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Research Report

Factors associated with staff retention in the NHS acute sector

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Institute for Fiscal Studies

IFS Report R216

Elaine Kelly
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Preface

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The authors thank the Department of Health and Social Care (DHSC) for access to data from the NHS Electronic Staff Record (ESR). Figures published using the ESR may be different from the official workforce statistics published by NHS Digital. The authors also thank staff at DHSC, Health Education England and NHS England/Improvement for helpful discussions throughout the course of the project, and the Policy Research Unit's patient and public involvement and advisory group for helpful comments on the emerging findings of this study and reading a near final version of the report. This subject clearly matters to patients, as one of our patient advisers noted: 'Security of staffing levels is obviously critical to maintaining a good service, but also in giving confidence to patients using the service. Nobody wants to feel that they might be on the receiving end of an under-resourced medical team.'

The views expressed are those of the authors and not necessarily those of the NIHR, the DHSC, or the ESRC.

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Executive summary

Against a backdrop of increasing demands for health care, the National Health Service (NHS) has long sought ways to increase the number of staff available to provide care to patients. More doctors, nurses, midwives and health-care assistants (HCAs) mean that the NHS can deliver more, and higher-quality, care. Increasing staff numbers is a clear policy priority, as reflected in the 2019 Conservative Party's manifesto commitment to increase the number of nurses by 50,000 by 2024, and demand for staff has only intensified in the wake of the pandemic and the subsequent backlog in elective care.

In addition to hiring new staff, the retention of existing staff is crucial in ensuring adequate numbers of NHS staff. These staff members have important skills and experience working in the NHS, and the supply of alternative medical staff is often restricted in the short term, with long training pathways and only a limited amount of staff who can be recruited from abroad. Retaining existing staff members and their skills is therefore important to ensure a well-functioning NHS. However, the evidence on which factors matter for retention of existing staff remains scarce.

In this report we add to this evidence base by examining how a range of individual staff characteristics, regional economic conditions and trust characteristics are associated with whether individual staff members decide to leave the NHS acute sector. We use the Electronic Staff Record (ESR), the monthly payroll of the NHS, to analyse how much of the variation in retention rates between NHS acute trusts can be explained by these characteristics, and to examine which factors were associated with the leaving decisions of medical consultants, nurses and midwives, and HCAs between 2012 and 2021.

While these findings cannot distinguish the causal impact of different factors on retention, they provide new evidence on the characteristics of staff who are most likely to leave the NHS acute sector, and can guide further policy interventions to improve the retention of these groups.

Key findings

- 1 Average monthly leaving rates differ substantially between NHS staff groups, but have remained stable over time.** On average, 0.4% of consultants left the NHS acute sector each month between April 2012 and May 2021. The average leaving rate was 0.8% for nurses and midwives over the same period, and 1.2% for HCAs.

- 2 **Retention rates vary considerably between different trusts.** For example, the average monthly leaving rate of HCAs was nine times higher at the trust with the worst retention rates (4.50%) than at the trust with the highest retention rate (0.49%). **There were large regional differences in leaving rates for all staff groups, but in all regions there remained significant variation.** The North East had the lowest leaving rates for consultants, nurses and midwives, and HCAs. London, the South and East of England had the highest leaving rates for nurses and midwives, and HCAs.
- 3 **The majority of variation in monthly leaving rates between trusts remains unexplained by our model of retention.** We studied three sets of observable, time-varying factors that could plausibly be related to retention – individual staff characteristics, local economic conditions and trust characteristics – in addition to controlling for nationwide time trends and persistent differences in leaving rates across trusts that are associated with fixed (and often unobserved) trust attributes. Together, **this explains between 11% and 21% of the variance in trust leaving rates for each staff group.** This highlights that much of what drives retention is often unobservable to researchers or policymakers, and makes targeting interventions at these unobserved factors difficult.
- 4 **Age is strongly associated with leaving decisions, with different patterns for men and women.** Female staff are most likely to leave the acute sector in their 30s, all else being equal, while male staff leaving rates start rising substantially from 55. **Tenure at a particular trust is also strongly associated with leaving decisions, even after controlling for age.** Staff members with the shortest tenures were most likely to leave the acute sector entirely, with those having a tenure of less than two years 43%–109% more likely to leave in a given month than those with a tenure of 5–10 years.
- 5 **Consultants who are British nationals were less likely to leave in any given month than their non-British counterparts, while HCAs who are British nationals were more likely to leave.** EU nurses were 43% more likely to leave than British nurses, while non-EU nurses were 28% less likely to leave. This pattern pre-dates the 2016 EU Referendum, but the differences in leaving rates between groups have grown since 2016.
- 6 **Staff members who had a recent sickness absence were much more likely to subsequently leave the acute sector.** This was true for absences related to physical health, and even stronger for absences related to mental health. A nurse or midwife who missed three days of work for mental health

reasons was 27% more likely to leave three months later than a peer with no absences. For a consultant, this difference was 58%.

- 7 **The leaving decisions of nurses and midwives, and HCAs were negatively correlated with regional unemployment rates, but not short-term changes in house prices.** A percentage point increase in the regional unemployment rate was associated with a 2.1% reduction in the probability that a nurse or midwife left, and a 2.6% fall in the probability that an HCA left. There was no association with consultant leaving rates. **Trust operational performance was largely unrelated to leaving rates for any staff group.**
- 8 **Different NHS Staff Survey themes were associated with the probability of leaving for different staff groups.** For nurses, higher reported staff engagement was associated with a lower probability of leaving. For consultants, higher satisfaction with immediate managers was associated with a lower probability of leaving, while for HCAs the probability of leaving was associated with the quality of team working.
- 9 **There were large, persistent differences in leaving rates associated with the characteristics of trusts that do not vary over time.** These persistent differences are only weakly correlated between different staff groups, suggesting that **different persistent trust characteristics matter for the retention of different staff groups.**
- 10 **The share of these persistent differences that can be explained by region, trust type and trust size is much higher for nurses and midwives than the other staff groups.** For nurses and midwives, almost half of these persistent differences in leaving rates was explained by trust type, size and region, suggesting that these are important factors in explaining the retention performance of different trusts. **In contrast, only 13% and 7% of this variation was explained by these three factors for consultants and HCAs, respectively.** This suggests that the vast majority of persistent differences in the retention of different trusts in these staff groups are explained by trust and job characteristics that are not correlated with the region, type or size of each trust.

1. Introduction

The NHS is highly dependent on the staff it employs to deliver health-care services. More doctors, nurses and health-care assistants (HCAs) mean that the NHS can deliver more, and higher-quality, care. Staff shortages also risk increasing waiting times for emergency departments and elective care, and may have implications for patient outcomes (NHS Confederation, 2022). Staff leaving the NHS also disrupts the continuity of care delivered to patients, reducing the chance to build rapport between patients and staff. Ensuring an adequate supply of highly skilled staff is therefore essential in providing high-quality care to patients.

Increasing staff numbers has been an important focus of recent policy. For example, the 2019 Conservative manifesto pledged to increase the number of NHS nurses by 50,000 by 2024.¹ However, hiring new staff is only part of the solution to increasing staff numbers: there are long training pathways and only a limited supply of available staff who can be hired from abroad. Overall staff numbers cannot be maintained or increased if current staff do not remain. Retaining existing staff, and their accumulated skills and experience, is therefore crucial to ensure a well-functioning NHS.

Despite this importance, understanding of what drives retention remains incomplete. The retention of NHS staff is a complex issue, with staff choosing to leave the NHS for many reasons. This includes – but is not limited to – retirement, ill-health, family reasons, unhappiness with working conditions, better outside alternatives, lack of progression and the desire to change career. Some of these reasons are directly amenable to policy changes, but many are not. Better understanding of which factors are associated with individual leaving decisions is therefore important in identifying where policy could improve retention rates, and in identifying groups of staff who are most likely to leave the NHS in the short term.

This report examines a range of factors that are plausibly associated with the retention of NHS staff in the acute sector, in order to further build the evidence base on the retention of NHS staff (e.g. Buchan et al., 2019; Bimpong et al., 2020).² We focus upon the acute sector as it is the largest part of the hospital sector, with the majority (74.6%) of staff directly employed by the

¹ <https://www.gov.uk/government/publications/50000-nurses-programme-delivery-update>

² For a survey of the literature related to retention factors for nursing across a broader range of settings, see Hayes et al. (2012).

NHS (i.e. NHS employees excluding those in contracted-out services and GP practices) between 2012 and 2021.

We study the retention of three of the largest staffing groups directly providing care in the NHS acute sector: consultants, nurses and midwives, and HCAs.³ For each of these groups, we examine the association between monthly leaving rates and three sets of factors: individual characteristics, local economic conditions and attributes of the trust in which they are employed. Our analysis examines the association between individual leaving decisions and each of these characteristics, holding constant all of the other factors.

Our main data source is the Electronic Staff Record (ESR), which is the monthly payroll for all staff directly employed by the NHS. This includes all NHS trusts but does not include those employed in primary care. These data allow us to track the careers of most NHS staff over the period between April 2012 and May 2021, and includes detailed information on pay, hours worked, demographic characteristics and job characteristics. The period does cover the first 15 months of the pandemic, but the focus of the report is on the longer-term associations of factors with retention and does not explicitly consider the effect of the pandemic. Many of the factors we use in our analysis are generated from the ESR, but we also use a range of other data sources, including NHS performance measures, the NHS Staff Survey and Office for National Statistics (ONS) regional labour market statistics.

The ESR allows us to conduct our analysis at the individual level. Rather than studying the average retention rates of different trusts over time, we study the factors associated with an individual staff member deciding to leave the NHS acute sector. This allows us to consider the impacts of individual characteristics, such as age or sickness absences, alongside the characteristics of the trust and region that each individual works in. This work contributes to the ongoing work of NHS England and NHS Improvement, and the Department of Health and Social Care to understand NHS staff retention.

The analysis in this report should be viewed as a useful step towards better understanding of what drives retention, but not the final answer. We estimate the associations between different factors and retention, but this does not determine which factors *cause* staff retention to be higher or lower. However, our analysis does highlight which factors are correlated with retention and which are not; this can help guide future research in this area in order to better understand the causal links between these factors and retention. Our research may also potentially identify the

³ Nurses and midwives are defined in the ESR as a single staff group, and we do not attempt to separately analyse their leaving decisions in this report. The factors that are associated with leaving decisions may vary between these groups. Exploring these differences would be an important area to focus on in future research.

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groups of staff that are particularly at risk of leaving the NHS, and who may be most amenable to trust-level retention interventions.

The rest of the report is organised as follows. In Chapter 2, we introduce the ESR, define our measures of retention and introduce the different factors we consider as potentially associated with leaving decisions. In Chapter 3, we analyse the variation in average staff leaving rates at the trust level, and examine what share of the trust-level variation in leaving rates can be explained by the factors that we study. In Chapter 4, we conduct our main analysis, analysing the relationship between our factors and individual leaving decisions. In Chapter 5, we analyse the persistent differences in retention between trusts that are not explained by the other factors we consider, examining how these vary across trust location, type and size. We conclude in Chapter 6.

2. Data and factors considered

2.1 The Electronic Staff Record

The main data source for our analysis is the ESR, which is the monthly payroll for all staff directly employed by the NHS. It includes all staff directly contracted to NHS organisations but does not include staff in primary care, such as GPs, or staff in contracted-out services, such as porters or cleaners in some hospitals.

We use data for the period between April 2012 and May 2021, enabling us to track individual staff members as they join and leave direct NHS employment over a period of nine years.⁴ Our sample period includes the first 15 months of the COVID-19 pandemic, but we do not focus on the specific impacts of the pandemic on the retention of NHS staff. Importantly, in all cases the data are pseudonymised. This means that names and identifying information (such as addresses or National Insurance numbers) are removed from the data, with staff identified over time only by unique codes that do not reveal their identity.

Each month, the ESR records the hours and pay of each individual staff member. It provides information on both contracted and worked hours, grade and pay band, and a detailed breakdown of basic pay and any additional payments from other sources (such as bank work, geographic allowances and performance-related pay). The data also record a range of demographic and job characteristics for each staff member. Demographic characteristics include age, gender and self-reported ethnicity. Job characteristics include the trust in which they are employed, start date at the trust, job role and any absences.

We focus on the retention of three different staff groups, and study the factors associated with their retention separately. In the primary analysis, these groups are consultants, nurses and midwives, and HCAs employed by acute trusts. These groups are defined using staff groups and pay codes recorded in the ESR. Further details on how we define each of these staff groups are contained in the Technical Appendix A. In Appendix B, we also repeat our analysis for smaller groups of the nurses and midwives staff group based on seniority.⁵

⁴ We use data from February to March 2012, as well as from June to August 2021 to compute our definition of leaving, but our analysis only considers those who we classify as leaving between April 2012 and May 2021.

⁵ In Appendix B, we split staff by pay band (Band 5, and Band 6 and above). We do not separately study nurses and midwives.

2.2 Defining retention

The outcome of interest is whether a staff member leaves the NHS acute sector in a given month. We define a staff member as leaving the acute sector if they are no longer employed by an acute trust. This includes both staff who move to another NHS organisation – such as a GP practice or community trust – and those who leave the NHS entirely. Movements between NHS trusts within the acute sector, however, are not classified as leaving, because the staff member remains in the acute sector. We focus on leaving the acute sector, rather than decisions to move between trusts within the sector, because the size of the acute workforce is a key determinant of the amount of hospital care that the NHS can deliver.⁶

More specifically, we define a staff member as leaving the acute sector if they have worked for at least three months in the acute sector, and do not receive any pay from any NHS acute trusts in the subsequent three months. We use a three-month work and leaving requirement in our definition because it is relatively common for staff to leave for a month or two and to then return to their original trust. Our focus is on more permanent decisions to leave the acute sector and so we do not want to include these temporary leaving spells. If we define our measure of leaving using a longer time period, however, we risk missing those that genuinely left the NHS for a meaningful period of time. We therefore chose three months as a mid-point to balance the risk of both under-counting and over-counting leavers. In Appendix B, we consider how our results vary when we define retention using a longer or shorter period.

This definition of leaving differs from the standard definition used within the NHS, where a staff member is defined as leaving if they are not present in the ESR in the current month and they were present 12 months ago. This allows us to consider shorter-term leavers – particularly important when we consider monthly leaving rates – and to use a longer sample period. However, as a result, our estimates of leaving rates may differ from official statistics.

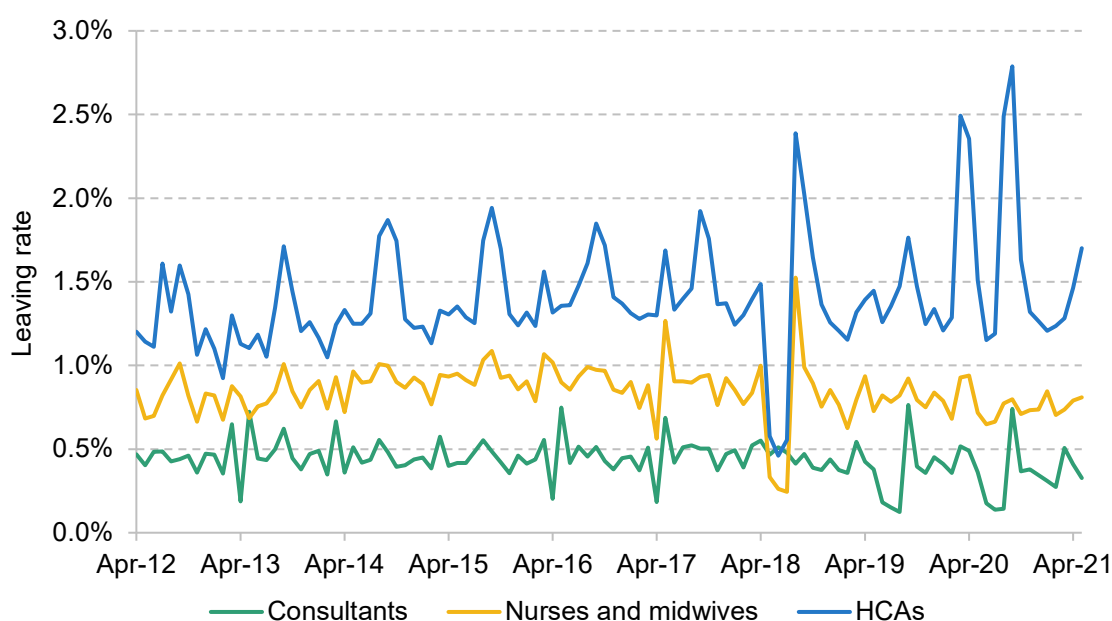
Our definition of retention uses total pay, which means that staff taking paid maternity leave are not classified as leaving, but those taking solely unpaid maternity leave or other forms of unpaid leave for at least three payroll months are classified as leaving. We define the month of leaving as the last month of work in the acute sector, rather than the first month not in the acute sector. More details on this definition, and several examples, are included in the Technical Appendix A.

⁶ The ESR includes non-acute NHS trusts, such as community and mental health trusts, and so we can follow those who move from acute to non-acute trusts. However, the ESR does not include primary care, and there is no equivalent data set. This means we cannot track those who move into the primary care sector. As the acute sector is the largest part of the hospital sector, we focus on retention within the acute sector throughout this report. Preliminary analysis suggests that the patterns observed among staff in these sectors are broadly similar to those documented here but further investigation should be a priority to better understand retention patterns in other parts of the NHS.

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Figure 2.1 shows the monthly leaving rate for our three staff groups of interest across all acute trusts in England between April 2012 and May 2021. This shows that while there is clear seasonality in leaving rates within each year, leaving rates have remained relatively constant over the entire period. Over the nine-year period, average leaving rates were lowest for consultants, at 0.4% per month. Leaving rates were higher for nurses and midwives at an average of 0.8% per month, and highest for HCAs at 1.2% per month.

Figure 2.1. Monthly national staff leaving rate, 2012–21



In several months – such as in May to August 2018 – there are large spikes in our measure of leaving. These occur due to backpay arising from pay settlements during these periods: staff are recorded as receiving pay beyond the period in which they actually work in the NHS acute sector, artificially reducing the numbers of ‘leavers’ in a given month, and then subsequently inflating the number of leavers in the following month. We do not believe these reflect genuine changes in staff behaviour, and therefore we exclude these months from our sample period in the analysis below.⁷

⁷ We exclude May to August 2018 for nurses and HCAs, and June to September 2019 and 2020 for consultants.

2.3 Factors potentially associated with retention

In our analysis we consider a number of factors that may be associated with retention. These factors can be split into three groups: individual characteristics, local economic conditions and trust characteristics. Some staff members work for multiple NHS trusts, and so each individual is assigned a unique primary trust, defined as the trust where they regularly work the most hours. Trust characteristics relate to the primary trust of each individual. Local economic conditions relate to the area where the primary NHS trust is located, rather than the region where the staff member lives.

Table 2.1 summarises the different factors we consider. Factors were chosen based on several criteria. The first criterion is whether we can measure the factor using the ESR or another data source. Many factors we might consider relevant, such as the workplace culture of a trust or the quality of life in a local area are more difficult to directly measure. Where possible, we use other sources such as the NHS Staff Survey to proxy for these characteristics.

The second criterion is whether the factor may reasonably be expected to be associated with retention. We held a number of useful discussions with NHS England, Health Education England and the Department of Health and Social Care to determine which factors would be included in our final model. As discussed in more detail below, in several cases these factors could not be used for all staff groups or for our whole sample period. More details on how each factor is computed are included in Technical Appendix A.

Table 2.1. Factors considered

Individual characteristics	Local economic conditions	Trust characteristics
Age	Regional unemployment	Sickness rates [†]
Tenure at the trust	Local house prices	Negative reasons for leaving
Gender		Waiting list performance
Nationality		Bed occupancy
Sickness absences [†]		Staff leaving rate
		Staff Survey results*

Note: † We only use sickness absences and rates for consultants and for nurses and midwives, due to a lack of available data on the sickness absences of other staff groups. *We only use Staff Survey results in a separate model because of changes to the relevant Staff Survey questions over time.

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All individual characteristics are calculated using the ESR, as are some trust characteristics. These include trust-wide sickness rates, leaving rates, and the rate of staff leaving for a ‘negative reason’, defined as leaving the NHS due to death in service, retirement due to ill health and voluntary resignations because of: better reward packages elsewhere, health problems, incompatible work relationships, lack of opportunities and work–life balance challenges. In addition to the ESR, we make use of a number of publicly available data sources. Both measures of local economic conditions (i.e. regional unemployment and local house prices) are based on data published by the ONS (2022a, b). We also use NHS England data for hospital waiting list performance and bed occupancy (NHS England, 2022a, b).

A final important data source is the NHS Staff Survey (NHS Staff Survey Coordination Centre, 2020, 2022). The Staff Survey is an annual survey of NHS staff, which is conducted each autumn. The survey is a repeated cross-section (the responses of staff members are not linked over time) and offers a snapshot of respondents’ experiences at work. All NHS trusts are required to take part in the Staff Survey, and on average just under half of those staff eligible complete the survey. Only those employed by the trust on 1 September can be included in that year’s survey. The survey asks how respondents feel about their job, their team, their organisation, their managers, and their own health and well-being at work.

The survey has run since 2003, but the questions change over time. We therefore only use the period between 2016 and 2020, when many of the questions are consistent. We use the average responses for each staff group separately, and aggregate sets of questions within each theme of the survey.⁸

⁸ <https://www.nhsstaffsurveys.com/results/national-results/>

3. Variation in staff retention

In this chapter, we set out how leaving rates vary across regions and across trusts, before turning to an analysis of the role of different factors at the individual level in Chapter 4. We first show that there are large differences in the average leaving rates between regions of England for each of the staff groups. We then examine the distribution of average leaving rates across trusts for the entire period, and analyse how much of the trust-level variation can be explained by the factors that we include in our model.

3.1 Regional variation

Figure 3.1 shows the average leaver rate in 2012–21 by region and staff group. This shows considerable variation in the leaver rate within each staff group across different parts of England. HCA monthly leaver rates were almost 80% higher in the South East (1.78%) than in the North East (1.03%). Nurse and midwife leaver rates were highest in Greater London (0.96%) and were again lowest in the North East (0.62%). Consultant leaver rates were much lower, and also varied less, ranging from 0.48% in the North West to 0.39% in the North East.

The figure also highlights the relationship between the leaver rates of different staff groups within the same regions. Regions with a higher leaver rate among nurses and midwives also typically had a higher HCA leaver rate: for example, nurse and midwife and HCA leaver rates were highest in the South East, South West and London, and lowest in the North East. In contrast, the correlation between leaver rates for consultants and other staff groups in the area was much weaker. A clear outlier is the North East, which had the lowest leaving rates for all three staff groups.

However, in addition to the variation across regions, there were substantial differences in the leaving rates across trusts even within the same region. This is illustrated by Figure 3.2, which shows the distribution of average monthly leaving rates for nurses and midwives across all trusts in each region. While the average level varies across regions, the variation within each region is clear. For example, even in the North East, which had the lowest average leaving rate of any region (0.62%), average trust leaving rates for nurses and midwives ranged from 0.55% to 0.75%. For Greater London, the region with average highest leaving rate for nurses and midwives (0.96%), the average trust leaving rate ranged from 0.71% to 1.24%. Similar patterns are found for consultants and HCAs. We therefore now turn to examining the variation across trusts in more detail for each staff group.

Figure 3.1. Average staff leaving rates in 2012–21 by region

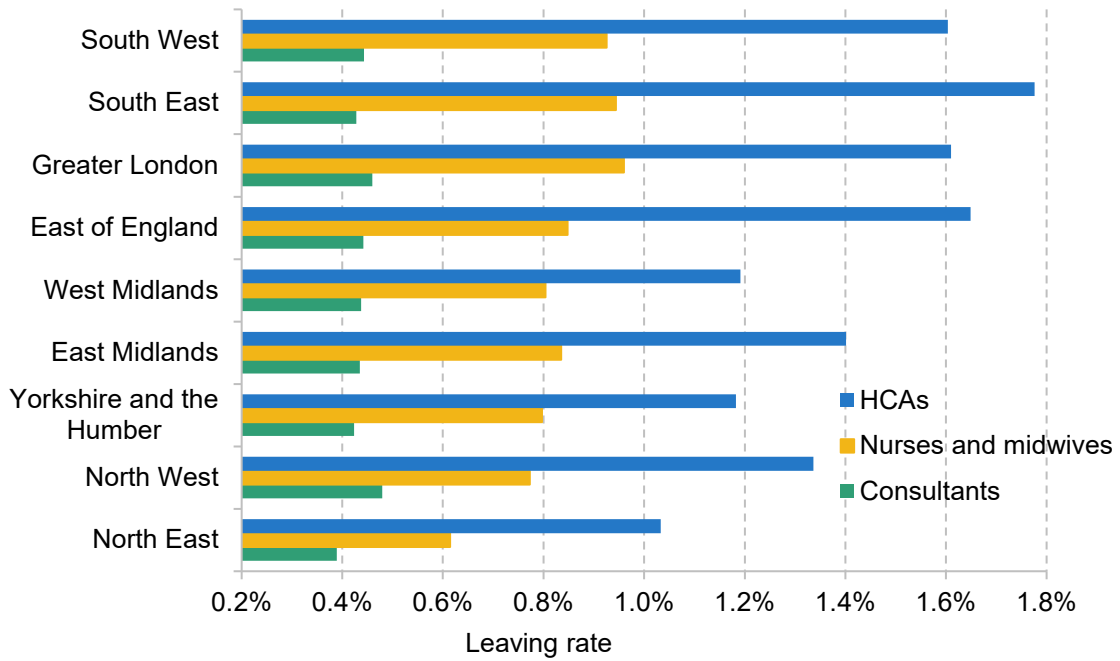
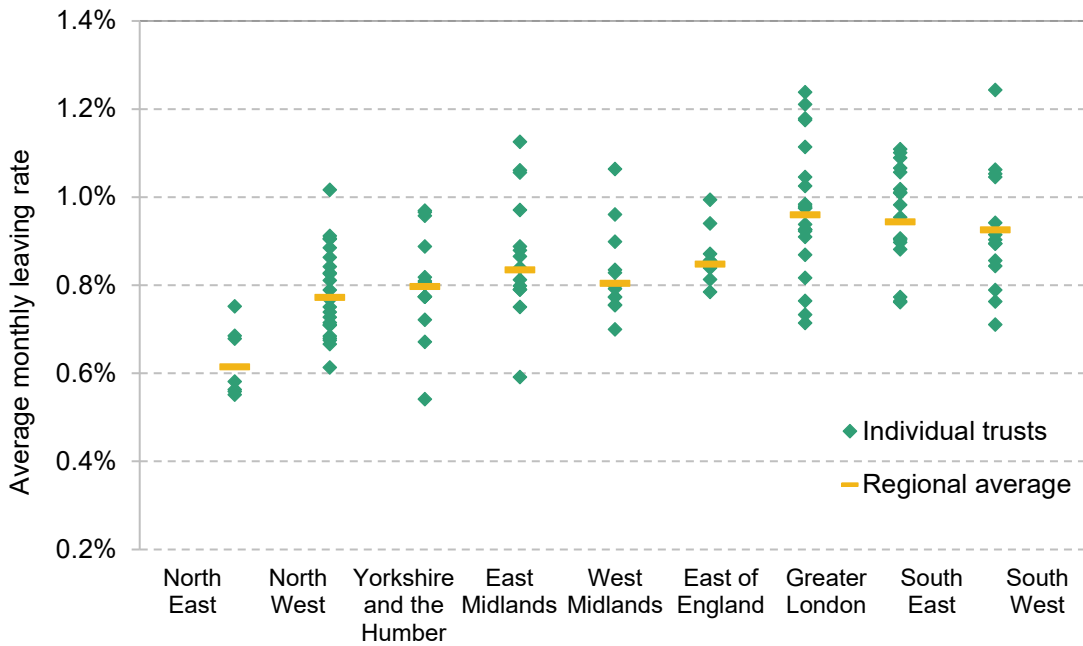


Figure 3.2. Average trust leaving rates for nurses and midwives by region



3.3 Trust-level variation

Figure 3.3 shows the average monthly consultant leaving rate between 2012 and 2021 for each acute trust in our sample. Most trusts had relatively similar leaving rates, with 79% of trusts having an average leaving rate between 0.35% and 0.55%. However, some trusts had either much higher or lower leaving rates: for example, the lowest average leaving rate for a single trust over the entire period was just 0.18%, while the highest was more than seven times higher, at 1.29%.

Figure 3.3. Distribution of average consultant leaving rate in 2012–21 by trust

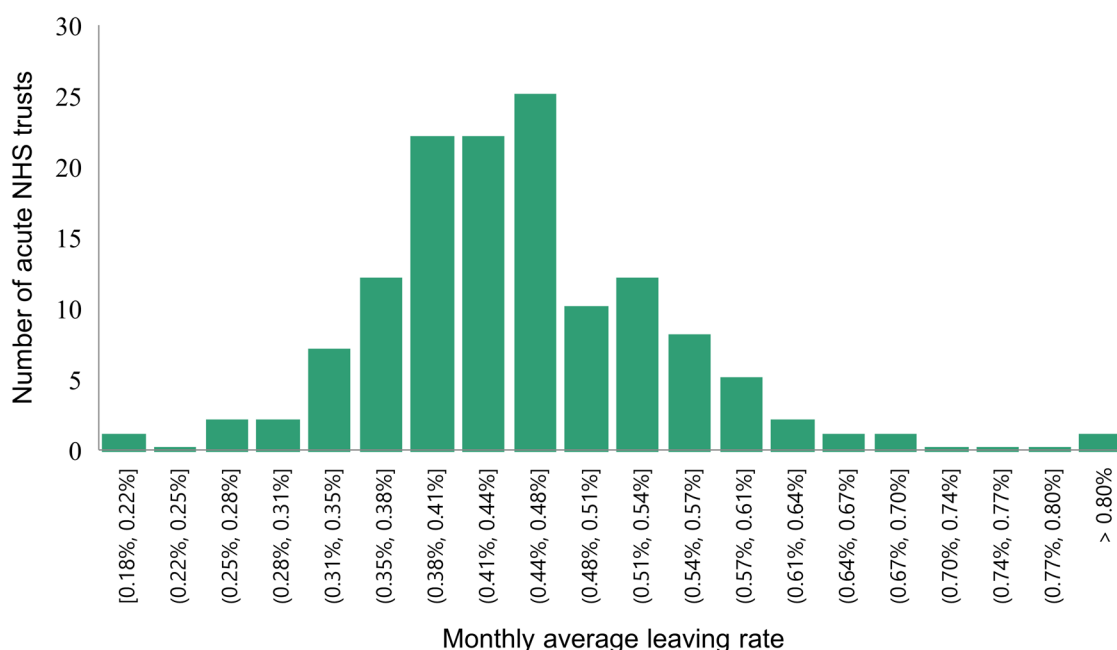


Figure 3.4 repeats this analysis for the average nurse and midwife leaving rates. The range of leaving rates was wider than for consultants, with 80% of trusts having leaving rates between 0.69% and 1.06%. The highest leaving rate was 1.24% while the lowest leaving rate was 0.54%. Consistent with the regional variation shown in Figure 3.1, four of the five trusts with the highest leaving rates were located in London, while four of the five trusts with the lowest leaving rates were located in the North East.

Figure 3.5 repeats this analysis for HCAs. This shows that the range of HCA leaving rates across trusts was much larger than for consultants and nurses and midwives: the middle 80% of trusts had leaving rates between 0.92% and 2.04%. The best performing trust had a leaving rate of just 0.49%, while the trust with the highest leaving rate had a leaving rate more than nine times higher (4.50%).

Figure 3.4. Distribution of average nurse and midwife leaving rate 2012–21 by trust

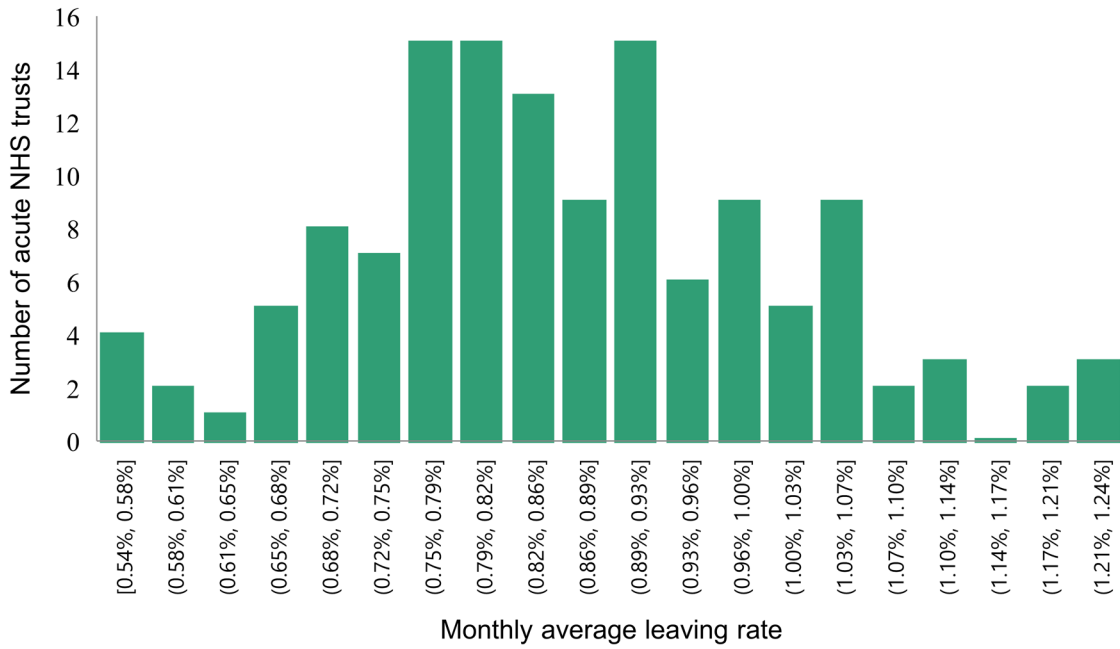
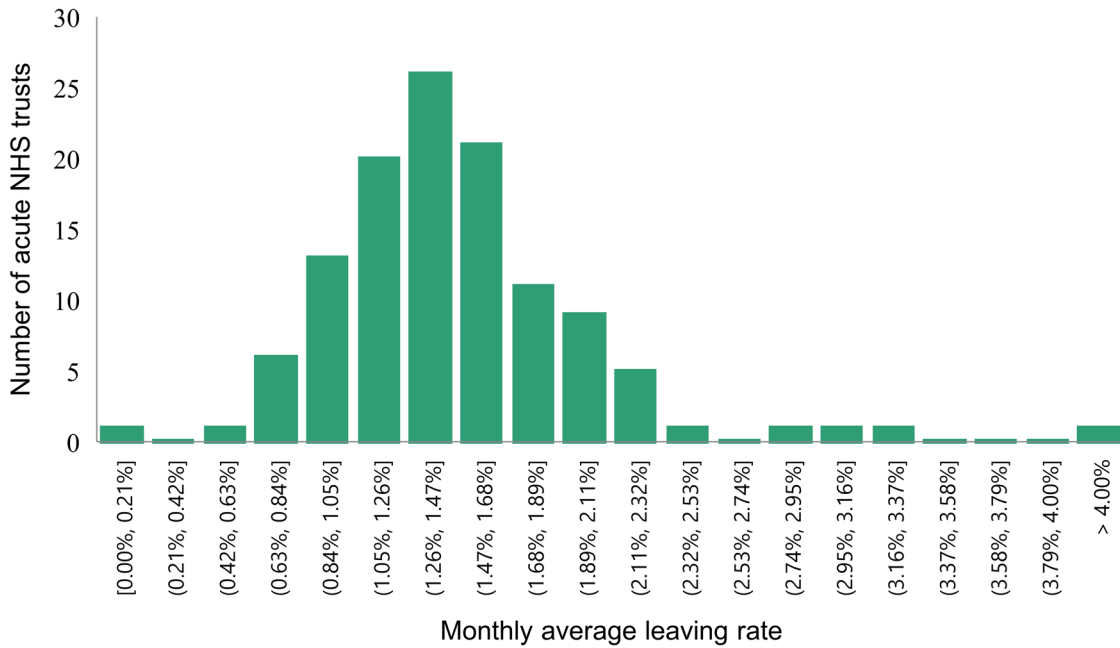


Figure 3.5. Distribution of average HCA leaving rate 2012–21 by trust



Note: Trusts with fewer than 1,000 HCAs employed during this period are excluded.

The substantial differences in the average leaving rates between different trusts raise the question of what explains this variation. Table 3.1 shows the percentage of variation in trust-level leaver rates that are explained by all of our factors combined. This includes trust and time-period ‘fixed effects’, which we discuss in more detail in the next chapter; these capture persistent differences in leaving rates between different trusts, and national changes in retention over time. Importantly, this does not necessarily mean that our factors are causally linked to leaving rates – for example, the associations between different variables could be explained by other alternative factors that we do not observe – but it provides a sense of how much of the difference in trust leaver rates could plausibly be linked to these factors.

Table 3.1. Percentage of variation in trust-level leaver rates explained by our factors

Staff group	Percentage of explained variation
Consultants	11.00%
Nurses and midwives	21.34%
Health-care assistants	14.56%

Note: Individual characteristics are aggregated to the trust level by taking their averages. Percentage of explained variation reports the R^2 from each staff group regression when including all of the factors in Table 2.1, in addition to time and trust fixed effects.

For consultants, our factors explain 11% of the total variation in trust-level leaving rates. For nurses and midwives, and HCAs, our factors do a somewhat better job: together they explain 21% and 15% of the total variation in leaving rates, respectively. But for all three staff groups, the majority of the variation in leaving rates is not explained by the factors we consider in our analysis.

In Table B.1 in Appendix B, we estimate the relative importance of different groups of these factors in explaining the total variation in trust-level leaving rates. When we just include average demographic characteristics (i.e. the basic staff characteristics included in the ESR), we explain 0.7% of the total variation for consultants, 4.0% for nurses and midwives and 2.8% for HCAs. If we also include average sickness absences, economic conditions and trust characteristics, we increase the total variation explained by 0.5% for consultants, 1.2% for nurses and midwives and 1.9% for HCAs. This suggests that for all three staff groups, adding these additional factors explains little of the variation over and above that explained by demographics.⁹

⁹ The order in which the variables are added to the analysis affects the relative gains in explained variance: for example, if sickness absence rates are closely correlated with age, then much of the explained variation in leaving rates across trusts with different sickness absence rates will already be assigned to age. This exercise should be interpreted as answering the question: ‘how much additional variance could be explained if we started with a basis model which just includes average demographic characteristics and added different variables in a given order?’

However, including national time trends (measured by the inclusion of time fixed effects) increases the total variation explained by 6.1%, 11.7% and 5.5%, respectively. This suggests that national policy and labour market changes are very important determinants of leaving rates, particularly for nurses and midwives. Including trust persistent differences increases the total variation explained by a further 3.7% for consultants, 4.4% for nurses and midwives and 4.4% for HCAs.¹⁰ This suggests that persistent differences between trusts are also important drivers of retention, and explain more of the total variation than demographic differences. We examine these persistent differences in much more detail in Chapter 5.

In Table B.2 in Appendix B, we repeat this decomposition at the annual rather than monthly level. The total percentage of variation in leaving rates that we can explain is much larger at the annual level, ranging from 45.2% for consultants to 63.9% for nurses and midwives. This suggests that it is easier to predict retention at the annual rather than monthly level. This is in part because the persistent differences between trusts explain much more variation when there are far fewer observations for each trust. However, the percentage of variation explained by our other factors is also much higher: for example, for nurses and midwives, at the annual level, average demographics explain 22.4% of the variation in leaving rates between trusts. The relative importance of factors remains the same as our monthly analysis: demographics and persistent differences between trusts are the two most important factors for understanding differences in retention between trusts.

The remaining variation in leaving rates is explained by factors outside of our model. One source of variation is factors relating to trusts and jobs that we cannot directly measure. For example, the behaviour and quality of individual line managers is likely an important determinant of whether staff decide to leave the acute sector, but this is not something we can observe in our data. Variation in individual situations will also drive variation in leaving rates: for example, differences in the birth dates of staff will influence the months that staff retire, and differences in personal circumstances will determine when and whether staff members decide to leave the NHS for family reasons.

It is important to remember, therefore, that although we will find in Chapter 4 that many of the factors we consider are significantly associated with leaving decisions, the majority of variation in leaving rates remains unexplained. This reflects the complexity of leaving decisions, and the many different factors that determine whether staff members decide to leave the NHS.

¹⁰ In Table B.1 we consider the role of regional persistent differences first, and then the role of trust persistent differences. In our main analysis, trust persistent differences include persistent differences between regions, as each trust lies within a single region. Therefore, here we calculate the increase in total variation explained by trust persistent differences as the sum of the regional and trust persistent differences in Table B.1.

4. What factors are associated with individual retention?

4.1 Methodology

The previous chapter showed considerable variation in leaving rates across regions and trusts. We now turn to examining how a range of different factors are associated with the leaving decisions of individual staff members in each of the three staff groups. Carrying out this exercise at the individual level allows us to examine the potential importance of both individual-level and trust-level factors in individual decisions. This also allows us to identify the groups of staff members that are particularly at risk of leaving the NHS, as well as to identify trusts with higher leaving rates than we would expect based on their observed characteristics.

To estimate the association of each factor discussed in Section 2.3 with the probability of leaving the acute sector, we use multivariate regression. More details on the methodology are contained in Technical Appendix A. Our outcome variable is whether the given staff member leaves the acute sector in that month, as defined in Section 2.2.

Our estimates measure the percentage point increase in the probability of leaving associated with each factor, holding all other factors in the multivariate regression constant. We can then transform these estimates into percentage changes in the probability of leaving relative to the average leaving rate. For example, suppose that the estimated effect of having a tenure of 0–2 years at a trust is 0.3. This means that someone with a tenure of 0–2 years is 0.3 percentage points more likely to leave the acute sector in a given month than those in the comparison group. If the average monthly leaving rate is 1.5%, then the estimated effect of having a tenure at a trust of less than two years is equivalent to a 20% (0.3 divided by 1.5) increase in the probability of leaving relative to the average leaving rate.

Multivariate regression estimates the association of the leaving rate with each factor while holding all other factors constant. This is important to keep in mind when interpreting the associations of different factors. For example, our analysis includes age and nationality groups. It may be that EU staff are younger on average than British staff. The estimated association with nationality, however, compares EU and British staff members of the same age group and so is not affected by any difference in average age. Similarly, in a sub-model we include different themes from the Staff Survey. The estimated association for each theme compares trusts with

different scores on that theme, but with the same scores on all the other themes (and the same values for all other factors).

When examining local economic conditions, and for most of the trust characteristics, we lag factors by three months. This means that we study the association between whether a staff member leaves in the current month with the level of these factors three months ago. This is to reflect the delay between deciding to leave the acute sector and actually leaving the acute sector, due to notice periods and the time needed to find a new job.

Local economic conditions and trust characteristics are recorded in a variety of different units (for example, percentage unemployed and local house prices in pounds (£)). To simplify the interpretation and comparison of the results for each factor, we standardise the units they are measured in. This means that if one factor has a larger estimated coefficient than another, it has a larger association with leaving than the other factor. Technical Appendix A includes more details on how each factor is standardised. The estimated associations are then transformed (multiplied by 100) so that one unit represents a one percentage point change in the probability of leaving.

There are many factors that we do not observe but are important for retention. To partially resolve this problem, we include trust and time period fixed effects in our regression model. Trust fixed effects account for unobserved (to the researchers) factors that differ between trusts, but do not change over time. For example, the trust fixed effects may absorb the effects of culture at a trust, or the living quality of the local area, both factors that may take a long time to change and can therefore be considered ‘fixed’ in the short run. Time period fixed effects account for unobserved factors that change over time but are the same at all trusts. For example, the period fixed effects may absorb the effects of national policy changes or changes in the national labour market. In Chapter 5, we analyse the trust fixed effects directly to consider what they can tell us about the importance of these persistent factors even if we cannot measure them directly.

An important caveat when interpreting our results is that the estimated effects of factors are associations and not necessarily causal relationships. For example, we will find that higher staff engagement is associated with a lower probability of leaving the acute sector for nurses and midwives, but this does not necessarily mean that higher engagement *causes* a higher retention rate. Our estimated associations could reflect true causal effects – where better engagement reduces exits – but could also reflect reverse causality (where fewer exits improve staff engagement) or be driven by other factors that we do not observe (such as management quality, which may improve both staff engagement and reduce leaving rates). For this reason, our estimates should be interpreted as associations rather than causal effects. This is even true in cases where the associations are particularly strong. This means that changing any of the factors

does not necessarily mean that retention will change in the direction of our associations. In addition, even if our estimated relationships were causal, the analysis does not reveal the exact mechanisms through which these factors influence retention. They instead act as a guide as to where policy interventions – supported by further research – may be effective.

A final caveat is that although we estimate some factors to have a statistically significant relationship with individual leaving decisions, it is possible these are driven by random noise, rather than representing a true relationship, because we are considering a wide range of different factors. In particular, if we considered ten factors that had no *true* relationship with retention, on average we would estimate that one had a relationship with retention at the 10% significance level. This is particularly likely to be the case if the estimated relationship is in an unexpected direction.

4.2 Individual characteristics

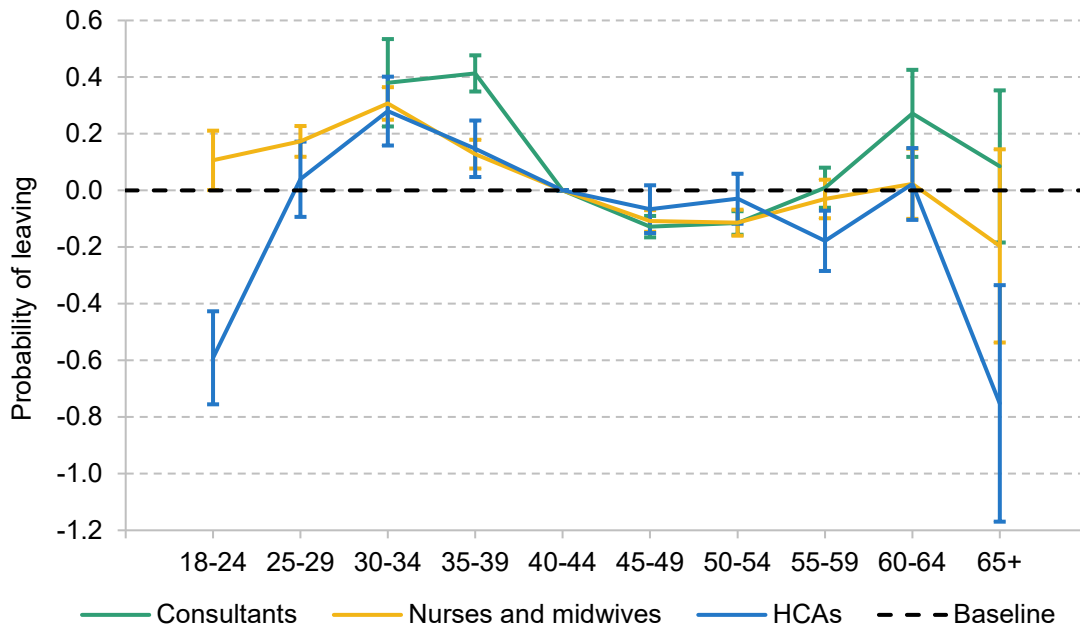
We first consider the association between exits from the acute sector and the individual characteristics of staff. These characteristics include those listed in column one of Table 2.1.

Figures 4.1 and 4.2 show how the probability of leaving changes with age for female and male staff, respectively, while holding all other factors constant. In each case, we use those aged 40–44 as the base group. This means that the estimated probability of leaving for each age group is estimated relative to this group.

Figure 4.1 shows that the probability of leaving the acute sector peaks early in life for female staff in all of our staff groups. For female consultants, the probability of leaving was highest for those aged 35–39: staff members in this age group were 0.4 percentage points more likely to leave the acute sector in a given month than those aged 40–44. For female nurses and midwives, and HCAs, it was highest for those aged 30–34. This is likely, at least in part, driven by maternity behaviour: the estimated leaving rate does not include those on paid maternity leave, as they will still be paid, but it does include those taking unpaid maternity leave of three payroll months or more, and those who leave before they have children.¹¹ Table B.17 in Appendix B shows that this is driven by those leaving the acute sector for less than a year, which supports this interpretation and suggests that many parents return relatively quickly to the sector.

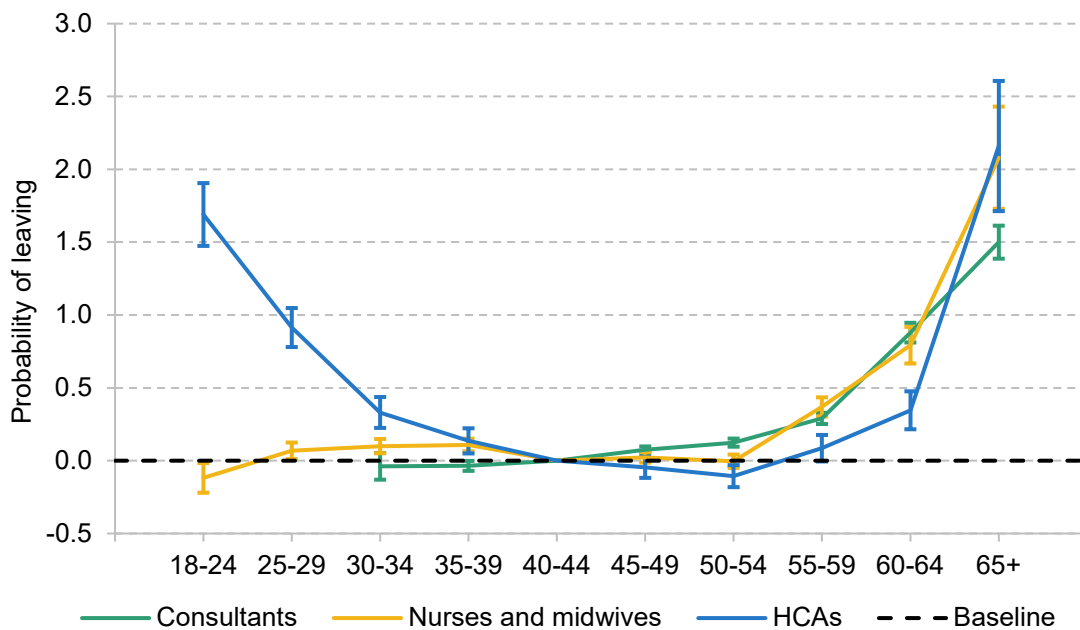
¹¹ We do not study movements from full-time to part-time work, which are likely to vary by age groups and are also related to maternity behaviour. See Kelly and Stockton (2022) for details on how post-maternity-leave labour supply varies across staff groups and trusts.

Figure 4.1. Probability of leaving the acute sector each month by age, female staff



Note: Each series includes 95% confidence intervals. All probabilities are relative to women aged 40–44. Regressions include all other factors in Table 2.1, trust fixed effects and time period fixed effects.

Figure 4.2. Probability of leaving the acute sector each month by age, male staff



Note: Each series includes 95% confidence intervals. All probabilities relative to men aged 40–44. Regressions include all other factors in Table 2.1, trust fixed effects and time period fixed effects.

For all three staff groups, leaving rates between ages 45 and 49 were similar or slightly lower than women in the same staff group aged 40–44. After age 60, leaving rates remained at approximately the same levels for nurses, increased for consultants, and fell for HCAs. Female nurses and midwives aged under 30 were slightly more likely to leave the acute sector than those aged 40–44. In contrast, HCAs aged between 18 and 24 were around 0.6 percentage points less likely to leave than those aged 40–44.

Comparing Figure 4.1 with Figure 4.2 reveals substantial differences in the patterns of leaving by age between female and male members of staff. Figure 4.2 shows that for male consultants, and nurses and midwives, the probability of leaving was essentially constant with age for those aged 18–49 – in contrast to the higher leaving rates among female nurses and midwives, and doctors in their 30s. It then rose rapidly for both groups, peaking for those aged 65 and above. For male HCAs, we see a different pattern. Those aged 18–24 were much more likely to leave the sector than those aged 40–44, and the probability of leaving declined with age all the way up to those aged 50–54. The probability of leaving then rose with age, as it did for male nurses and midwives, and consultants.

Figure 4.3 shows how the probability of leaving changed with tenure at the current trust. In this case, those with tenure of 5–10 years are the base group, and all probabilities of leaving are estimated relative to this group. For all three staff groups, the pattern is very similar: for the first 20 years, those with a longer tenure at a given trust were less likely to leave the acute sector in the next month than those with lower tenure. In particular, the probability of leaving was much higher among those with very short tenure (i.e. those with less than two years' experience at the trust). HCAs with a tenure of less than two years were 0.7 percentage points more likely to leave than an HCA who had worked at the trust between five and ten years, holding all else constant. The equivalent differences were 0.5 and 0.3 percentage points for consultants and nurses and midwives in this age group, respectively.

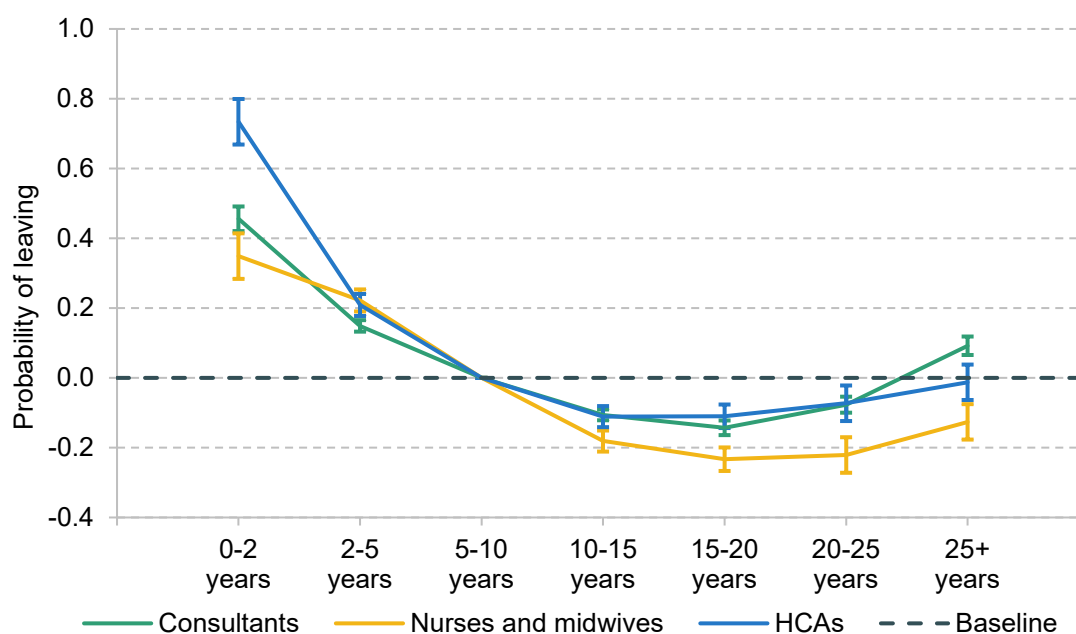
The association between short tenure and a high probability of leaving the acute sector could be driven by several different mechanisms. Staff members with short tenure really comprise two separate groups: those who are new to the NHS acute sector, and those who have recently moved from another acute trust. These two groups likely have different reasons for leaving the acute sector. For example, it could be that staff who have recently moved from another trust have higher leaving rates because staff try moving to another trust before they decide to leave the sector.

In an additional regression, we separate these two groups of low-tenure staff by including an indicator for whether the staff member was working for another trust six months ago. This captures those who have recently moved trusts, but not those who are new to the acute sector. For consultants, and nurses and midwives, we find that those who had recently moved were

significantly less likely to leave the acute sector. Table B.3 in Appendix B presents the results. For consultants, being a recent mover was associated with a 0.3 percentage point reduction in the probability of leaving, equivalent to a 74% reduction. For nurses and midwives, being a recent mover was associated with a 0.6 percentage point reduction in the probability of leaving, equivalent to a 72% reduction. For HCAs, there was no significant association between recently moving trust and leaving, suggesting recent movers have the same leaving rates as those who have not recently moved.

Figure 4.3 also shows that once tenure has exceeded 20 years, an increase in tenure was then associated with a small increase in the probability of leaving the sector, but only for consultants did it ever rise above the probability of leaving for the base group of those with 5–10 years tenure. Importantly, because we also include age in our regressions, these results estimate the association between leaving decisions and tenure, holding age constant. These patterns therefore do not simply reflect changing labour supply decisions as staff members age.

Figure 4.3. Probability of leaving the acute sector each month by tenure



Note: Each series includes 95% confidence intervals. All probabilities relative to staff with 5–10 years tenure. Regressions include all other factors in Table 2.1, trust fixed effects and time period fixed effects.

In an additional regression, we also split the effects of tenure by gender. Tables B.4 and B.5 in Appendix B summarise the results. The largest difference by gender is that the high leaving probability for those with low tenure was driven by male rather than female staff, for all three of our staff groups. For example, a male nurse or midwife with tenure of less than two years was 0.5 percentage points more likely to leave the acute sector, while a female nurse or midwife with less than two years tenure was 0.1 percentage points less likely to leave.

Table 4.1 shows the differences in leaving rates by gender. In this case, male staff members are the reference group, and so the estimated associations for female staff members measure the probability of leaving relative to male staff, holding all else equal.

Table 4.1. Probability of leaving the acute sector each month by gender

	Consultants	Nurses and midwives	Health-care assistants
Male	0	0	0
	(.)	(.)	(.)
Female	0.0982***	-0.0539***	0.0597
	(0.0169)	(0.0185)	(0.0382)

Note: Standard errors clustered at the trust level are displayed in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. All probabilities are relative to male staff. Regressions include all other factors in Table 2.1, trust fixed effects and time period fixed effects.

The table shows that differences in retention rates across gender varied by staff groups. For consultants and HCAs, female staff were more likely to leave the acute sector in a given month. For consultants, female staff were 0.1 percentage points more likely to leave. This is equivalent to a 23% higher leaving probability relative to the average leaving rate (0.4%). Female HCAs were 0.06 percentage points more likely to leave the acute sector, equivalent to a 5% higher leaving probability. However, this is not statistically significant. By contrast, female nurses and midwives were less likely to leave than their male counterparts: female nurses and midwives were 0.05 percentage points less likely to leave the acute sector, equivalent to a 7% lower leaving probability.

Table 4.2 shows differences in the leaving probability by self-declared nationality.¹² This presents how the probability of leaving in a given month compares to British staff for individuals from the EU/EEA, and from other countries. The table shows very different patterns across staff groups. For consultants, both EU and non-EU consultants were substantially more likely to leave the acute sector than their British counterparts. These differences are large: in a given month, an EU consultant was 0.24 percentage points more likely to leave the acute sector, equivalent to a 56% increase over the average leaving rate. For non-EU consultants, the increase was equivalent to a 23% higher leaving rate each month.

¹² Self-declared nationality is recorded contemporaneously for each assignment in each month in the ESR. We used the nationality recorded in the primary assignment of the staff member in each month. As a result, the recorded nationality of individual staff members may change over time, reflecting differences in their reporting and any changes in national status over time (e.g. if staff gain a British passport on residency grounds).

Table 4.2. Probability of leaving the acute sector each month by nationality group

	Consultants	Nurses and midwives	Health-care assistants
British	0	0	0
	(.)	(.)	(.)
EU/EEA	0.236***	0.349***	-0.124***
	(0.0190)	(0.0235)	(0.0298)
Non-EU/EEA	0.0964***	-0.225***	-0.196***
	(0.0132)	(0.0139)	(0.0295)

Note: Standard errors clustered at the trust level are displayed in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. All probabilities are relative to British staff. Regressions include all other factors in Table 2.1, trust fixed effects and time period fixed effects.

For nurses and midwives, the pattern is more complicated. EU staff members were 43% more likely to leave than their British counterparts. In contrast, non-EU nurses and midwives were 28% less likely to leave.

One potential explanation for the difference between EU and non-EU nurses and midwives could be the impacts of the UK's exit from the EU. However, we find similar patterns between nationality groups even if we restrict our sample to 2012–15 (i.e. prior to the 2016 EU referendum). This suggests that these qualitative differences are, at least in part, driven by other factors. However, Brexit may have exacerbated these differences: when we split our sample period, the gap between the probability of an EU/EEA nurse or midwife leaving relative to their British counterparts was 68% higher in 2016–21 than in 2012–15, holding all other factors constant. Tables B.6 and B.7 in Appendix B present the full results.

For HCAs, both EU and non-EU staff were less likely to leave the acute sector in a given month than their British counterparts. EU HCAs were 11% less likely to leave the acute sector, while non-EU HCAs were 17% less likely to leave.

Again, it is important to note that our analysis controls for other demographic characteristics of staff, such as age and gender, and so these patterns are not explained by demographic differences between staff of different nationalities.

The final individual characteristic that we consider is the number of health-related absences that individual staff members have taken in recent months. The ESR records any form of absence, including absences due to sickness. We calculate the percentage of days in the month absent due to physical health conditions, and the percentage of days in the month absent because of mental

health conditions.¹³ To reflect the delay between deciding to leave the acute sector and actually leaving, we lag these factors by three months.

Table 4.3 shows the association between the probability of leaving and sickness absences for consultants, and nurses and midwives.¹⁴ For both staff groups, recent absences were strongly associated with an increased chance of exiting the acute sector. For consultants, missing 10% of the month three months ago because of physical sickness was associated with a 0.13 percentage point increase in the probability of leaving in the next month.¹⁵ This is equivalent to 30% of the average exit rate of 0.4%. For nurses and midwives, missing 10% of the month three months ago was associated with a 0.098 percentage point increase in leaving, or 13% of the average exit rate of 0.8%.

Table 4.3. Associations between the monthly probability of leaving the acute sector and individual sickness absences (data unavailable for HCAs)

	Consultants	Nurses and midwives
Physical health absences	1.26***	0.983***
	(0.0963)	(0.0242)
Mental health absences	2.44***	2.23***
	(0.227)	(0.0565)

Note: Standard errors clustered at the trust level are displayed in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. Regressions include all other factors in Table 2.1, trust fixed effects and time period fixed effects.

The associations with mental health absences were even larger in magnitude. For consultants, missing 10% of the month three months ago because of mental health problems was associated with a 0.24 percentage point, or 58%, increase in the probability of leaving the NHS in the next month. The equivalent association was 0.22 percentage points, or 27%, for nurses and midwives.

These results suggest that even relatively small periods of absences are associated with much higher leaving rates for both consultants and nurses and midwives, particularly for absences related to mental health. There are at least two mechanisms that could explain these relationships. The first is that having a period of poor mental or physical health may make

¹³ The absence data in the ESR include a number of sickness categories. We classify sickness absences as related to mental health if they are recorded as anxiety, stress, depression or other psychiatric reasons. We classify all other sickness absences as physical health absences.

¹⁴ The data on absences for HCAs are unavailable.

¹⁵ In the ESR, we observe the number of days that the staff member misses due to sickness absence, but not the number of days that they are scheduled to work in a month. We therefore divide the number of days missed by the total number of days in a month. But because staff do not work every day of the month, this will underestimate the impact of a single day's absence. We therefore present these results as missing a given percentage of the month rather than a given number of days.

someone both more likely to take a sickness absence and more likely to leave the NHS. This could be, for example, because their condition makes it very hard to work. Sick leave is a proxy for their state of health. We cannot directly observe the health of those who do not take sick leave, but it could be that people who experience a period of ill health but do not take sick leave are also more likely to leave. The second is that, conditional on health, taking sick leave is associated with an increased probability of leaving. This could be because it is an administrative step along the way or because they are already considering alternative careers or planning to take early retirement.

In the case of sickness absence and leaver rates, it is particularly important to note that our estimates are associations and can therefore be used to highlight a problem, but they do not lend support to a particular solution. For example, if people with poor mental or physical health are more likely to leave because of their condition, policies that are aimed at reducing sickness absence without addressing the underlying health of the workforce are likely to be ineffective. Policies aimed at improving the mental and physical health of staff would therefore seem much more likely to succeed in boosting retention than other measures aimed at reducing health-related absences.

4.3 Local economic conditions

We next consider the association between local economic conditions and whether a staff member leaves the acute sector. We use two measures of local economic conditions: regional unemployment and house prices. Unemployment rates are measured at the region level (e.g. for London or the North East). Local house prices are measured at the level of Travel to Work Area, a geographical unit smaller than regions that is designed to approximate local labour markets.

Regional unemployment captures the outside opportunities of NHS staff: when unemployment rates in an area are higher, there may be fewer job opportunities for current NHS staff to move to. This will change the financial incentive to stay in the current job. Higher house prices capture differences in the cost of living between areas, which will also change the financial incentives to stay in the current job.

We lag both measures of local economic conditions by three months, which means we estimate the association between whether the staff member leaves in a given month with the local economic conditions three months ago. We also standardise each factor, so that one unit of the standardised factor in the model equals one standard deviation of the true factor. More details on how these variables are constructed are given in Technical Appendix A.

Table 4.4. Associations between the monthly probability of leaving the acute sector and local economic conditions

	Consultants	Nurses and midwives	Health-care assistants
Regional unemployment	0.00429	-0.0288*	-0.0532**
	(0.0174)	(0.0152)	(0.0259)
Local house prices	0.0134	-0.0266	0.0435
	(0.0222)	(0.0279)	(0.0468)

Note: Standard errors clustered at the trust level are displayed in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. Regressions include all other factors in Table 2.1, trust fixed effects and time period fixed effects.

Table 4.4 shows the estimated associations with local economic conditions for each staff group. There was no statistically significant association between local house prices for any staff groups. For consultants, there was also no statistically significant association between the probability of leaving the acute sector and regional unemployment. This is perhaps unsurprising as it is unlikely that regional unemployment is strongly correlated with consultants' outside employment options.

For nurses and midwives, a standard deviation increase in regional unemployment (1.7%) was associated with a 0.03 percentage point lower probability of leaving the acute sector, equivalent to a 4% higher probability of leaving relative to the average leaving rate. This was, however, only statistically significant at the 10% level. For HCAs, the effect of regional unemployment was larger and statistically significant at the 5% level: a one standard deviation increase is associated with a 0.05 percentage point lower probability of leaving the acute sector, an increase of 4.5% over the average leaving rate. The relative magnitudes of the estimated associations for each of the staff groups is in line with what we might expect if the local unemployment rate is likely to be more reflective of the outside employment options for HCAs, and to a lesser extent nurses and midwives, than it is for consultants.

Moreover, in Table B.14 in Appendix B, we show that this result for nurses and midwives is driven by Band 5 nurses and midwives, not those who are Band 6 and above. This is consistent with staff groups with less seniority in the NHS (i.e. HCAs and Band 5 nurses and midwives) being more responsive to outside labour market conditions, while those with more seniority (i.e. Band 6+ nurses and midwives, and consultants) are less responsive.

Importantly, our regressions also include trust fixed effects, which capture persistent differences between trusts, and by extension local areas, in the probability of leaving. These change the interpretation of the associations between local economic conditions and the probability of leaving the acute sector. With trust fixed effects in our model, the associations between these

characteristics are estimated by looking at changes in these factors over time within the same local areas, rather than using differences in economic conditions between different local areas.

Table 4.5 shows how the estimated associations change when we do not include trust fixed effects. There continues to be a statistically significant negative association between regional unemployment and the probability of leaving for both nurses and midwives, and HCAs. There is now also a positive and statistically significant association between local house prices and the probability of leaving. The magnitude of the estimated association between regional unemployment and the probability of a nurse or midwife leaving was also much larger than in Table 4.4 where we have included trust fixed effects.

Table 4.5. Associations between the monthly probability of leaving the acute sector and local economic conditions without trust fixed effects

	Consultants	Nurses and midwives	Health-care assistants
Regional unemployment	-0.00717	-0.0639***	-0.116***
	(0.00834)	(0.0129)	(0.0257)
Local house prices	-0.00108	0.0396***	0.155***
	(0.00593)	(0.0115)	(0.0211)

Note: Standard errors clustered at the trust level are displayed in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. Regressions include all other factors in Table 2.1.

Comparing the results in Tables 4.4 and 4.5 is informative about the association between local economic conditions and NHS staff retention. Higher house prices were associated with higher leaving rates for nurses and midwives and HCAs, but only without trust fixed effects. This means that the association is driven by persistent differences in house prices and retention between areas, rather than short-run changes in house prices over time in the same area. In other words, some areas have higher house prices throughout our sample period, and these areas on average have higher leaver rates, but short-term increases in house prices in a local area, within a sample period, are not associated with an increase in the leaver rate.¹⁶

For HCAs, there were statistically significant associations between higher permanent levels of regional unemployment and lower leaving rates (Table 4.5), and between changes in unemployment within region over time and leaving rates (Table 4.4). The magnitude of the estimate coefficient or association with leaver rates is, however, twice as large in Table 4.5,

¹⁶ Propper, Stockton and Stoye (2021) showed that nurse annual leaving rates do correlate with longer-term (three-year) changes in house prices, and these effects were greatest in areas where house prices were already persistently high. Taken together, this suggests that longer-term shifts in house prices – to which nurses can potentially respond over time – are important for nurse retention, as opposed to fluctuations in the short run, which are harder to react to.

where do we not include fixed effects. The pattern is similar for nurses and midwives, although the association in Table 4.4 is only statistically significant at the 10% level.

For consultants, neither measure of local economic conditions was significantly associated with the probability of leaving the NHS.

4.4 Trust characteristics

Next, we consider the association between trust characteristics and the probability of leaving the acute sector. In our main model, we consider six different trust characteristics. Each of these factors aims to capture a different aspect of the working conditions at the trust.

First, we calculate average absence rates for staff in the same staff group using the ESR. We split these into absences caused by physical health problems, and absences caused by mental health problems. We might expect staff in trusts with higher average levels of sickness absence to be under more pressure, conditional on their own health, because those absences create a greater workload for those still working or because high absences could proxy for other poor working conditions, such as a lack of supportive management or limited access to flexible working.

Next, we include two measures that capture the operational performance of the trust. First, we use the percentage of patients on the elective waiting list who have been waiting less than 18 weeks, a key NHS performance target. We also use the percentage of the hospital beds that are occupied in the trust. These measures can proxy for many aspects of hospital performance that might affect a staff member's decision to leave. For example, how much pressure staff may be under to increase the flow of patients through the hospital, or how effective management is at ensuring targets are met.

In the ESR, we also observe the (reported) reason why staff members have decided to leave a trust. We therefore calculate the percentage of people who left the trust three months before for 'negative' reasons. This includes those leaving for work–life balance, health problems or because of higher pay elsewhere.

Finally, we include the leaving rate of staff in the same staff group at the trust. This will capture many factors that drive peers within the trust to leave.

All factors are lagged three months, and so we measure the association between leaving in the current month and these factors three months before. As with the measures of local economic conditions, we standardise each factor so that one unit is equal to one standard deviation. This allows us to compare the relative importance of these different factors.

Table 4.6 summarises the associations for each of these trust-level factors for each staff group. Whereas at the individual level (Table 4.3), we saw a strong association between sickness absence and leaving, the sickness rate of peers at the trust was not statistically significantly associated with individual decisions to leave. This could be because it is only their own sickness that matters to individuals, or because factors that determine sickness absence, and the additional workload that sickness absences can create for other staff, operate at the department or ward level rather than the trust level. For waiting list performance and the negative reasons for leaving, there was no statistically significant association with the probability of leaving the acute sector for any of the staff groups.

Table 4.6. Associations between the monthly probability of leaving the acute sector and trust characteristics

	Consultants	Nurses and midwives	HcAs
Physical health absence rates	-0.00574 (0.0126)	-0.000385 (0.00975)	
Mental health absence rates	0.000400 (0.00771)	0.0125 (0.00848)	
Waiting list performance	0.00625 (0.00951)	-0.00323 (0.00603)	0.0121 (0.0168)
Bed occupancy	-0.00140 (0.00761)	-0.0192* (0.0114)	-0.00187 (0.0133)
Negative reasons for leaving	0.00146 (0.00390)	0.00569 (0.00682)	-0.000287 (0.00657)
Leaving rate	-0.0139** (0.00645)	0.0114 (0.00867)	0.000863 (0.00593)

Note: Standard errors clustered at the trust level are displayed in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. Regressions include all other factors in Table 2.1, trust fixed effects and time period fixed effects.

For bed occupancy, we find that nurses and midwives working in hospitals with higher bed occupancy were less likely to leave the acute sector. In particular, a standard deviation increase in bed occupancy (7.9%) was associated with a 0.02 percentage point reduction in the probability of leaving, equivalent to a 2.4% reduction. This is, however, a relatively weak relationship, only significant at the 10% level. It is perhaps surprising: we might expect that staff in hospitals closer to capacity face a more stressful working environment. One potential explanation is that the relationship we estimate could be driven by other unobservable factors. For example, hospitals that have higher bed occupancy could also have other factors that

increase retention. There was no significant association between bed occupancy and the probability of leaving for either consultants or HCAs.

There was also a significant association between the leaving rate of peers three months ago and the probability that a consultant decides to leave the acute sector. A standard deviation increase in the consultant leaving rate (0.6%) was associated with a 0.01 percentage point reduction in the probability of leaving the sector, equivalent to a 3.3% reduction. This is also a somewhat surprising result: we might expect that a higher leaving rate would capture negative factors about the trust, and therefore be associated with a higher – not lower – probability of leaving. This could suggest, for example, that in trusts where many consultants have recently left, the remaining consultants are reluctant to leave because of the potential impact this would have on services. There is no significant association with the probability of leaving for either nurses and midwives, or HCAs. However, other analysis of NHS staff retention does suggest there is a relationship between the leaving rates of different staff groups, with higher leaving rates for doctors when more nurses leave (Moscelli, Sayli and Mello, 2022).

4.5 Staff Survey responses

In this section, we consider the association between the probability that individual members of staff leave the acute sector and the responses of their colleagues (and themselves) to the NHS Staff Survey. In all cases, we examine the association between exits and the responses of staff within the same staff group who work at the same trust (e.g. we use the responses of nurses, rather than all staff, when studying nurse leaving rates).

As discussed in Section 2.3, the NHS Staff Survey provides useful information on how the NHS workforce perceives the working conditions of their trust. However, the questions asked in the survey frequently change over time. As a result, we cannot include Staff Survey measures for our full analysis period of 2012–21. We instead restrict our sample to 2016–20 and re-run our analysis, including all of the factors previously discussed, as well as the scores for nine Staff Survey themes. These scores are computed at the same level of the staff group in each regression.¹⁷

Table 4.7 summarises the associations between each Staff Survey theme and the individual probability of leaving the acute sector in a given month for each staff group. As with the other reported relationships, these estimates are from a multivariate regression, and so measure the association between each Staff Survey theme and the probability of leaving, holding the scores

¹⁷ The Staff Survey methodology weights responses by occupation group and trust size. Because we are using results at the trust by staff group level, we do not need to weight the responses used in our analysis.

on all the other Staff Survey themes (and all other characteristics) constant. Because we use the aggregated Staff Survey responses for each staff group, this will likely underestimate the effect of an *individual's* Staff Survey responses on whether they decide to leave the acute sector.

The table shows that for each staff group, different Staff Survey themes were significantly associated with individual leaving decisions. For consultants, the reported quality of immediate managers was negatively associated with leaving: if this was a standard deviation higher, then it was associated with a 0.03 percentage point reduction in the probability of leaving, equivalent to a 7.1% reduction relative to the average leaving rate of consultants. This theme includes questions such as whether consultants feel supported by their immediate manager, whether their immediate manager gives clear feedback and whether their immediate manager values their work.

For nurses and midwives, the reported staff engagement was negatively associated with leaving: a standard deviation increase in staff engagement was associated with a 0.08 percentage reduction in the probability that a nurse or midwife leaves, equivalent to a 9.6% reduction relative to the average leaving rate of nurses and midwives. This theme includes questions such as whether they look forward to going to work, whether they are enthusiastic about their job and whether they would recommend their trust as a place to work. Such a relationship is consistent with other evidence that better staff engagement improves retention within the NHS hospital sector (Moscelli, Sayli and Mello, 2022). Table B.16 in Appendix B suggests that this relationship is primarily driven by Band 6+ nurses and midwives.

However, we also find that a higher reported health and well-being among nurses and midwives at a trust was significantly associated with a higher probability of leaving. This is unexpected, and an important example of why our results should be interpreted as associations and not necessarily true causal relationships: it seems unlikely that an increase in the reported health and well-being of staff would cause *more* staff to leave the NHS acute sector, with this relationship likely driven by other factors in the trust. For example, it may be that trusts with higher reported health and well-being at work have other factors that increase leaving rates, such as higher outside options for nurses and midwives. Equally, it may be that this result, particularly as it is only significant at the 10% level, is driven by noise rather than capturing a *true* relationship.

Finally, for HCAs, the reported quality of team working was significantly associated with leaving: a standard deviation increase in reported satisfaction with team working was associated with a 0.07 percentage point reduction in the probability of leaving, equivalent to a 5.6% reduction relative to the average leaving rate of HCAs. This theme includes questions such as whether the team they work in has a shared set of objectives. Table B.16 in Appendix B also shows a significant association between this factor and the probability of leaving for Band 5 nurses and midwives.

Taken together, these results suggest that different aspects of the working conditions in trusts are most strongly associated with leaving decisions for our staff groups. For consultants, immediate managers appear to be the most important, while for nurses and midwives it is staff engagement that matters the most, and for HCAs it is satisfaction with team working.

Table 4.7. Associations between the monthly probability of leaving the acute sector and Staff Survey themes

	Consultants	Nurses and midwives	HCAs
Equality, diversity and inclusion	-0.0169 (0.0134)	0.000612 (0.0176)	0.0339 (0.0265)
Health and well-being	0.00211 (0.0147)	0.0636* (0.0345)	-0.00135 (0.0302)
Immediate managers	-0.0297** (0.0147)	-0.0356 (0.0440)	0.0267 (0.0269)
Quality of care	0.0201 (0.0215)	-0.0217 (0.0259)	0.0375 (0.0379)
Bullying and harassment	-0.00773 (0.0130)	0.0510 (0.0446)	0.0190 (0.0334)
Violence	0.00496 (0.00812)	-0.0166 (0.0430)	-0.0252 (0.0397)
Safety culture	-0.0113 (0.0216)	0.0219 (0.0413)	-0.000380 (0.0362)
Staff engagement	-0.00113 (0.0288)	-0.0770* (0.0408)	0.0385 (0.0476)
Team working	0.0170 (0.0169)	-0.0451 (0.0392)	-0.0680* (0.0391)

Note: Standard errors clustered at the trust level are displayed in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. Regressions include all other factors in Table 2.1, trust fixed effects and time period fixed effects.

5. What explains persistent differences between trusts?

In Chapter 4, we estimated the persistent differences in leaving rates (known as trust fixed effects) for each trust and each staffing group. These measure the average leaving rate of each trust that is explained by factors at the trust that are fixed over time (regardless of whether we could observe them directly in the data, or not).

Such persistent differences are important in understanding variation in retention rates and can be large in magnitude.¹⁸ This is illustrated by Figure 5.1, which shows the distribution of these persistent differences across trusts in the leaving rates of nurses and midwives after adjusting for all other factors in the model. A higher persistent difference means that the trust has a higher average leaving rate over our sample period than our other factors would predict. For most trusts, these persistent differences are relatively small: 72 of the 133 trusts in our sample have persistent differences within 0.1 percentage points (i.e. their leaving rates only differ from the predicted rate by up to 0.1 percentage points). This means that the factors included in our analysis predict leaving rates for these trusts that are very similar to their actual average leaving rates over this period.

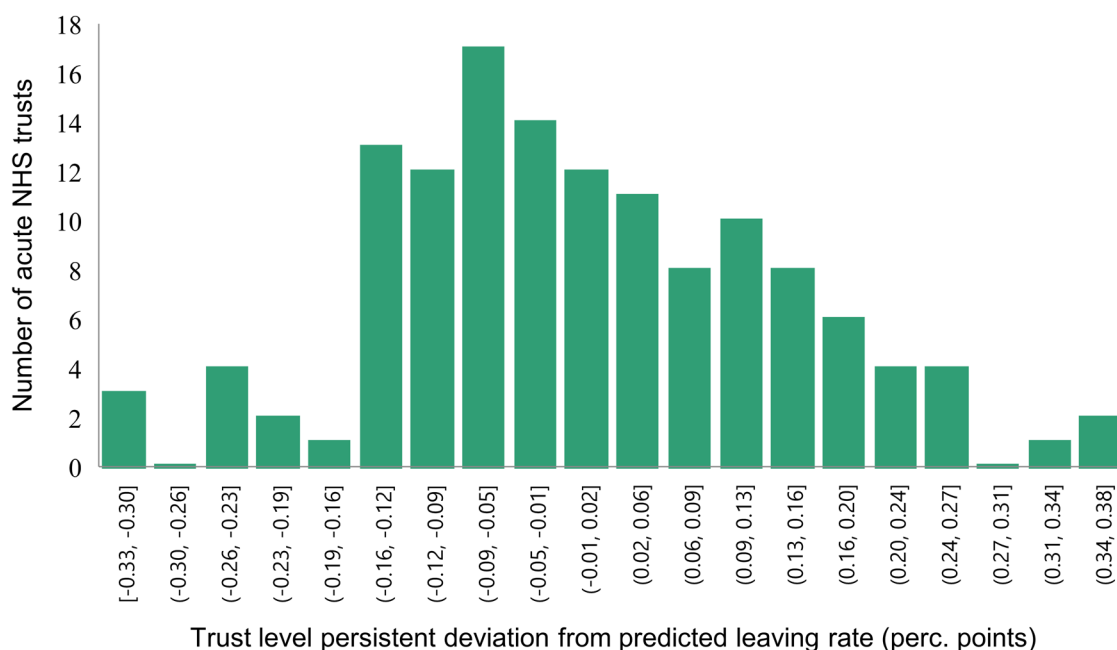
But there are some trusts with larger persistent differences in leaving rates. These differences range from -0.33 percentage points to 0.38 percentage points. This means that the ‘worst’ performing trust in terms of retention for nurses and midwives had an average monthly leaving rate for this staffing group that was 0.37 percentage points higher than would be predicted given the other characteristics of the trust and the staff employed by the trust. This is a large difference, equivalent to having a leaving rate 46% higher than the average monthly leaving rate (0.8%). Similarly, the ‘best’ performing trust had a leaving rate that was 41% lower than would be expected based on all other factors.

In the rest of this chapter, we analyse these persistent differences between trusts in two ways. We first consider the extent to which trust fixed effects are correlated across staff groups. This indicates the extent to which the persistent differences between trust leaving rates for each staff

¹⁸ These ‘fixed effects’ also substantially increase the share of the variation in trust-level retention rates that are explained by the model. In the analysis of trust-level leaving rates we conducted in Section 3.2, the inclusion of trust fixed effects increases the total explained variation by 3.7 percentage points (50%) for consultants, by 4.4 percentage points (26%) for nurses and midwives, and 4.4 percentage points (44%) for HCAs.

group are likely to be driven by common factors at each trust. We then consider the relationship between persistent differences across trusts and other trust-level characteristics that are largely fixed over time, including region, trust type and trust size, and examine what share of the variation in the persistent differences in leaver rates by staff group are explained by these characteristics.

Figure 5.1. Distribution of trust persistent differences for nurse and midwife leaving rates



5.1 Correlations in persistent trust-level differences between staff groups

We start by considering the relationship between the fixed effects for our three different staff groups. If the estimated fixed effects for two different staff groups within the same trust are highly positively correlated, it would indicate that retention of both staff groups within a given trust is persistently above or below the retention rates predicted by the characteristics included in our model. This would suggest that retention for both staff groups is likely influenced by shared factors: for example, if the overall management of the trust was of high quality, then both consultant and nurse and midwife retention rates may be higher than would otherwise be predicted. However, the weaker the correlation, the more likely these persistent differences between trusts are driven by different factors for the different staff groups. Different interventions would then likely be required to improve retention among different staff groups.

Table 5.1 shows the correlation between the different fixed effects for each trust. The correlation between the fixed effects for consultants and nurses and midwives is positive, but close to zero

(0.11). This suggests that a trust with consultant leaving rates that were persistently higher than those predicted by the other factors included in the analysis had leaving rates for nurses and midwives that are just – but not much – above those predicted by the other factors. A similar pattern was also found for consultants and HCAs, with a correlation of 0.14, again suggesting only a weak relationship. For nurses and midwives and HCAs, the correlation was again positive, and was a little larger in magnitude (0.22). This suggests a somewhat stronger relationship in the persistent leaving rates of these groups.

Table 5.1. Correlation between fixed effects of different staff groups

First staff group	Second staff group	Correlation
Consultants	Nurses and midwives	0.107
Consultants	Health-care assistants	0.135
Nurses and midwives	Health-care assistants	0.223

Note: Correlations are weighted by total staff numbers in April 2012.

These correlations suggest that the persistent unobserved factors that matter for consultant retention were mostly different for consultants compared with nurses and midwives and HCAs, while there was a little more overlap between the factors that matter for nurses and midwives and HCAs. Nonetheless, the correlation between the trust fixed effects for nurses and midwives and HCAs was still not very large. This suggests that staff retention is not something that is just determined by a trust-wide culture, management quality, or other trust-wide characteristics. This is consistent with the associations we found for the Staff Survey, shown in Table 4.7, where different aspects of job quality mattered for different staff groups. This means that policy interventions that seek to improve retention of NHS staff in the acute sector are likely to have to be tailored towards specific staff groups, rather than seeking a ‘one size fits all’ policy to improve retention for all staff in a trust simultaneously.

5.2 Persistent differences in leaver rates and trust characteristics

We next examine the extent to which we can explain the persistent differences across trusts in their retention of different staff groups. To do this, we first analyse how these persistent differences vary with the region in which the trust is located, the trust type and the trust size.¹⁹

¹⁹ We cannot include these factors in our multivariate analysis as, being fixed over time, they are captured by the fixed effects, and therefore drop out of the specification.

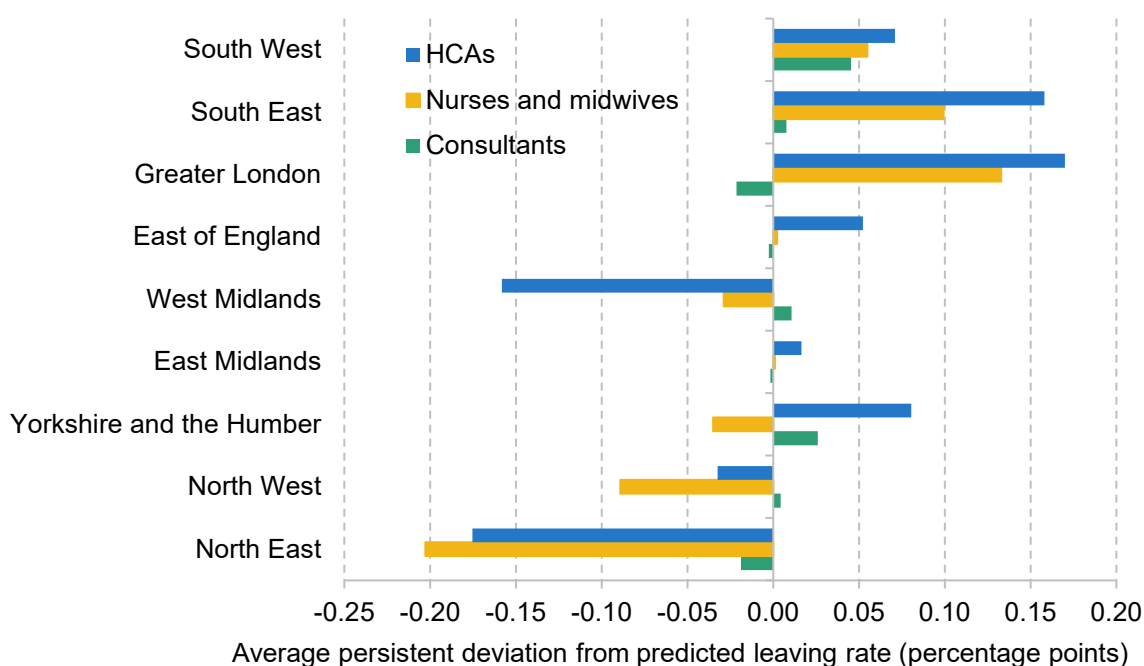
We then examine what proportion of the variation in these trust effects is explained by these three factors.

Regional differences

Figure 5.2 shows the average fixed effect for each region by staff group. For consultants, the highest fixed effects were in the South West and in Yorkshire and the Humber. This means that in these regions, consultants were more likely to leave than would be expected based on the other factors included in our multivariate analysis. The lowest fixed effects were in London and in the North East, meaning consultants were less likely to leave than might have been predicted by these factors.

For nurses and midwives, the highest fixed effects were in London and in the South of England, while the lowest were in the North. For HCAs, the highest fixed effects were also in London and in the South, while the lowest were in the North East and in the West Midlands. This is a similar picture to the regional pattern in overall retention rates in Figure 3.1.

Figure 5.2. Average trust fixed effect by region and staff group



Note: Averages are weighted by staff numbers in April 2012.

Comparing the regional pattern of fixed effects by staff group again indicates that at least some of the factors driving consultant, nurse and midwife, and HCA retention are different. London had the lowest average fixed effect for consultants, but the highest for both nurses and midwives and HCAs. Similarly, Yorkshire and the Humber had relatively high fixed effects for consultants and HCAs, but relatively low fixed effects for nurses and midwives. However, the South West

had high fixed effects for all three staff groups, while the North East had relatively low fixed effects for all three. This indicates that trusts in the North East consistently have better retention rates than would be predicted by the other factors in the model across all staff groups, while those in the South West have worse retention rates than would be predicted for all staff groups.

There are many possible explanations for the differences in the regional pattern of fixed effects by staff group. For example, there may be differences in regional labour markets by occupation that are not accurately captured by our measures of local economic conditions (including regional unemployment rates): nurses and midwives and HCAs may have more alternative job options in London, which is why their leaving rates could be higher than elsewhere in England. The relative value of pay in these NHS jobs also varies across the country given the relative lack of regional variation in NHS pay coupled with large geographic differences in the cost of living. Areas where NHS pay remains relatively high compared to the cost of living – such as the North East – may therefore have better retention rates (Propper, Stockton and Stoye, 2021).

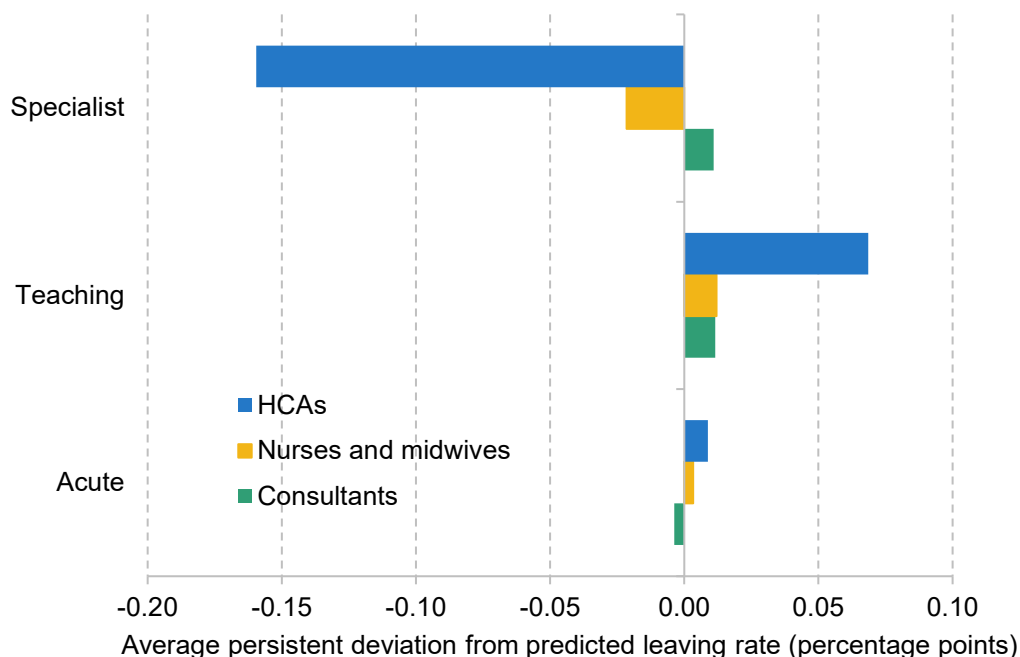
In addition, there may also be regional differences in how hospitals are organised across the country, the type of work they carry out, and access to professional development. One hypothesis for why the consultant leaving rate is relatively low in London, for example, is that in London the average consultant works on more interesting or more varied medical cases, or receives more training that would be beneficial for their future career.

Trust type differences

We can also examine how these persistent differences in retention rates vary between different types of trusts. Figure 5.3 shows the average trust fixed effect for three types of trust: specialist trusts (those focusing on particular areas of medicine), teaching trusts (those attached to university medical departments) and acute hospital trusts (all other hospital trusts). For consultants, the average fixed effect was lowest in acute trusts, and relatively high in specialist and teaching trusts. This means that consultant retention was, on average, better in acute trusts, and worse in specialist and teaching trusts than would be predicted by the other characteristics of these trusts.

For both nurses and midwives and HCAs, the patterns are different: average fixed effects were highest in teaching trusts, and lowest in specialist trusts. This means that retention for these staff groups was, on average, better than predicted in specialist trusts. In particular, the difference for HCAs working in specialist trusts was especially large: on average, specialist trusts had leaving rates almost 0.2 percentage points lower than the other factors would predict.

Figure 5.3. Average trust fixed effect by trust type and staff group



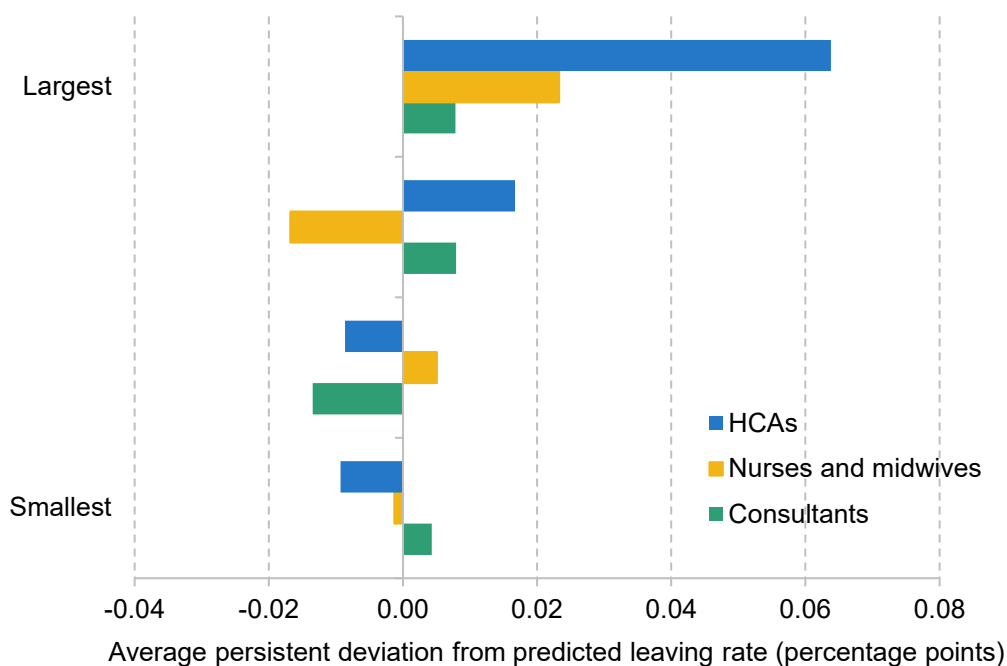
Note: Averages are weighted by staff numbers in April 2012.

Trust size differences

Figure 5.4 shows how the average fixed effect varies across trust size. We split trusts into four groups based on the total number of staff they employed in April 2012 across all three staff groups. For all staff groups, the figure shows that larger trusts generally had worse than predicted leaving rates (i.e. a larger average fixed effect) while smaller trusts had better than predicted leaving rates (i.e. a smaller average fixed effect). This pattern is clearest for HCAs; for consultants, the best retention rates were found in the second smallest quartile, while for nurses and midwives, the best retention rates were among trusts in the second largest quartile.

It is not clear what drives these patterns, with multiple possible explanations. It could be that there is something about small trusts that results in a lower leaving rate: for example, it may be easier to form closer relationships with colleagues in a small trust, and this encourages retention. Alternatively, it might also be that small trusts are located in particular types of area – for example, in rural areas – with local labour markets that encourage retention, so that the size of the trust itself does not have a direct bearing on retention.

Figure 5.4. Average trust fixed effect by trust size and staff group



Note: Averages are weighted by staff numbers in April 2012. The average fixed effect for consultants in the smallest quartile was zero to three decimal places.

How much do these characteristics explain persistent differences in leaver rates across trusts?

In order to understand how much of the variation in persistent retention differences across trusts is explained by region, trust type and trust size, we carry out a similar analysis to Section 3.2. We regress the estimated trust fixed effects on indicators for regions, trust types and size, and examine the share of the variation in these persistent differences that is accounted for by these factors.

Table 5.2 shows the results for each staff group. The results show a clear dichotomy between nurses and midwives on the one side, and consultants and HCAs on the other. For nurses and midwives, these three characteristics explained just under half of the total variation in trust fixed effects. For consultants and HCAs, they explained only 13.1% and 7.3%, respectively.

This suggests that for consultants and HCAs, the vast majority of these persistent differences in the retention of different trusts can be explained by trust- and job-specific characteristics that are not correlated with the region, type or size of each trust. These could include factors such as workplace culture or management quality. More work is needed to understand what these characteristics are, and which policies can be used to target these and improve retention rates in turn.

46 Factors associated with staff retention in the NHS acute sector

For nurses and midwives, almost half of the total variation in *persistent differences* in retention across trusts (which, in turn, only explained a small share of total variation across trusts) is explained by regions, types and sizes of trusts. This suggests that these factors are very important in explaining persistent retention differences across trusts, and the mechanisms through which they affect retention warrant more attention.

Table 5.2. Percentage of explained variation in trust fixed effects

Staff group	Explained variation
Consultants	13.1%
Nurses and midwives	47.2%
Health-care assistants	7.3%

Note: Regressions weighted by staff numbers in April 2012.

6. Conclusions

Improving the retention of existing NHS staff is a key step towards meeting staffing targets and providing high-quality care to patients. In this report, we have examined the association between the leaving decisions of three prominent staff groups working in NHS acute trusts and a range of individual characteristics, regional economic conditions and trust characteristics.

Our analysis shows that many individual characteristics of staff members are associated with their monthly probability of leaving the sector. There are clear age and tenure profiles in leaving that vary by gender, in addition to strong associations with nationality. This suggests that staff members in certain groups are more likely to be considering leaving the NHS acute sector, and may benefit from focused interventions to decrease the probability of exit.

Individual absences related to both physical and mental health are also strongly correlated with subsequent exits from the acute sector. As a minimum, this means that sickness absence could be an important indicator of staff members who are likely to leave the NHS acute sector, acting as a flag to trusts that staff may be on a path towards exiting the sector. Future research should focus on why these staff members are much more likely to leave the acute sector, and in particular, whether poor health is causing staff to leave, or whether sickness absences are a step on an administrative path towards leaving. Better understanding of these mechanisms could help design more effective interventions to improve retention.

We have also provided evidence that the probability of leaving the NHS acute sector is related to the wider economic opportunities in the local area, especially for lower-paid members of staff. In particular, HCAs and nurses on lower pay bands were less likely to leave the NHS when regional unemployment rates increased. This is consistent with staff members choosing to stay in their current job when there are fewer alternative options available outside of the NHS, and leaving when these opportunities increase. One drawback of the ESR data is that we do not know where individuals go if they leave the NHS hospital sector. Developing a deeper understanding about where these staff members move to – and which outside opportunities matter – would help in ensuring that NHS pay and opportunities remain competitive with the outside labour market. These factors may well also become even more important during a period of rapid increases in the cost of living, and when pay in the private sector is increasing more quickly than in the public sector (ONS, 2022c).

The results from the NHS Staff Survey analysis suggest that different elements of the trust environment matter for different staff groups. We found lower leaving rates associated with

better quality of immediate managers for consultants, better staff engagement for nurses and midwives, and higher quality of team working for HCAs. This suggests that the leaving decisions of each staff group are associated with different factors. Consistent with this, we found only a weak correlation between different staff groups in the persistent differences in retention that we saw across trusts that could not be explained by our factors. In other words, trusts that performed better than expected (based on their other observed attributes and the characteristics of staff) in retaining one staff group were not much better at retaining other types of staff. This indicates that there are unlikely to be many policies that substantially improve retention for all staff groups. Instead, targeting different interventions towards each staff group is likely to be more effective.

Our analysis has also highlighted the complexity of leaving decisions. We have used detailed individual, regional and trust characteristics, but much of the substantial variation in trust-level leaving rates remains unexplained: the factors included in our model explained between 11% and 20% of the variation in leaving rates at the trust level depending on which staff groups were studied. Continuing to improve knowledge of these factors – including more intangible trust and job characteristics such as culture and overall management quality – will be important in designing and evaluating policies to boost retention through improvements in these channels.

A final large unknown is the long-run impact that the COVID-19 pandemic will have on NHS staff retention. While retention during the pandemic improved, it is unclear what will happen as the immediate pressures from COVID-19 on hospitals ease. This analysis has focused on patterns of retention over a period of almost a decade, with the first 15 months of the pandemic from March 2020 making up only a small share of the period studied. While a preliminary analysis suggests that the patterns discussed here did not change substantially during this period, this may change in future, and the experience of staff at different hospitals during the pandemic may directly affect their career decisions in future. Careful monitoring of the patterns of retention will therefore be required as the NHS emerges from the pandemic.

Technical Appendix A

Data and definitions

Definition of staff groups

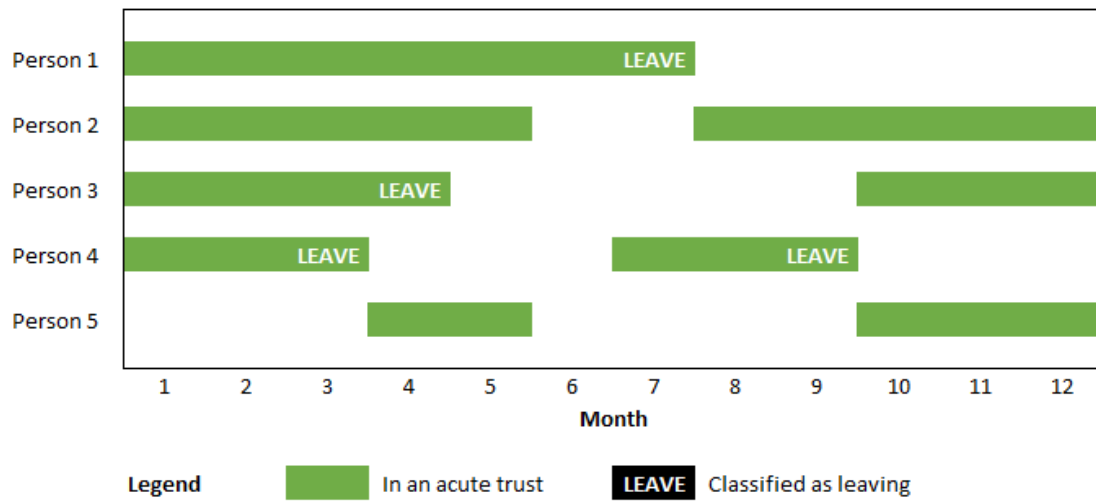
Our analysis focuses on three staff groups: consultants, nurses and midwives, and health-care assistants. Each of these is defined in order to be as close as possible to the standard NHS definitions. We define consultants as staff employed with any of the following paycodes: YC51–73, YM51–73, YK51–73, YL51–73, MC21, KC11, LC01, LC10. We define nurses and midwives as staff employed in the nursing and midwifery staff group with an Agenda for Change (AfC) band of five or higher. We define health-care assistants as staff employed with an occupation code beginning with H1.

Definition of retention

As set out in Section 2.2, we define retention using total pay. We define a staff member as leaving the acute sector if they have worked for at least three months in the acute sector, and do not receive any pay from any NHS acute trusts in the subsequent three months.

Figure A.1 gives several examples of how we classify leaving. Person 1 gives a classic example of someone who works in the NHS acute sector, leaves and is never observed in the data again. We do not want to classify those with short breaks as ‘leavers’, and so staff who leave the sector for less than three months and subsequently return (such as Person 2) will not be classified as leaving. However, those with longer breaks (such as Person 3) who eventually return are classified as leavers. For staff who leave and return to the acute sector multiple times (such as Person 4), each time will be separately classified as leaving the acute sector. If a staff member has worked in the acute sector for less than three months (such as Person 5), they will not be classified as leaving if they stop working in the sector.

Figure A.1. Examples of how we classify staff as leaving the acute sector



Definitions and sources of factors

Table A.1. Factor definitions and sources

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Factor	Source	Definition
Age	ESR	Age at the start of the month, banded
Tenure	ESR	Tenure in the current trust, banded
Gender	ESR	Gender recorded in ESR
Nationality group	ESR	Split into British (including nations of the UK), EU/EEA and other countries
Sickness absences	ESR	Defined as percentage of the full month (e.g. 28–31 days) absent for sickness reasons
Regional unemployment	ONS Regional Labour Market Statistics	Unemployment rate for those aged 16+ by region
Local house prices	ONS House Price Statistics for Small Areas	Median price paid for all houses by Travel to Work Area
Sickness rates	ESR	Average percentage of the full month absent for sickness reasons for the staff group
Negative reasons for leaving	ESR	Percentage of staff leaving from the group that month who leave for negative reasons. We use the NHS England definition: death in service, retirement due to ill health, and voluntary resignations due to better reward package, health, incompatible work relationships, lack of opportunities and work–life balance.
Waiting list performance	NHS England Consultant-led Referral to Treatment Waiting Times	Percentage waiting less than 18 weeks for elective treatment
Bed occupancy	NHS England Bed Availability and Occupancy	Total average daily percentage of available and occupied beds open overnight
Staff leaving rate	ESR	Number leaving in each month (by our primary definition) divided by the number working at the beginning of the period (by our definition)
Staff Survey results	NHS Staff Survey ²⁰	Each question in the theme is assigned a value between 0 and 1, where 0 means that all respondents choose the most negative answer and 1 means that all respondents choose the most positive answer. The scores for each question are then summed to give a theme score. Unlike the standard methodology, we do not divide by the number of questions, but this does not matter because we standardise the scores. See the note to Table A.2.

Standardisation of factors

We standardise our trust-level and regional characteristics so that one unit of each standardised factor equals one standard deviation in the true distribution of the factor. Therefore, if one factor has a larger estimate than another factor, a one standard deviation of the first factor is associated with a larger change in the probability of leaving the acute sector than the other factor.

In order to recover the effect of a unit of each factor, Table A.2 lists the standard deviations of each factor that has been standardised. For example, if our main results show a one standard deviation, the increase in a factor is associated with a 0.5 percentage point increase in the probability of leaving, and if one standard deviation of that factor is 10, then a one-unit increase is associated with a 0.05 percentage point increase in the probability of leaving.

Sample selection

We restrict our primary sample to acute NHS hospitals that employ staff for the full length of our sample period. We adjust for mergers during this period, treating them as if they happened at the beginning of our period.

Missing data

Several sources of data have missing values for some trusts for some time periods. In each case, we set the value of the missing variable to the most recent past value, and include a dummy variable to indicate that the true value is missing.

Table A.2. Standard deviations of standardised variables

Factor	Standard deviation
Regional unemployment	1.712%
Local house prices	£105,040
Physical health absence rate	1.596%
Mental health absence rate	0.546%
Negative reasons for leaving	13.208%
Waiting list performance	15.650%
Bed occupancy	7.876%
Staff leaving rate	0.631%
Equality, diversity and inclusion (4)	0.536
Health and well-being (5)	0.293
Immediate managers (5)	0.358
Quality of care (3)	0.203
Bullying and harassment (3)	0.151
Violence (3)	0.166
Safety culture (6)	0.428
Staff engagement (9)	0.574
Team working (2)	0.155

Note: The maximum score for the Staff Survey theme is equal to the number of questions (given in parentheses). Scores will range from zero to this value.

Methodology

Our primary analysis in Chapter 4 uses multivariate regression at the individual level. Our outcome of interest is y_{ijt} , a dummy variable for whether individual i who is currently employed at trust j decides to leave the acute sector in period t . Our regression specification is

$$y_{ijt} = \alpha_j + \delta_t + X_{it}\beta + Z_{jt}\gamma + \epsilon_{ijt},$$

where α_j are trust fixed effects, δ_t are period fixed effects, X_{it} are individual characteristics and Z_{jt} are trust and regional characteristics. Standard errors are clustered at the trust level.

Our analysis in Section 3.2 conducts a similar exercise at the trust level, where \bar{y}_{jt} is the average leaving rate at trust j in period t . Our regression specification is

$$\bar{y}_{jt} = \alpha'_j + \delta'_t + \bar{X}_{jt}\beta' + Z_{jt}\gamma' + \epsilon'_{ijt},$$

where \bar{X}_{jt} are the average values of individual characteristics X_{it} for staff members employed at the trust j in time period t .

In Section 5.2, we regress the estimated fixed effects from the primary regressions on invariant characteristics D_j of each trust j

$$\alpha_j = D_j\rho + \omega_j.$$

Appendix B. Additional results

Relative importance of factors

Table B.1 shows the relative importance of our different groups of factors in explaining the total variation in monthly trust leaving rates. The first row shows the total variation explained by average demographic characteristics only. The next row shows the *additional* variation explained when we included average sickness absence rates (i.e. how much the total variation increased relative to the regression with just average demographics). Each subsequent row repeats this pattern, showing the *additional* variation explained relative to the previous factors. For this type of variance decomposition, the order that groups of characteristics are added matters for the relative importance of different groups.²¹

Table B.1. Contribution of factors to explaining total variation in monthly trust leaving rates

Factor group	Consultants	Nurses and midwives	Health-care assistants
Demographics	0.66%	4.00%	2.80%
Sickness absences	0.02%	0.62%	0.18%
Economic conditions	0.05%	0.22%	0.79%
Trust characteristics	0.44%	0.38%	0.88%
National trends	6.14%	11.69%	5.49%
Regional persistent differences	0.16%	0.36%	0.18%
Trust persistent differences	3.54%	4.06%	4.24%
Total explained	11.00%	21.34%	14.56%

Note: Variables are the trust-level equivalents of the factors listed in Table 2.1.

²¹ Consider demographics and sickness absences, which are likely to be correlated. For example, perhaps older workforces have higher sickness absence rates. All of these correlations will be assigned to the factors that are added first in the analysis. This analysis therefore tells you the additional share of the variance you can explain if you started with a model of demographic variables only, and added other variables on a sequential basis (i.e. how much better could you do in explaining variation in retention if you added more variables in a specific order).

Table B.2 repeats this analysis at the annual (financial year) level. The outcome variable is the mean monthly leaving rate for the trust for the financial year. For each of our factors, we take the average value for the financial year, lagged by three months for relevant factors.

Table B.2. Contribution of factors to explaining total variation in annual trust leaving rates

Factor group	Consultants	Nurses and midwives	Health-care assistants
Demographics	5.24%	22.38%	15.40%
Sickness absences	0.14%	4.20%	0.84%
Economic conditions	0.24%	1.67%	4.20%
Trust characteristics	6.60%	1.35%	3.88%
National trends	4.88%	9.00%	2.56%
Regional persistent differences	2.02%	1.99%	1.25%
Trust persistent differences	26.04%	23.31%	27.24%
Total explained	45.16%	63.90%	55.37%

Note: Variables are the trust-level equivalents of the factors listed in Table 2.1 except past leaving rates.

Additional primary results

Here, we include additional results that we have discussed in Chapter 4. In each case, the regressions are the same as our primary analysis, with one specific variable changed or added. All other factors are unchanged. The results of each table are discussed in the main text of Section 4.2.

Table B.3. Association between the monthly probability of leaving the acute sector and recent movements (six months) between trusts

	Consultants	Nurses and midwives	Health-care assistants
Recent mover (six months)	-0.311***	-0.584***	-0.0772
	(0.0368)	(0.0224)	(0.106)

Note: Standard errors clustered at the trust level are displayed in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. Recent mover is defined as having been employed at another trust six months ago. Regressions include all other factors in Table 2.1, trust fixed effects and time period fixed effects.

Table B.4. The probability of leaving the acute sector each month by tenure, female staff

	Consultants	Nurses and midwives	Health-care assistants
0–2 years	-0.147***	-0.137***	-0.0663
	(0.0345)	(0.0269)	(0.0604)
2–5 years	-0.0347	-0.0740***	0.000489
	(0.0235)	(0.0263)	(0.0314)
5–10 years	0	0	0
	(.)	(.)	(.)
10–15 years	0.0274	0.0304	-0.0711*
	(0.0212)	(0.0202)	(0.0363)
15–20 years	0.0444*	0.0370	-0.110**
	(0.0260)	(0.0228)	(0.0485)
20–25 years	0.0507	-0.0138	-0.113
	(0.0485)	(0.0379)	(0.0769)
25+ years	-0.0895	-0.0709*	-0.0947
	(0.0943)	(0.0425)	(0.0768)

Note: Standard errors clustered at the trust level are displayed in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. Regressions include all other factors in Table 2.1, trust fixed effects and time period fixed effects.

Table B.5. Probability of leaving the acute sector each month by tenure, male staff

	Consultants	Nurses and midwives	Health-care assistants
0–2 years	0.510***	0.474***	0.791***
	(0.0208)	(0.0294)	(0.0660)
2–5 years	0.161***	0.291***	0.209***
	(0.0155)	(0.0250)	(0.0332)
5–10 years	0	0	0
	(.)	(.)	(.)
10–15 years	-0.114***	-0.208***	-0.0495
	(0.0117)	(0.0192)	(0.0365)
15–20 years	-0.154***	-0.266***	-0.0118
	(0.0152)	(0.0222)	(0.0474)
20–25 years	-0.0852***	-0.209***	0.0291
	(0.0282)	(0.0381)	(0.0739)
25+ years	0.117**	-0.0589	0.0727
	(0.0469)	(0.0436)	(0.0738)

Note: Standard errors clustered at the trust level are displayed in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. Regressions include all other factors in Table 2.1, trust fixed effects and time period fixed effects.

Table B.6. Probability of leaving the acute sector each month by nationality group, 2012–15

	Consultants	Nurses and midwives	Health-care assistants
British	0	0	0
	(.)	(.)	(.)
EU/EEA	0.239***	0.237***	-0.176***
	(0.0247)	(0.0326)	(0.0497)
Non-EU/EEA	0.134***	-0.124***	-0.140***
	(0.0203)	(0.0182)	(0.0462)

Note: Standard errors clustered at the trust level are displayed in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. Regressions include all other factors in Table 2.1, trust fixed effects and time period fixed effects.

Table B.7. Probability of leaving the acute sector each month by nationality group, 2016–21

	Consultants	Nurses and midwives	Health-care assistants
British	0	0	0
	(.)	(.)	(.)
EU/EEA	0.237***	0.399***	-0.115***
	(0.0246)	(0.0242)	(0.0321)
Non-EU/EEA	0.0711***	-0.278***	-0.227***
	(0.0159)	(0.0156)	(0.0298)

Note: Standard errors clustered at the trust level are displayed in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. Regressions include all other factors in Table 2.1, trust fixed effects and time period fixed effects.

Narrower nurse staff groups

Here, we repeat the analysis of the leaving decisions of nurses and midwives that we conducted in Chapter 4, but we split nurses and midwives into two groups: those who are Band 5, and those who are Band 6 and above. Our factors are identical to the main analysis, in that trust-level characteristics are still calculated for all nurses and midwives.

The average leaving rate for the two groups is quite different: on average, 0.96% of Band 5 nurses and midwives leave the acute sector each month, compared to 0.78% for Band 6+ and above. Band 5 nurses and midwives are therefore 43% more likely to leave the acute sector in a given month than Band 6+ nurses and midwives. This is important to bear in mind when comparing the percentage point changes in the probability of leaving the acute sector: the same percentage point association is a larger percentage change for Band 6+ nurses.

Table B.8 shows the effects of age for female nurses and midwives. The pattern is relatively similar between both staff groups. The one exception is nurses aged 18–24, where Band 5 nurses and midwives are much more likely to leave the acute sector than those aged 40–44, but Band 6+ nurses and midwives are much less likely to leave. This likely reflects that it is relatively rare for a nurse or midwife this young to be Band 6+, and so this is a group that is particularly skilled or motivated.²²

²² For example, only 8% of the nurses and midwives in our sample aged 18–24 are Band 6+, compared to 28% for those aged 25–29 and 56% for those aged 40–44.

Table B.8. Probability of leaving the acute sector each month by age, female staff

Age	Band 5 Nurses and midwives	Band 6+ Nurses and midwives
18–24	0.173*** (0.0586)	-0.420** (0.204)
25–29	0.0227*** (0.0356)	0.0889** (0.0439)
30–34	0.324*** (0.0378)	0.292*** (0.0351)
35–39	0.123*** (0.0337)	0.128*** (0.0354)
40–44	0 (.)	0 (.)
45–49	-0.0981*** (0.0320)	-0.104*** (0.0241)
50–54	-0.141*** (0.0383)	-0.0862*** (0.0259)
55–59	-0.00637 (0.0488)	-0.0461 (0.0443)
60–64	0.102 (0.0955)	-0.0604 (0.0870)
65+	-0.373 (0.251)	0.0190 (0.248)

Note: Standard errors clustered at the trust level are displayed in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. Regressions include all other factors in Table 2.1, trust fixed effects and time period fixed effects.

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Table B.9 repeats this analysis for male nurses and midwives. As with their female counterparts, the patterns are relatively similar between the two groups. One difference, however, is that male Band 6+ nurses and midwives aged 55+ are much more likely to leave the acute sector than their Band 5 counterparts.

Table B.9. Probability of leaving the acute sector each month by age, male staff

Age	Band 5 Nurses and midwives	Band 6+ Nurses and midwives
18–24	–0.266*** (0.0573)	0.153 (0.202)
25–29	0.000666 (0.0370)	0.0246 (0.0439)
30–34	0.0889** (0.0343)	0.0786** (0.0328)
35–39	0.107*** (0.0337)	0.104*** (0.0272)
40–44	0 (.)	0 (.)
45–49	0.0136 (0.0295)	0.0293 (0.0247)
50–54	0.0211 (0.0362)	–0.0134 (0.0257)
55–59	0.192*** (0.0472)	0.495*** (0.0458)
60–64	0.596*** (0.0905)	0.973*** (0.0960)
65+	2.09*** (0.248)	2.00*** (0.250)

Note: Standard errors clustered at the trust level are displayed in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. Regressions include all other factors in Table 2.1, trust fixed effects and time period fixed effects.

Table B.10 shows the estimated association between the probability of leaving the acute sector and tenure in the current trust. Both groups of nurses and midwives have a similar pattern of results: those with low tenure are more likely to leave, and this falls with increased tenure, before slightly rising for those with tenure of 25+ years.

Table B.10. Probability of leaving the acute sector each month by tenure

Tenure	Band 5 Nurses and midwives	Band 6+ Nurses and midwives
0–2 years	0.340***	0.253***
	(0.0206)	(0.0176)
2–5 years	0.248***	0.160***
	(0.0120)	(0.0101)
5–10 years	0	0
	(.)	(.)
10–15 years	-0.213***	-0.159***
	(0.0116)	(0.00902)
15–20 years	-0.241***	-0.225***
	(0.0167)	(0.0113)
20–25 years	-0.214***	-0.214***
	(0.0213)	(0.0120)
25+ years	-0.128***	-0.128***
	(0.0219)	(0.0152)

Note: Standard errors clustered at the trust level are displayed in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. Regressions include all other factors in Table 2.1, trust fixed effects and time period fixed effects.

Table B.11 shows that, in both groups, female staff members are less likely to leave the NHS. But the effects are larger for Band 6+ nurses: male Band 5 nurses are 5% (0.05 percentage points) more likely to leave the acute sector each month, while male Band 6+ nurses are 8% (0.06 percentage points) more likely to leave.

Table B.11. Probability of leaving the acute sector each month by gender

	Band 5 Nurses and midwives	Band 6+ Nurses and midwives
Male	0	0
	(.)	(.)
Female	-0.0482*	-0.0548***
	(0.0270)	(0.0203)

Note: Standard errors clustered at the trust level are displayed in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. Regressions include all other factors in Table 2.1, trust fixed effects and time period fixed effects.

Table B.12 shows the differences in the probability of leaving the acute sector by nationality group. In both cases, we see the same pattern of results: EU/EEA nurses and midwives are more likely to leave the acute sector than their British counterparts, while non-EU/EEA nurses and midwives are less likely to leave. These differences are somewhat larger for Band 5 nurses and midwives than Band 6+ nurses and midwives: an EU/EEA Band 5 nurse or midwife is 45% (0.43 percentage points) more likely to leave the acute sector each month than a British equivalent, while an EU/EEA Band 6+ nurse or midwife is only 20% (0.13 percentage points) more likely to leave.

Table B.12. Probability of leaving the acute sector each month by nationality group

	Band 5 Nurses and midwives	Band 6+ Nurses and midwives
British	0	0
	(.)	(.)
EU/EEA	0.430***	0.132***
	(0.0304)	(0.0196)
Non-EU/EEA	-0.343***	-0.159***
	(0.0181)	(0.000162)

Note: Standard errors clustered at the trust level are displayed in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. Regressions include all other factors in Table 2.1, trust fixed effects and time period fixed effects.

Table B.13 shows a very similar relationship between physical and mental health absences and the probability of leaving for both groups of nurses and midwives.

Table B.13. Associations between the monthly probability of leaving the acute sector and individual sickness absences

	Band 5 Nurses and midwives	Band 6+ Nurses and midwives
Physical health absences	1.08***	0.850***
	(0.0350)	(0.0350)
Mental health absences	2.33***	2.12***
	(0.0753)	(0.0691)

Note: Standard errors clustered at the trust level are displayed in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. Regressions include all other factors in Table 2.1, trust fixed effects and time period fixed effects.

Table B.14 shows the association between local economic conditions and the probability of leaving the acute sector. As with the main nurse and midwife results, there is no significant association between local house prices and the probability of leaving. But for regional unemployment, we only find a significant association for Band 5 nurses and midwives. A one standard deviation increase in regional unemployment (1.7%) is associated with a 0.04 percentage point lower probability of leaving, equivalent to a 3.9% reduction in the probability of leaving. This is not an unexpected result: Band 6+ nurses likely have longer tenure and more accumulated skills in the NHS, and therefore their retention in the NHS is less likely to be associated with outside economic opportunities, the same result we find for consultants.

Table B.14. Associations between the monthly probability of leaving the acute sector and local economic conditions

	Band 5 Nurses and midwives	Band 6+ Nurses and midwives
Regional unemployment	-0.0372**	-0.0174
	(0.0180)	(0.0176)
Local house prices	-0.0301	-0.0106
	(0.0323)	(0.0298)

Note: Standard errors clustered at the trust level are displayed in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. Regressions include all other factors in Table 2.1, trust fixed effects and time period fixed effects.

Table B.15 shows that most trust characteristics are not associated with the probability of leaving the acute sector for either nurse and midwife group. The one exception is bed occupancy: for Band 6+ nurses and midwives, higher bed occupancy is associated with a lower probability of leaving.

Table B.15. Associations between the monthly probability of leaving the acute sector and trust characteristics

	Band 5 Nurses and midwives	Band 6+ Nurses and midwives
Physical health absence rates	0.0101	-0.0104
	(0.0122)	(0.0123)
Mental health absence rates	0.0137	0.0125
	(0.0111)	(0.00952)
Waiting list performance	-0.00703	-0.000746
	(0.00741)	(0.00778)
Bed occupancy	-0.0151	-0.0228*
	(0.0130)	(0.0118)
Negative reasons for leaving	0.000977	0.0102
	(0.00667)	(0.00902)
Leaving rate	0.00677	0.0156
	(0.0106)	(0.00973)

Note: Standard errors clustered at the trust level are displayed in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. Regressions include all other factors in Table 2.1, trust fixed effects and time period fixed effects.

Table B.16 shows the associations between the probability of leaving and responses to Staff Survey themes. As we found in our main results, there is a positive significant association between reported health and well-being and the probability of leaving for Band 5 nurses and midwives only. For staff engagement, there is again a significant negative association, but this is driven by Band 6+ nurses and midwives. Finally, similarly to health-care assistants, there is a significant negative association between the reported quality of team working and the probability of leaving the NHS for Band 5 nurses and midwives only.

Table B.16. Associations between the monthly probability of leaving the acute sector and Staff Survey themes

	Band 5 nurses and midwives	Band 6+ nurses and midwives
Equality, diversity and inclusion	0.0369	-0.0310
	(0.0223)	(0.0208)
Health and well-being	0.0822*	0.0459
	(0.0433)	(0.0327)
Immediate managers	-0.0508	-0.0205
	(0.0533)	(0.0399)
Quality of care	-0.0131	-0.0278
	(0.0368)	(0.0283)
Bullying and harassment	0.0570	0.0436
	(0.0571)	(0.0406)
Violence	-0.0237	-0.00692
	(0.0609)	(0.0400)
Safety culture	0.00876	0.0313
	(0.0536)	(0.0375)
Staff engagement	-0.0503	-0.0993**
	(0.0539)	(0.0424)
Team working	-0.0963*	0.00256
	(0.0515)	(0.0383)

Note: Standard errors clustered at the trust level are displayed in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. Regressions include all other factors in Table 2.1, trust fixed effects and time period fixed effects.

Different definitions of leaving

Below we repeat the analysis of leaving decisions for nurses and midwives that we conducted in Chapter 4 using number of different definitions of ‘leaving’ the NHS acute sector. Our primary definition required staff members to leave the acute sector for at least three months to be classified as a leaver. Here we show how the results change if we use a one-month, one-year, two-year or five-year leaving requirement. We still require that staff members must have worked for three months in the acute sector before leaving. All other factors are identical to the main analysis. We focus on the results for nurses and midwives.²³

These different definitions of leavers capture different types of leavers. The one-month definition will include those who leave for several months, who will not be included in the one-year and longer definitions. This means that the average leaving rate is lower for the longer-period definitions. On average, 1.10% of nurses and midwives left the NHS each month using the one-month definition, compared to 0.56% for the one-year definition, 0.52% for the two-year definition and 0.46% for the five-year definition. These differences in average leaving rates mean that care must be taken when comparing coefficients across the different definitions.

The longer leaving definitions also mean that we must reduce our sample period. This is because we require more months of subsequent data to define a staff member as leaving in the current month. In all cases, the sample period continues to start from April 2012. But for the one-year definition, we end our sample period in September 2020, for the two-year definition we end it in September 2019, and for the five-year definition we end it in September 2016. For the one-month definition, we extend our sample period to July 2021. This means that results may differ not just because the definition of leaving has changed, but also because the sample period has changed. For example, the analysis using the two- and five-year definitions of leaving will not include any of the COVID-19 pandemic.

Table B.17 shows the probability of leaving the acute sector for female nurses and midwives. For the one-month definition, we see that female nurses and midwives were most likely to leave the acute sector when aged 25–39, the same as our primary results using the three-month leaving definition. But when we use the one-year or longer definition, this pattern changes, and female nurses aged between 25 and 39 were, if anything, less likely to leave the sector than their counterparts aged 40–44. This suggests that female nurses and midwives who leave when aged between 25 and 39 are mainly leaving the acute sector for less than a year.

²³ Results for consultants and health-care assistants are available upon request.

Table B.17. Probability of leaving the acute sector each month by age, female nurses and midwives

Age	Leaving definition			
	One month	One year	Two years	Five years
18–24	0.0776 (0.0596)	0.126** (0.0524)	0.0807 (0.0538)	0.185*** (0.0547)
25–29	0.322*** (0.0311)	-0.0326 (0.0278)	-0.0343 (0.0256)	0.0357 (0.0298)
30–34	0.564*** (0.0311)	-0.103*** (0.0232)	-0.124*** (0.0249)	-0.0935*** (0.0301)
35–39	0.267*** (0.0308)	-0.0824*** (0.0191)	-0.0851*** (0.0196)	-0.0337 (0.0220)
40–44	0 (.)	0 (.)	0 (.)	0 (.)
45–49	-0.158*** (0.0230)	-0.0405** (0.0179)	-0.0481** (0.0202)	-0.0606*** (0.0230)
50–54	-0.161*** (0.0257)	-0.0445** (0.0214)	-0.0350 (0.0217)	-0.0483* (0.0272)
55–59	-0.0354 (0.0419)	0.0355 (0.0330)	0.0175 (0.0363)	-0.00422 (0.0449)
60–64	0.0884 (0.0690)	0.0820 (0.0602)	0.0975 (0.0668)	0.176* (0.0904)
65+	-0.308 (0.203)	0.0340 (0.180)	-0.132 (0.204)	-0.605* (0.345)

Note: Standard errors clustered at the trust level are displayed in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. Regressions include all other factors in Table 2.1, trust fixed effects and time period fixed effects.

Table B.18 repeats this analysis for male nurses and midwives. The results are similar to our primary results, with the probability of leaving the acute sector rising rapidly from 55.

Table B.18. Probability of leaving the acute sector each month by age, male nurses and midwives

Age	Leaving definition			
	One month	One year	Two years	Five years
18–24	–0.137** (0.0579)	–0.194*** (0.0528)	–0.166*** (0.0527)	–0.263*** (0.0538)
25–29	0.0662* (0.0348)	0.0255 (0.0269)	0.0189 (0.0248)	–0.0685** (0.0313)
30–34	0.101*** (0.0276)	0.0889*** (0.0233)	0.108*** (0.0237)	0.0841*** (0.0279)
35–39	0.104*** (0.0258)	0.0906*** (0.0188)	0.0846*** (0.0193)	0.0391* (0.0211)
40–44	0 (.)	0 (.)	0 (.)	0 (.)
45–49	0.0270 (0.0218)	0.0224 (0.0171)	0.0365* (0.0191)	0.0490** (0.0230)
50–54	–0.00365 (0.0254)	0.00802 (0.0216)	0.0135 (0.0217)	0.0408 (0.0266)
55–59	0.509*** (0.0420)	0.341*** (0.0323)	0.383*** (0.0378)	0.432*** (0.0487)
60–64	1.01*** (0.0728)	0.763*** (0.0595)	0.822*** (0.0658)	0.984*** (0.0889)
65+	2.77*** (0.210)	1.73*** (0.176)	1.82*** (0.199)	2.42*** (0.342)

Note: Standard errors clustered at the trust level are displayed in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. Regressions include all other factors in Table 2.1, trust fixed effects and time period fixed effects.

Table B.19 shows the association between tenure and the probability of leaving the acute sector. These results are similar to our primary results, with higher tenure associated with a lower probability of leaving the sector up to 25 years of tenure.

Table B.19. Probability of leaving the acute sector each month by tenure for nurses and midwives

Tenure	Leaving definition			
	One month	One year	Two years	Five years
0–2 years	0.425*** (0.0268)	0.374*** (0.0136)	0.337*** (0.0137)	0.304*** (0.0149)
2–5 years	0.288*** (0.0112)	0.193*** (0.00854)	0.175*** (0.00916)	0.150*** (0.0106)
5–10 years	0 (.)	0 (.)	0 (.)	0 (.)
10–15 years	-0.262*** (0.0101)	-0.106*** (0.00673)	-0.0947*** (0.00751)	-0.0748*** (0.00702)
15–20 years	-0.335*** (0.0130)	-0.143*** (0.00919)	-0.127*** (0.0101)	-0.103*** (0.00917)
20–25 years	-0.329*** (0.0154)	-0.140*** (0.0105)	-0.131*** (0.0110)	-0.103*** (0.0114)
25+ years	-0.216*** (0.0191)	-0.0594*** (0.0123)	-0.0472*** (0.0127)	-0.0264** (0.0129)

Note: Standard errors clustered at the trust level are displayed in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. Regressions include all other factors in Table 2.1, trust fixed effects and time period fixed effects.

Table B.20 shows the probability of leaving the acute sector each month by gender. For the one-month leaving definition, there is no difference between male and female staff members. But for the one-year and longer definitions, female staff members were significantly less likely to leave the acute sector than their male counterparts. This suggests that male staff members were more likely to have short periods outside of the acute sector than their female counterparts.

Table B.20. Probability of leaving the acute sector each month by gender for nurses and midwives

	Leaving definition			
	One month	One year	Two years	Five years
Male	0 (.)	0 (.)	0 (.)	0 (.)
Female	-0.0129 (0.0221)	-0.116*** (0.0154)	-0.113*** (0.0150)	-0.114*** (0.0160)

Note: Standard errors clustered at the trust level are displayed in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. Regressions include all other factors in Table 2.1, trust fixed effects and time period fixed effects.

Table B.21 shows the association between the probability of leaving the acute sector and nationality groups. In each case, the pattern of results is similar to our primary results: EU/EEA nurses and midwives were more likely to leave the sector than their British counterparts, while non-EU/EEA nurses and midwives were less likely. However, the magnitude of these differences changes depending on the definition of leaving we use. Non-EU/EEA nurses and midwives were 24.2% less likely to leave than their British counterparts using the one-month definition. This difference falls the longer the time period we use to define leaving. Using the five-year definition, non-EU/EEA nurses and midwives were 8.7% less likely to leave than their British counterparts. British nurses and midwives, therefore, are much more likely to have shorter periods away from the NHS than their non-EU/EEA counterparts. This may reflect visa requirements if many non-EU/EEA nurses and midwives are in the UK on work visas.

Table B.21. Probability of leaving the acute sector each month by nationality group for nurses and midwives

	Leaving definition			
	One month	One year	Two years	Five years
British	0 (.)	0 (.)	0 (.)	0 (.)
EU/EEA	0.336*** (0.0255)	0.390*** (0.0215)	0.397*** (0.0234)	0.332*** (0.0251)
Non-EU/EEA	-0.266*** (0.0167)	-0.129*** (0.0107)	-0.0844*** (0.0103)	-0.0402*** (0.0110)

Note: Standard errors clustered at the trust level are displayed in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. Regressions include all other factors in Table 2.1, trust fixed effects and time period fixed effects.

Table B.22 shows the association between sickness absences and the probability of leaving the acute sector. In each case, the pattern of results is similar: staff members who have sickness absences were more likely to leave the acute sector than those who did not, and the effects of mental health absences were approximately double the effects of physical health absences. These effects do not change substantially between our different definitions, suggesting that sickness absences were associated with both short-term and longer-term periods out of the acute sector.

Table B.22. Associations between the monthly probability of leaving the acute sector and individual sickness absences for nurses and midwives

	Leaving definition			
	One month	One year	Two years	Five years
Physical health absences	1.31***	0.932***	0.892***	0.853***
	(0.0343)	(0.0206)	(0.0209)	(0.0247)
Mental health absences	2.81***	1.96***	1.90***	1.80***
	(0.0683)	(0.0553)	(0.0561)	(0.0717)

Note: Standard errors clustered at the trust level are displayed in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. Regressions include all other factors in Table 2.1, trust fixed effects and time period fixed effects.

Table B.23 shows the associations between our two measures of local economic conditions and the probability of leaving the acute sector. Consistent with our primary results, there is no significant association between local house prices and the probability of leaving. The association with regional unemployment, however, varies substantially depending on our leaving definition. Using the one-month leaving definition, we find that higher regional unemployment was associated with lower leaving rates, the same result we find using our primary three-month definition. However, there is no significant association between leaving and local unemployment rates when we use the one- or two-year definitions of leaving. This suggests that those who left the acute sector because of greater outside opportunities tended to leave for a short period. Perhaps surprisingly, we find that regional unemployment is positively associated with the probability of leaving the acute sector when we use our five-year definition.

Table B.23. Associations between the monthly probability of leaving the acute sector and local economic conditions for nurses and midwives

	Leaving definition			
	One month	One year	Two years	Five years
Regional unemployment	-0.0332** (0.0162)	-0.0221 (0.0173)	-0.00989 (0.0198)	0.0298* (0.0176)
Local house prices	-0.0354 (0.0345)	-0.0184 (0.0231)	-0.00608 (0.0244)	0.0167 (0.0214)

Note: Standard errors clustered at the trust level are displayed in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. Regressions include all other factors in Table 2.1, trust fixed effects and time period fixed effects.

Table B.24. shows the associations between our measures of trust performance and the probability of leaving the acute sector. These results are relatively consistent with our primary results, with the majority of measures of performance having no significant association with leaving rates. One difference is that using the one-month leaving definition, mental health absences in the same staff group are positively associated with the probability of leaving. This suggests that the mental health of colleagues matters for short-term, but not longer-term, periods away from the acute sector.

Table B.24. Associations between the monthly probability of leaving the acute sector and trust characteristics for nurses and midwives

	Leaving definition			
	One month	One year	Two years	Five years
Physical health absence rates	0.00491 (0.0109)	-0.00329 (0.00918)	-0.00181 (0.0132)	-0.0323** (0.0139)
Mental health absence rates	0.0207** (0.00845)	0.00633 (0.00872)	0.000766 (0.00955)	-0.00578 (0.00830)
Waiting list performance	-0.000517 (0.00796)	0.00163 (0.00427)	0.00448 (0.00891)	0.0169 (0.0123)
Bed occupancy	-0.0224* (0.0120)	-0.0213 (0.0135)	-0.0234* (0.0131)	-0.00745 (0.00741)
Negative reasons for leaving	0.00561 (0.00717)	0.00674 (0.00705)	0.00753 (0.00793)	0.0131 (0.0101)
Leaving rate	0.0141 (0.00952)	0.00258 (0.00820)	-0.00153 (0.00815)	-0.00733 (0.00674)

Note: Standard errors clustered at the trust level are displayed in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. Regressions include all other factors in Table 2.1, trust fixed effects and time period fixed effects.

Finally, Table B.25 shows the association between Staff Survey themes and the probability of leaving the acute sector. We do not include results for the five-year definition because our Staff Survey sample period is 2016–20 and our sample period for the five-year definition is 2012–16. The results are consistent with our primary results: higher staff engagement is associated with a lower probability of leaving the acute sector for all of our definitions of leaving, and for the one-month and one-year definitions, higher reported health and well-being are also associated with a higher probability of leaving the acute sector.

Table B.25. Associations between the monthly probability of leaving the acute sector and Staff Survey themes for nurses and midwives

	Leaving definition		
	One month	One year	Two years
Equality, diversity and inclusion	0.0126 (0.0205)	-0.00668 (0.0152)	-0.000964 (0.0176)
Health and well-being	0.0716* (0.0376)	0.0602* (0.0358)	0.0704 (0.0484)
Immediate managers	-0.0299 (0.0462)	-0.0374 (0.0439)	-0.0393 (0.0508)
Quality of care	-0.0347 (0.0291)	-0.00556 (0.0288)	0.0144 (0.0398)
Bullying and harassment	0.0592 (0.0438)	0.0410 (0.0430)	0.0696 (0.0500)
Violence	-0.0142 (0.0444)	-0.0357 (0.0410)	-0.0786 (0.0533)
Safety culture	0.0182 (0.0417)	0.0185 (0.0402)	0.0205 (0.0472)
Staff engagement	-0.0930** (0.0425)	-0.0781** (0.0392)	-0.0884** (0.0439)
Team working	-0.0509 (0.0407)	-0.00380 (0.0387)	-0.0136 (0.0466)

Note: Standard errors clustered at the trust level are displayed in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. Regressions include all other factors in Table 2.1, trust fixed effects and time period fixed effects.

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