your family or someone else close to you wanted to talk to a doctor, did they have enough opportunity to do so? — 7.3

Q29. Did you have confidence and trust in the hospital staff treating you? — 9.1

Q51. Overall, did you feel you were treated with respect and dignity while you were in the hospital? — 9.3

Comparison with national average
■ About the same ■ Higher

*The black line represents the national average

Other aspects of care: what do these results mean?

Most participants said they were always treated with respect and dignity while in the hospital. On the other hand, a number of patients said that there were insufficient opportunities for their families to talk to a doctor.

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Overall experience

Respondents were asked to rate their overall hospital experience on a scale from 0 to 10, with 10 being the most positive experience, and 0 the most negative experience. 56% of participants from Portiuncula University Hospital rated their care as very good, matching the national average.

Figure 13 compares the average overall rating of hospital experience for Portiuncula University Hospital with the national average.

Figure 13 Overall rating of hospital experience for Portiuncula University Hospital and nationally

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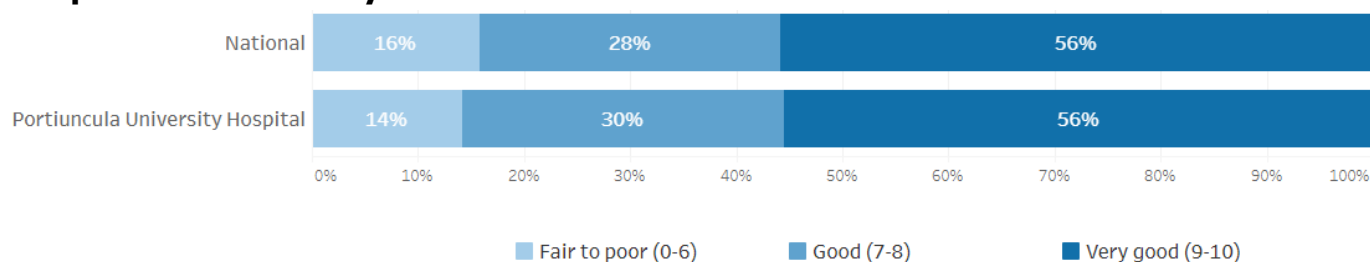
In their own words: analysis of patients' comments

The last three questions (questions 59-61) of the survey asked patients to provide additional information, in their own words, on their experiences in hospital. These free-text questions allowed people to give a more in-depth description of specific aspects of their care. It also allowed them to talk about various things (good or bad) that could not be captured by the structured questions. In total, 271 comments were received from patients of Portiuncula University Hospital in response to the free-text questions in the 2019 survey.

Figure 14 shows the breakdown of comments by theme for each of the three open-ended questions. Q59 asked participants what was particularly good about their hospital care, Q60 asked participants what could be improved, and Q61 asked participants for any other comments or suggestions.

In relation to good aspects of care, most of the comments related to the 'general and other comments', 'hospital staff' and 'compassion' themes. Most patient suggestions for improvement related to the 'physical environment', 'hospital staff', and 'general and other comments' themes. Responses to Q61 covered various themes. A selection of relevant comments from these themes is provided in Figure 15.

Figure 14 Participant comments by theme

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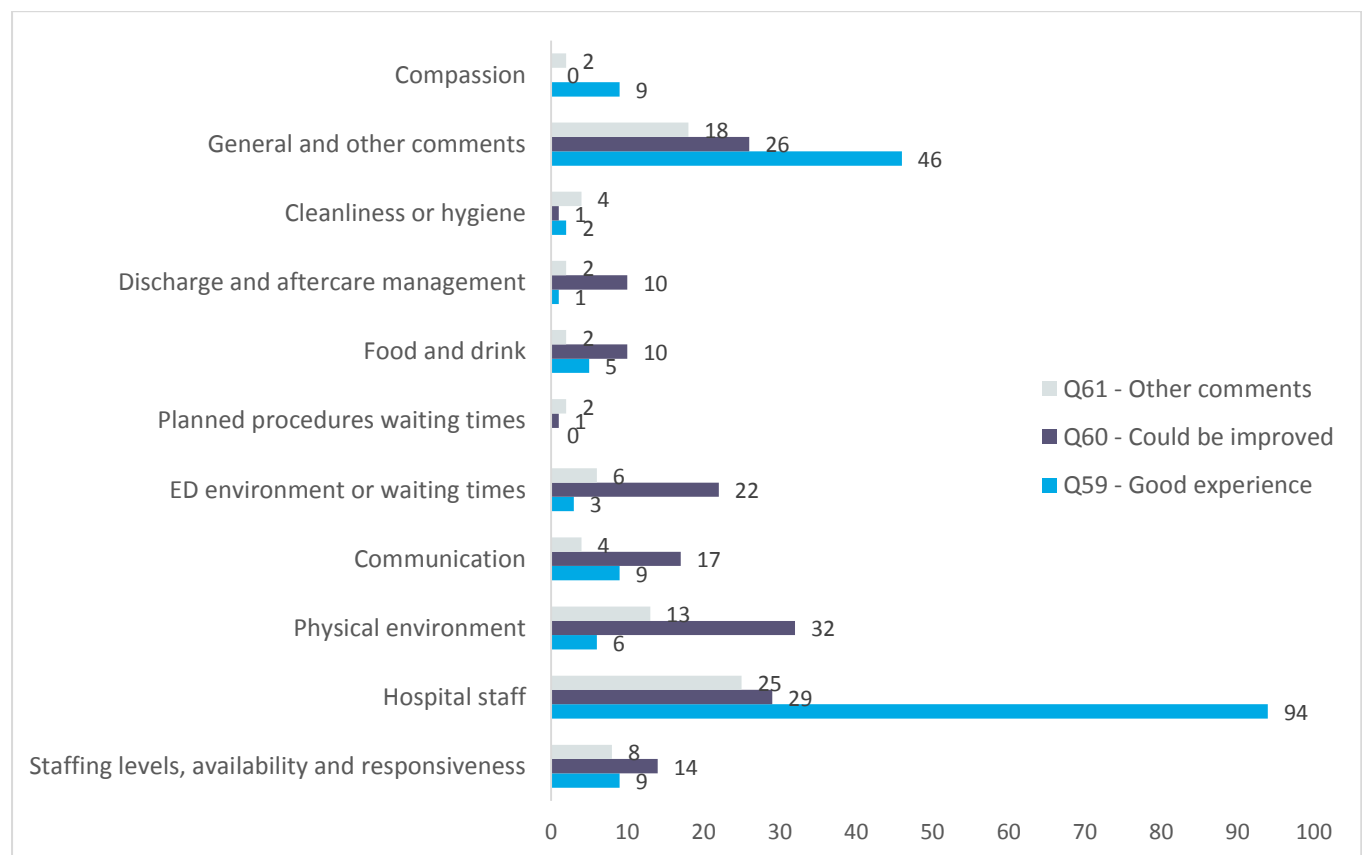
Figure 15 Example comments

Positive comments

"No complaints whatsoever. Excellent nursing care, all so pleasant day or night, no matter how busy they were."	"Despite all the negativity you hear about public hospital care, I could not fault the care I received, or the caring attitude of the staff."
"Yes everyone was getting or either giving every patient attention and doctors and nurses doing their best. All staff were friendly, those serving the food and cleaning staff."	"As an elderly person living alone, help and advice of social worker in finding step-down/respite placement was very helpful."
"I was always treated with dignity and respect and I really enjoyed my stay. I had not been in hospital before; it was a new experience for me. It was so clean and the food was very good."	"The idea of the PAL (Patient Advocacy Liaison) in the hospital is excellent and the particular lady in Portiuncula was more than suited to the role."

Suggestions for improvement

"More communication between staff in relation to receiving of appropriate meds. More communication with me as to what and when I was receiving meds."
"Too long a wait in A&E. I had to wait 9 hours until seen by a doctor. 9 hours sitting in a waiting room. I fully accept and understand that it was busy and bigger emergencies than mine but some information or explanation or clarification would have made the wait more bearable."
"The healthcare workers including nurses would switch main lights on in the middle of the night and talk really loud. I would whisper to encourage them to talk quieter so not to wake anyone else. I could hear everyone else's discussions with doctors. Most patients needed sleeping assistance to sleep while they stayed in hospital — and didn't at home. You need sleep to recover."

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Conclusion

What were patients' experiences of hospital care in Portiuncula University Hospital in May 2019?

The majority of patients said that they had positive overall experiences in Portiuncula University Hospital. 86% of patients said they had a 'good' or 'very good' experience, compared with 84% nationally.

Portiuncula University Hospital received scores that were close to the national average for every stage of care and also for overall experience. Participant ratings of 'care on the ward' were significantly higher than those received in 2018. There were no other significant changes in patients' ratings since 2018.

Three areas of good experience were identified. These were areas that were related to participants' overall experiences and where participants gave significantly above-average ratings. For example, most patients said that wards and bathrooms in the hospital were very clean. Patients also gave positive ratings of the hospital food.

One area needing improvement, where the hospital scores significantly below the national average, was identified. A number of patients said they were not given written or printed information on what they should or should not do after leaving hospital.

The findings of the 2019 survey will be used to help Portiuncula University Hospital improve the experiences of patients in the hospital.

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Appendix 1: Areas of good experience and areas needing improvement

Improvement map

It is important for hospitals to know if they scored above or below the national average for each question, and this is shown in the improvement map in Figure 16. The improvement map also shows which questions are related to patients' overall experience in hospital. Some questions had a stronger relationship with overall experience than others.

For example, Question 22 which asked patients if nurses gave them clear answers to questions had a strong relationship with overall experience. This means that patients who said that nurses always gave them clear answers were very likely to give a positive rating of their overall experience. Patients who felt that nurses did not give clear answers to questions tended to give more negative ratings of their overall experience.

Other questions had a weaker relationship with overall experience – this means that patients' experiences in these areas had little bearing on how they rated their overall experience. An example is Question 16 which asked patients if they were offered a choice of food. The relationship between being offered a choice of food and patients' ratings of their overall experience was weak. This means that even if patients were always offered a choice of food they may have given negative ratings of their overall experience, or if they were never offered a choice of food, patients may still have given positive ratings of their overall experience.

It is useful for hospitals to know which questions strongly relate to their patients' overall experience as these are the areas on which they should focus their improvement efforts.

In Figure 16, each dot shows a specific survey question for Portiuncula University Hospital. Questions at the top of the graph are strongly related to overall experience, while those at the bottom have a weaker relationship. Questions to the right of the graph scored below the national average, while those on the left scored above it.

Questions that scored significantly above average and had a stronger relationship with overall experience are areas of good experience. Questions that scored significantly below average and had a stronger relationship with overall experience are areas needing improvement.

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The improvement map for every hospital is unique and gives specific information on where a hospital is doing well, and areas where improvements are needed. More information on the science behind the improvement map is available below. An interactive version of the improvement map is also available at http://www.yourexperience.ie/, along with instructions on how to interpret it.

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Figure 16 Improvement map for Portiuncula University Hospital
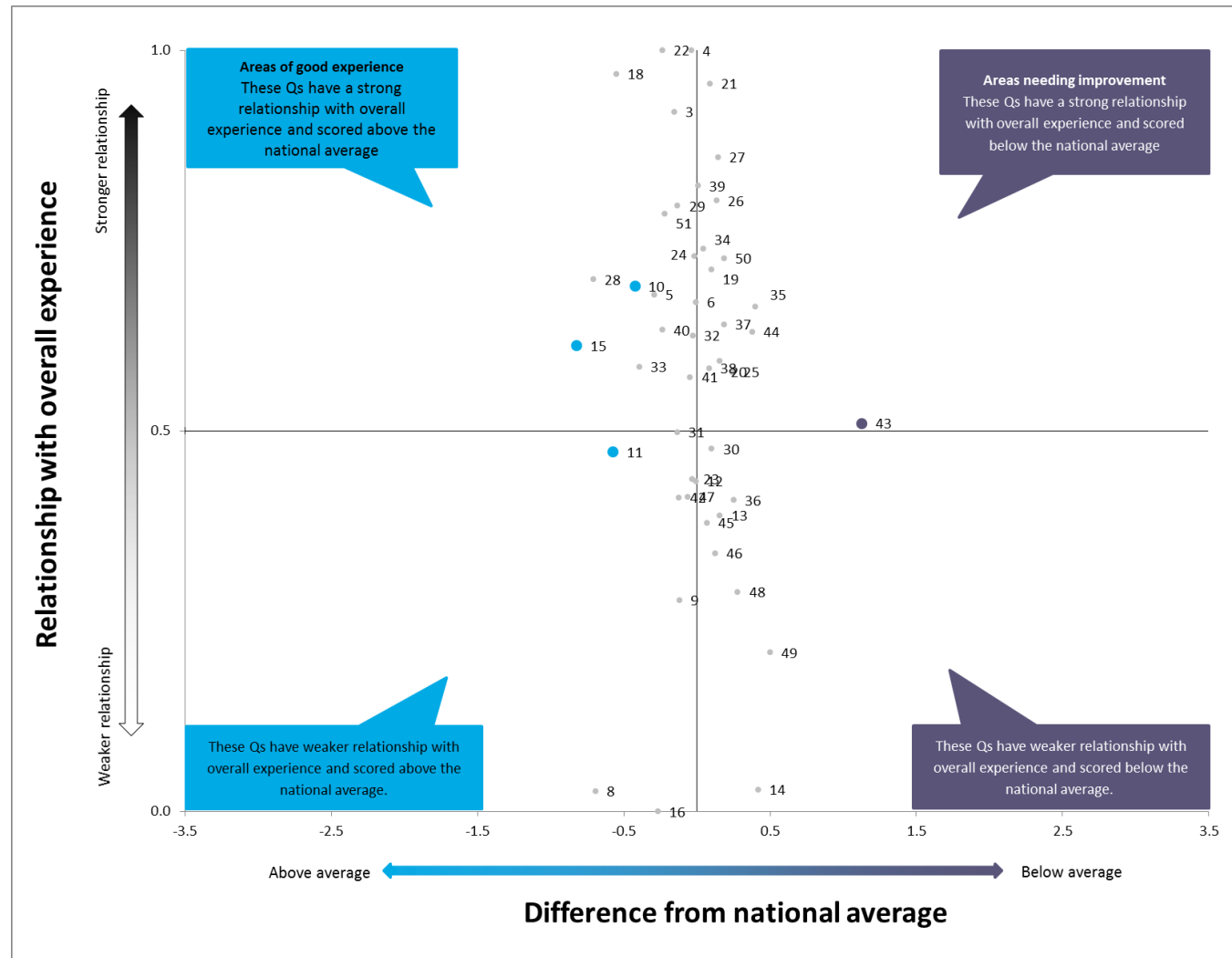
How the improvement map is constructed

The improvement map is constructed by charting the normalised correlation between each question and overall experience on the vertical axis, against the difference between the hospital average and national average for each question on the horizontal axis.

What is correlation?

Correlation is a measure of the relationship between two variables. For example, in general there is a strong correlation between patients saying they were treated with respect and dignity, and patients giving a positive rating of their overall experience in hospital. It can thus be said that there is a strong correlation between respect and dignity, and overall experience. A 'correlation coefficient' is a number between 0 and 1 that represents the strength of a relationship, with 1 being the strongest possible relationship and 0 indicating that there is no relationship. Correlation does not tell us if a change in one variable is caused by a change in the other.

How do we calculate the correlation coefficient?

The first step in calculating the correlation coefficient between two variables is to calculate their 'covariance'. Covariance is a simple measure of the relationship between two variables and is calculated using the formula below:

$$\text{cov}_{xy} = \frac{\sum \left(x_i - \bar{x} \right)\left(y_i - \bar{y} \right)}{n - 1}$$

While covariance does measure the relationship between variables, it does so in an unstandardised way, depending on the scale of measurement used. This makes comparing covariances measured on different scales problematic. In order to get around this issue, 'standardisation' must be carried out. In order to do this, the covariance for both variables must be divided by the product of the standard deviations for each variable. The formula below shows how standardisation is carried out, resulting in r, known as the 'Pearson correlation coefficient'.

$$r = \frac{\text{cov}_{xy}}{s_x s_y} = \frac{\sum \left(x_i - \bar{x} \right)\left(y_i - \bar{y} \right)}{(N - 1) s_x s_y}$$

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The final step in the analysis is to normalise the correlation coefficients between 0 and 1 using the below formula:

$$r = \frac{r - r_{min}}{r_{max} - r_{min}}$$

In Figure 16, we plot the correlation coefficients between each question and overall experience on the vertical axis. Each question's difference from the national average is plotted on the horizontal axis.

How do we calculate difference from the national average?

Statistical tests were carried out to examine if there were significant differences between a hospital's score for each question and the national average for that question. A z-test was used to compare question scores at the 99% confidence level. A z-test is a statistical test used to examine whether two population mean scores are different. A statistically significant difference means it is very unlikely that results were obtained by chance alone if there was no real difference. Therefore, when a score is significantly 'higher than' or 'lower than' the national average, this is highly unlikely to have occurred by chance.

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