Cavan and Monaghan Hospital

2019 survey results

Respondents
- 268 Number of respondents
- 67.3 Average age
- 45% Participation rate

Overall experience

<table>
<thead>
<tr>
<th>Year</th>
<th>Very Good</th>
<th>Good</th>
<th>Fair to Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019</td>
<td>51%</td>
<td>30%</td>
<td>19%</td>
</tr>
<tr>
<td>2018</td>
<td>50%</td>
<td>33%</td>
<td>17%</td>
</tr>
</tbody>
</table>

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

Stages of care

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

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

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

Discharge or transfer
Participant ratings of ‘discharge or transfer’ were similar to the national average and to last year’s survey.
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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%. 268 patients from Cavan and Monaghan 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 Cavan and Monaghan Hospital?

The majority of participants from Cavan and Monaghan Hospital reported positive experiences in hospital. 81% of participants said they had ‘good’ or ‘very good’ overall experiences, compared with 84% nationally. The hospital scored about the same as the national average for every stage of care and for overall experience.\(^2\)

Three areas needing improvement were identified. While the majority of patients said that staff explained the risks or benefits of procedures, the hospital scored below the national average for this question. In addition, a number of patients said they were not involved in decisions about their discharge, nor were they given sufficient notice of their discharge.

\(^1\) 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’.
There were no significant differences in patient ratings of the stages of care compared with the 2018 survey.

The findings of the 2019 survey will help Cavan and Monaghan Hospital to improve patients’ experiences of care in hospital.

**Hospital and participant profile**

Cavan and Monaghan Hospital is located in Co. Cavan and Co. Monaghan. There were 242 inpatient beds available in the hospital during the survey period of May 2019.

604 people discharged from Cavan and Monaghan Hospital during the month of May 2019 were invited to participate in the survey. 268 people completed the survey, achieving a response rate of 45%. 46.3% of participants were male and 53.7% were female. 236 respondents (88.1%) 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 Cavan and Monaghan Hospital.

**Figure 1 Participants from Cavan and Monaghan Hospital by sex, age group and admission route**

![Chart showing participant sex, age group, and admission route](chart.png)
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.

In Cavan and Monaghan Hospital, the scores for all questions across the five stages of care were below or the same as the national average. This means that it was not possible to identify any areas of particularly good experience using the methodology outlined in Appendix 1.

The areas needing improvement in Cavan and Monaghan Hospital are:

Examinations, diagnosis and treatment
Clear explanation of the risks/benefits of treatments | Q35
Of the 204 people who answered this question, 129 (63%) said that staff always explained the risks or benefits of treatments in a way they could understand. The hospital scored below the national average on this question.

Discharge or transfer
Involvement in decisions about discharge | Q40
Of the 237 people who answered this question, 126 (53%) said that they were definitely involved in decisions about their discharge from hospital. This was below the national average.

Discharge or transfer
Sufficient notice of discharge | Q41
153 people (61%) said that they were definitely given enough notice about their discharge from hospital. The hospital scored below the national average on this question.
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:

**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 statistically significant difference between the hospital’s score and the national average, it is described as ‘about the same’.

Changes in patient experience over time
There were no significant changes in patient experience from the 2018 survey. Figure 2 shows a comparison of scores for individual stages of care.

It is important that any 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 Cavan and Monaghan Hospital

<table>
<thead>
<tr>
<th>Stage of Care</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admissions</td>
<td>8.0</td>
<td>8.0</td>
<td>7.7</td>
</tr>
<tr>
<td>Care on the ward</td>
<td>8.3</td>
<td>8.4</td>
<td>8.3</td>
</tr>
<tr>
<td>Examinations, diagnosis and treatment</td>
<td>8.1</td>
<td>8.0</td>
<td>8.0</td>
</tr>
<tr>
<td>Discharge or transfer</td>
<td>6.9</td>
<td>6.9</td>
<td>6.7</td>
</tr>
<tr>
<td>Overall experience</td>
<td>8.1</td>
<td>8.2</td>
<td>8.0</td>
</tr>
</tbody>
</table>

\(^3\) Scores for the stages of care were constructed by calculating the average scores for all the questions belonging to that stage.
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 Cavan and Monaghan Hospital with the national average score for ‘admissions’ (out of a maximum of 10).**

<table>
<thead>
<tr>
<th></th>
<th>National</th>
<th>Cavan and Monaghan Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7.9</td>
<td>7.7</td>
</tr>
</tbody>
</table>

*The black line represents the national average*
Emergency department waiting times

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 Cavan and Monaghan Hospital, 44 respondents (21%) said they were admitted to a ward within six hours of arriving at the emergency department, while 152 respondents (71%) reported waiting between six and 24 hours. 18 respondents (8%) said that they waited 24 hours or more before being admitted to a ward in Cavan and Monaghan Hospital, with five 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 Cavan and Monaghan Hospital, compared with the national average.

Figure 5 Emergency department waiting times, as reported by patients for Cavan and Monaghan Hospital and nationally

<table>
<thead>
<tr>
<th></th>
<th>National</th>
<th>Cavan and Monaghan Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;6 hours</td>
<td>30%</td>
<td>21%</td>
</tr>
<tr>
<td>6-24 hours</td>
<td>56%</td>
<td>71%</td>
</tr>
<tr>
<td>&gt;24 hours</td>
<td>14%</td>
<td>8%</td>
</tr>
</tbody>
</table>

Admissions: what do these results mean?

Patient ratings of admission to Cavan and Monaghan 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 whether a patient’s condition or treatment was explained to them in a way they could understand.

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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](https://www.hse.ie/eng/services/publications/kpis/acute-hospitals-metadata-2019.pdf)
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 Cavan and Monaghan Hospital with the national average score for ‘care on the ward’ (out of a maximum of 10).**

<table>
<thead>
<tr>
<th></th>
<th>National</th>
<th>Cavan and Monaghan Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8.3</td>
<td>8.3</td>
</tr>
</tbody>
</table>

**Figure 7 Cavan and Monaghan Hospital scores for questions on ‘care on the ward’**

<table>
<thead>
<tr>
<th>Question</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q9. Were you given enough privacy while you were on the ward?</td>
<td>8.4</td>
</tr>
<tr>
<td>Q10. In your opinion, how clean was the hospital room or ward that you</td>
<td>9.0</td>
</tr>
<tr>
<td>were in?</td>
<td></td>
</tr>
<tr>
<td>Q12. When you needed help from staff getting to the bathroom or toilet,</td>
<td>8.6</td>
</tr>
<tr>
<td>did you get it in time?</td>
<td></td>
</tr>
<tr>
<td>Q13. Did staff wear name badges?</td>
<td>8.5</td>
</tr>
<tr>
<td>Q14. Did the staff treating and examining you introduce themselves?</td>
<td>8.5</td>
</tr>
<tr>
<td>Q15. How would you rate the hospital food?</td>
<td>6.9</td>
</tr>
<tr>
<td>Q16. Were you offered a choice of food?</td>
<td>8.8</td>
</tr>
<tr>
<td>Q18. Were you offered a replacement meal at another time?</td>
<td>6.4</td>
</tr>
<tr>
<td>Q19. Did you get enough help from staff to eat your meals?</td>
<td>7.7</td>
</tr>
<tr>
<td>Q20. When you had important questions to ask a doctor, did you get</td>
<td>6.0</td>
</tr>
<tr>
<td>answers that you could understand?</td>
<td></td>
</tr>
<tr>
<td>Q22. When you had important questions to ask a nurse, did you get</td>
<td>8.5</td>
</tr>
<tr>
<td>answers that you could understand?</td>
<td></td>
</tr>
<tr>
<td>Q23. If you ever needed to talk to a nurse, did you get the opportunity</td>
<td>8.3</td>
</tr>
<tr>
<td>to do so?</td>
<td></td>
</tr>
<tr>
<td>Q28. Did you find someone on the hospital staff to talk to about your</td>
<td>6.3</td>
</tr>
<tr>
<td>worries and fears?</td>
<td></td>
</tr>
<tr>
<td>Q32. Do you think the hospital staff did everything they could to</td>
<td>8.9</td>
</tr>
<tr>
<td>help control your pain?</td>
<td></td>
</tr>
</tbody>
</table>

*The black line represents the national average*
Care on the ward: what do these results mean?

Patient ratings of ‘care on the ward’ in Cavan and Monaghan Hospital were similar to the national average and to 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 could find a member of staff to talk to about their worries and fears.
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 Cavan and Monaghan Hospital with the national average score for ‘examinations, diagnosis and treatment’ (out of a maximum of 10).

<table>
<thead>
<tr>
<th></th>
<th>National</th>
<th>Cavan and Monaghan Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Score</td>
<td>8.2</td>
<td>8.0</td>
</tr>
</tbody>
</table>

*The black line represents the national average.
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. However, some patients would have liked more information about their condition or treatment. This was the lowest scoring question for this stage of care.
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 Cavan and Monaghan Hospital with the national average score for ‘discharge or transfer’ (out of a maximum of 10).**

<table>
<thead>
<tr>
<th></th>
<th>National</th>
<th>Cavan and Monaghan Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discharge or transfer</td>
<td>7.0</td>
<td>6.7</td>
</tr>
</tbody>
</table>

**Figure 11 Cavan and Monaghan Hospital scores for questions on ‘discharge or transfer’**

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

*The black line represents the national average*
Discharge or transfer: what do these results mean?

Participant ratings for this stage of care were similar to the national average and to last year’s survey. Most patients said that staff explained the purpose of the medications they were to take at home. The lowest scoring question for this stage of care related to whether the potential side effects of medication were explained to patients in a way they could understand.
Other aspects of care

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

Figure 12 Cavan and Monaghan Hospital scores for ‘other aspects of care’*

<table>
<thead>
<tr>
<th>Question</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q11. How clean were the toilets and bathrooms that you used in hospital?</td>
<td>8.5</td>
</tr>
<tr>
<td>Q27. If your family or someone else close to you wanted to talk to a doctor, did they have enough opportunity to do so?</td>
<td>7.3</td>
</tr>
<tr>
<td>Q29. Did you have confidence and trust in the hospital staff treating you?</td>
<td>8.8</td>
</tr>
<tr>
<td>Q51. Overall, did you feel you were treated with respect and dignity while you were in the hospital?</td>
<td>9.0</td>
</tr>
</tbody>
</table>

*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 they were in hospital. On the other hand, a number of patients said that there were insufficient opportunities for their families to talk to a doctor.
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. 51% of participants from Cavan and Monaghan Hospital rated their care as very good, slightly below the national figure of 56%.

Figure 13 compares the average overall rating of hospital experience for Cavan and Monaghan Hospital with the national average.

**Figure 13** Overall rating of hospital experience for Cavan and Monaghan Hospital and nationally

<table>
<thead>
<tr>
<th>Cavan and Monaghan Hospital Group</th>
<th>National</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Category](Fair to poor (0-6))</td>
<td>19%</td>
</tr>
<tr>
<td><img src="Good" alt="Category" title="7-8" /></td>
<td>30%</td>
</tr>
<tr>
<td>![Category](Very good (9-10))</td>
<td>51%</td>
</tr>
<tr>
<td>![Category](Fair to poor (0-6))</td>
<td>16%</td>
</tr>
<tr>
<td><img src="Good" alt="Category" title="7-8" /></td>
<td>28%</td>
</tr>
<tr>
<td>![Category](Very good (9-10))</td>
<td>56%</td>
</tr>
</tbody>
</table>
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, 363 comments were received from patients of Cavan and Monaghan 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.

When asked what was good about their care, most patient comments related to the ‘hospital staff’, ‘general and other comments’ and ‘food and drink’ themes. Most of the comments suggesting improvements related to the ‘hospital staff’, ‘physical environment’, 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**
**Figure 15 Example comments**

### Positive comments

<table>
<thead>
<tr>
<th>Comment 1</th>
<th>Comment 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Excellent nurse in charge. Carers and other staff excellent. Consultant doctor very attentive and helpful with excellent team of supporting doctors whom he talked and listened to.”</td>
<td>“I was very satisfied with the care and attention both in A&amp;E and in the ward. The doctors, nurses and carers and attendants were very good. The food was very good, tasty.”</td>
</tr>
<tr>
<td>“The nurses, carers, cleaners were in a league of their own. The people who delivered the lovely food to the patients every day with a smile on their faces were outstanding.”</td>
<td>“Speed at which I was seen in ED, prompt action and treatment started soon after I arrived in ED. Single room for isolation purposes was immediately available. Doctors and nurses very good.”</td>
</tr>
<tr>
<td>“The cleaners were very thorough. Probably the cleanest hospital I have ever been in.”</td>
<td>“I had a very positive experience from admission to discharge. No complaints at all.”</td>
</tr>
</tbody>
</table>

### Suggestions for improvement

<table>
<thead>
<tr>
<th>Comment 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>“As a family we have observed wide variance in the level of communication relayed. Some staff are very well informed and 'know' their patient. Unfortunately it has been our experience that others are clearly not well informed and give conflicting information. There is definitely a case for improvement in general communication and to have consensus when relaying information to families.”</td>
</tr>
<tr>
<td>“The discharge process to stepdown facility was my biggest cause for concern. I was not given any notice or advice before I left. I was extremely worried as I do not think I was well enough to go.”</td>
</tr>
<tr>
<td>“Privacy. It was difficult being in a mixed ward of men and women, everyone could overhear what the doctors were saying. It was hard to get to sleep, with 6 patients in the ward. No other accommodation available.”</td>
</tr>
</tbody>
</table>
Conclusion

What were patients’ experiences of hospital care in Cavan and Monaghan Hospital in May 2019?

The majority of patients said that they had positive overall experiences in Cavan and Monaghan Hospital. 81% of patients said they had a ‘good’ or ‘very good’ experience, compared with 84% nationally.

Cavan and Monaghan Hospital scored close to the national average for every stage of care and for overall experience. Participant ratings of care were generally similar to those received in 2018.

Three areas needing improvement were identified. While the majority of patients said that staff explained the risks or benefits of procedures, the hospital scored below the national average for this question. In addition, a number of patients said they were not involved in decisions about their discharge, nor given sufficient notice of their discharge.

The findings of the 2019 survey will be used to help Cavan and Monaghan Hospital improve the experiences of patients in hospital.
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 51 which asked patients if they were treated with respect and dignity had a strong relationship with overall experience. This means that patients who said they were treated with respect and dignity were very likely to give a positive rating of their overall experience. Patients who felt they were not treated with respect and dignity 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 13 which asked patients if hospital staff wore name badges. The relationship between staff wearing name badges and patients’ ratings of their overall experience was weak. This means that even if all staff wore name badges, patients may have given negative ratings of their overall experience, or if no staff wore name badges, 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 Cavan and Monaghan 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.
The improvement map for each 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.
Figure 16 Improvement Map for Cavan and Monaghan Hospital

- Areas of good experience: These Qs have a strong relationship with overall experience and scored above the national average.
- Areas needing improvement: These Qs have a strong relationship with overall experience and scored below the national average.

These Qs have weaker relationship with overall experience and scored above the national average.

These Qs have weaker relationship with overall experience and scored below the national average.

Above average

Below average

Difference from national average

Relationship with overall experience

Stronger relationship

Weaker relationship

Page 24 of 26
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:

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

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’.

$$r = \frac{\text{cov}_{xy}}{s_x s_y} = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{(N - 1)s_x s_y}$$
The final step in the analysis is to normalise the correlation coefficients between 0 and 1 using the below formula:

\[ r = \frac{r - r_{\text{min}}}{r_{\text{max}} - r_{\text{min}}} \]

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.