Institute for Fiscal Studies

IFS Report R247

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Progression of parents in NHS medical and nursing careers

NIHR | Policy Research Unit in Health and Social Care Workforce

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UKRI Economic and Social Research Council

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Published by **The Institute for Fiscal Studies**

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ISBN 978-1-80103-122-6

Preface

This research is funded by the National Institute for Health and Care Research (NIHR) Policy Research Programme, through the Policy Research Unit in Health and Social Care Workforce, PR-PRU-1217-21002, with co-funding from the Royal College of Surgeons through the Nuffield Trust. The authors also gratefully acknowledge the support of the ESRC Centre for the Microeconomic Analysis of Public Policy (ES/T014334/1). 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.

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Executive summary

The employment rates and hours of mothers in the UK fall after their first child is born, while average wages stagnate. Changes for fathers are minimal and their wages continue to grow (Andrew et al., 2021). While the NHS performs relatively well at retaining female staff after maternity leave (Kelly and Stockton, 2022), Dacre et al. (2020) document substantial gender pay gaps in medicine, with a switch to part-time working and institutional training and pay structures important factors in explaining the gap. In addition, men and women continue to choose different medical specialties, with women in general, and mothers especially, being under-represented in higher-earning specialties such as surgery and cardiology.

Nursing and midwifery are heavily female-dominated occupations, but men are over-represented at the most senior levels of the profession (Punshon et al., 2019). There is a paucity of prior quantitative evidence on how gender and parenthood influence career progression in these professions.

In this report, we examine how the length of parental leave and rates of progression after having children vary by specialty, gender and other staff characteristics among doctors, dentists, nurses and midwives in the English NHS. Career progression has a direct impact on pay and can affect other job characteristics, such as shift pattern and location stability. The analysis of length of parental leave augments our previous work on rates of maternity leave and contracted hours upon return to work (Kelly and Stockton, 2022). This provides context for the environment in which women in different occupations and medical specialties make decisions and progress through their careers.

There are multiple possible causes of variation in progression rates and working patterns by gender and parenthood. Documenting and understanding that variation helps assess whether the gaps should or could be narrowed, and what policy levers might be most appropriate. Where there are cultural or structural barriers for certain groups, such as women in general or mothers in particular, this not only raises equity concerns for those affected but could suggest that the NHS is not making the best use of the talent it has (or could have). More broadly, the NHS is a very large employer and its success on equality has an important benchmarking role and can potentially influence conditions in the rest of the labour market.

Our analysis uses the Electronic Staff Record (ESR), the monthly payroll of directly employed staff in the NHS, from 2012 to 2021. This provides detailed information on the pay, hours, progression and parental leave absences of NHS staff. We analyse doctors of all grades and all

registered nurses/midwives in the acute (hospital) and community sectors. We examine three points of progression: for doctors, progression from early to late specialty training, and completion of specialty training; for nurses and midwives, progression from Agenda for Change band 5 (the entry point for newly qualified nurses/midwives) to band 6. We provide extended results which show how patterns in surgery, a field with few women, compare with those in other fields.

Key findings

1 **The length of maternity leave taken by female medics is shortest in male-dominated specialties including cardiology and surgery, and longest in more female-dominated specialties including community/public health, geriatric medicine and paediatrics.** For example, the median length of maternity leave in surgery is 43 weeks, compared with 48 weeks in community/public health. This adds to previous research, which showed that women in male-dominated specialties have fewer children and work more contracted hours when they return from maternity leave.

2 **Patterns are similar for nurses and midwives, with leaves typically shorter in branches of nursing with a higher share of men (psychiatry) and longer in the most female-dominated branches (obstetrics and gynaecology including midwifery, and children's nursing).** The average maternity leave is 41 weeks in psychiatric and mental health nursing, compared with 48 weeks in obstetrics and gynaecology.

3 **There is little variation in the length of paternity leave.** Across different staff characteristics, specialties and occupations, the vast majority of fathers take two weeks – which corresponds to the period of occupational paternity pay.

4 **Women doctors and nurses/midwives remain less likely to progress than their childless male colleagues for several years after returning from maternity leave.** This is true at every transition we analyse – from early to late specialty training and onward to specialty doctor or consultant for doctors, and from band 5 to band 6 for nurses/midwives. Among men, the differences in progression between fathers and childless men are much smaller.

5 **Part-time working and absences can explain some, but not all, of the slower progression of mothers**, with the proportion explained varying across different transitions. These factors can explain most of mothers' slower progression for doctors, but only about half for nurses'/midwives' rate of progression to band 6.

6 **Part-time working and absences explain much less of the gender gap in progression rates in surgery than in other specialties.** Mothers working in surgery – whether as doctors or as nurses – take shorter periods of maternity leave and work closer to full-time hours after returning from maternity leave than mothers in other fields of medicine or nursing and midwifery. Nevertheless, they progress more slowly than their childless male colleagues. So part-time working cannot account for the difference in progression rates in this case, and the causes must lie elsewhere.

1. Introduction

The career development of NHS staff is crucial to delivering high-quality and cost-effective care for patients. Employment practices that are inclusive and flexible have a crucial role to play in this, as recognised in the NHS People Promise. These practices benefit all employees but can be of increased value to parents of young children, many of whom remain in specialist training or are seeking progression.

Across the whole economy, it is principally mothers who change their labour supply (employment and hours) and see slower rates of progression and pay growth after having children (Andrew et al., 2021). Dacre et al. (2020) reported on the substantial pay gaps between male and female medics in the NHS, with motherhood and shifts to part-time working being a major factor. While this remains the case, the focus of addressing the career consequences of parenthood is typically on women and motherhood. This is particularly salient for the NHS as three in four NHS workers are women, including nine in ten nurses and midwives, half of all doctors and the majority of doctors under 50. There is a separate related set of questions for the NHS and the wider economy about how to enable others, including fathers and those with other caring responsibilities, to access and use flexible and part-time working.[1]

Ensuring opportunities for career progression are available to mothers is important not just for fairness but also to ensure that the NHS makes the best use of its resources. In the short term, progression opportunities may affect rates of retention of mothers within the NHS, or within certain specialties. A woman's choice of specialty may also be affected by its perceived compatibility with future family life. In the longer term, progression will affect who is in leadership and training positions, and therefore potentially the opportunities and outcomes of future generations of staff. Progression rates may also provide one indicator, although not the only indicator, of the success of flexible working and equal opportunities policies. More broadly, the NHS is the largest employer in the UK, and the opportunities it offers its employees could set a benchmark for other employers.

In this report, we examine two outcomes related to parenthood and the NHS, for both doctors and nurses/midwives in the acute and community sectors: length of parental leave and subsequent rates of career progression across different career stages. We analyse these outcomes

[1] Throughout this report, we use the terms 'part-time' and 'less than full-time'/'LTFT' interchangeably. The former is more common in the wider labour market and familiar to most audiences. The latter term is more commonly used in the NHS.

for both mothers and fathers, document variation by staff characteristics and highlight differences between fields of medicine and nursing/midwifery.

The duration of parental leave is of interest for career progression and the representation of women across specialties for two reasons. First, parental leave reduces the experience accumulated by mothers (and, to a much lesser extent, fathers). Second, variation in length of maternity leave by specialty, together with differences in rates of maternity leave and contracted hours on return documented in Kelly and Stockton (2022), may point to differences in ways of working and culture across specialties. These factors – and their perception – matter not just for the careers of women in each specialty now, but also for the specialty choice of younger cohorts.

We focus on three main points of career progression, which form the majority of career transitions for doctors and nurses/midwives with young children in our data. For doctors, we consider progression from early to late specialty training and completion of specialty training. For nurses and midwives, we examine progression from Agenda for Change band 5 (the entry point for newly qualified nurses/midwives) to band 6. We pay particular attention to doctors and nurses in surgery compared with other fields of medicine, as this field has particularly low rates of women. We also analyse the role of part-time work in accounting for slower progression.

Our data come from the Electronic Staff Record (ESR), which is the monthly payroll for all staff directly employed by the NHS. These data allow us to track the careers of most NHS staff over the period between early 2012 and late 2021, and include information on pay, career progression, hours worked, periods of absence including parental leave, and demographic characteristics.

This report contributes to our understanding of the factors that might contribute to the under-representation of women in some medical specialties, and the relationships between parenthood and progression across the NHS. However, it cannot answer the question of what is *causing* these patterns. This is because we observe associations rather than causal relationships. For example, it may be that women in male-dominated specialties have different motivations, skills or preferences from women in other specialties. The associations do, however, provide a basis for pointing to possible explanations and directing future evidence gathering.

The rest of the report is organised as follows. In Chapter 2, we introduce the ESR and describe our sample and methodology. In Chapter 3, we analyse variation in the length of maternity and paternity leave. Chapters 4 and 5 examine the relationships between parenthood and progression for doctors and nurses/midwives respectively. We conclude in Chapter 6.

2. Data and methodology

We use the Electronic Staff Record, a payroll dataset covering all staff directly employed by the NHS. This includes those employed in hospital and community settings and in physical and mental health. Those working in primary care are not generally included, with the exception of GPs in training, who remain directly employed by the NHS until they become fully qualified GPs.

Our focus is on doctors and registered nurses/midwives (Agenda for Change band 5 and above). We include doctors across five possible career stages after they finish medical school (see Box 4.1 later). We study midwives and nurses together because they are in the same NHS staff group, and staff members transition between both types of role.[2] We do not include health visitors, nursing associates, or other more junior nursing staff in our analysis.

Our data run from January 2012 to November 2021, or until staff leave the NHS sectors covered by the ESR (hospital and community care).[3] However, due to irregularities in the maternity data for nurses and midwives, we only analyse their data from January 2014 onwards. We disregard a small group of NHS staff who work for organisations other than trusts.[4] Our sample includes the first year of the COVID-19 pandemic, but all of our results remain unchanged if we exclude it. However, we do not consider whether patterns of parental leave and progression have changed since the start of the pandemic, as it is not the primary focus of this report and a longer post-COVID time frame would be required to address that question in detail.

We use data on absences as well as maternity and paternity pay to identify staff members on parental leave (see Box 2.1 for details on the NHS's parental leave entitlements). Women who take a full year of formal maternity leave will be recorded with some non-zero contracted hours (because they are still employed while on leave), though with zero earnings and zero hours worked and an indicator of being absent on maternity leave. Any staff members who take a longer, less formal family leave – even if they intend to return to the NHS at some point – drop out of our data because we cannot distinguish between planned, temporary family-related absences and other exits.

[2] The ESR does not give reliable information on education before joining the NHS, making it impossible to distinguish nurse-trained from direct-entry midwives.

[3] Individuals who have an assignment recorded in the ESR, but receive no pay of any type (including maternity pay) and record zero hours either contracted or worked, are deemed to have left.

[4] For example, clinical commissioning groups, special health authorities, and commissioning support units.

Box 2.1. Parental leave in the NHS and its recording in payroll data

All employees in the UK who meet the eligibility criteria are entitled to up to 52 weeks of maternity leave, provided they have an employment contract and give correct notice to their employer. For those meeting the eligibility criteria (based on earnings and length of service), statutory maternity pay (SMP) is paid for up to 39 weeks: 90% of pre-tax pay for the first 6 weeks and a flat rate (£151.97 in 2021–22, or 90% of average weekly earnings if that is lower) for the next 33 weeks. The NHS offers eligible employees who give birth an enhanced scheme of 8 weeks of full pay, 18 weeks of half pay plus SMP or maternity allowance (a benefit available for those not eligible for SMP), and a further 13 weeks of SMP. The remaining 13 weeks of leave – if taken – are unpaid. Parents can share up to 50 weeks of leave and 37 weeks of statutory shared parental pay between them.

NHS workers on maternity leave continue to accrue annual leave, which they may use before or after returning to work. They can also be promoted while on maternity leave.

Our data record maternity leave, paternity leave and additional paternity leave, parental leave and shared parental leave, and adoption leave, as well as occupational absence payments. For simplicity, we refer to all birth- and adoption-related leave by women as 'maternity leave' and by men as 'paternity leave'. We observe fewer paternity leaves than maternity leaves, even conditionally on the different age structures of men and women doctors and nurses/midwives. This may in part be caused by some fathers not taking any paternity-specific leave around the birth or adoption of their child. These births are not observed in the data. To the extent that fathers who take at least some paternity leave also make greater adjustments to their work and career in response to the birth of their child, the effects we show will therefore overstate the impacts for *all* fathers.

We do not observe whether a period of leave relates to a twin or other multiple birth, or to a sibling adoption. For simplicity, we will occasionally refer to 'parents of one child' to mean 'parents who have taken one maternity or paternity leave' during the period covered by our data.

In our analysis, we split the sample into four groups: women with and without observed periods of maternity leave and men with and without observed periods of paternity leave. Our analysis of length of parental leave will consider just those who took parental leave. We can compare patterns of maternity and paternity leave, and consider how length of leave differs for men and women with different characteristics.

Table 2.1 shows the characteristics of doctors and nurses/midwives who go on parental leave and our sample sizes. The average doctor is around 34 when they start maternity leave, whereas the average nurse/midwife is 32. Male doctors and nurses/midwives are both a little older at, on average, 35½ when they start paternity leave. Median maternity leave is 301 days or around 10

months for doctors, slightly more than the median of 286 days' or around 9½ months' maternity leave for nurses/midwives. Median paternity leave is 14 days for both doctors and nurses/midwives.

Table 2.1. Sample characteristics of doctors and nurses/midwives on parental leave

	Doctors		Nurses/midwives	
	Mothers	Fathers	Mothers	Fathers
Age at start of leave (years)	33.9	35.7	32.3	35.6
Duration of leave (days)	301	14	286	14
No. of people	26,071	12,664	97,804	6,811
No. of leave spells	35,275	14,972	124,550	7,788
No. of monthly observations	1,384,806	639,924	4,793,200	250,928
Observation period	2012–21		2014–21	

Note: Median values shown for age and duration. Age given at start of any (i.e. first or subsequent observed) leave. Parenthood status based on recorded parental leave during sample window. Excludes leaves already ongoing in January 2012 and those beginning in November 2020 or later.

Around 0.8% of all maternity and paternity leave spells among doctors (close to 400 spells) and 1.1% of those among nurses and midwives (just over 1,400 spells) relate to adoptions, although this may understate the true share of adoptions since the information is not always recorded. Due to the small size of this subgroup, we will not analyse them separately.

Our analysis of the association between parenthood and career progression is conducted using a hazard model (see the appendix). The model compares three groups – women with and without observed maternity leave and men with observed paternity leave – with men without observed paternity leave. An alternative would be to compare women with and without observed maternity leave. However, we only have data on births back to 2012 for doctors and 2014 for nurses/midwives. This means there are many women in the comparison group, particularly in the same age groups, who have young children born just before the data period starts. A comparison would therefore tend to reduce the magnitude of any impacts on progression. It is also true that we do not observe some periods of paternity leave, either before the sample started or because they were not recorded. However, this is less problematic because there are not large changes in labour supply after paternity leave and, as we shall see, there are limited differences in rates of progression between men who do and do not have a recorded paternity leave.

3. The duration of parental leave

In this chapter, we describe how long parents are typically absent for around childbirth, and how this varies depending on the medical field that they work in and their other characteristics. To do this, we analyse absence data on all birth- or adoption-related absences, including antenatal or adoption appointments, maternity and paternity leave, and shared parental leave.

While length of maternity leave is not necessarily of direct policy relevance, it does help provide context for the choices that parents face, the constraints they may face, and what young doctors may take into account when choosing their future specialty.

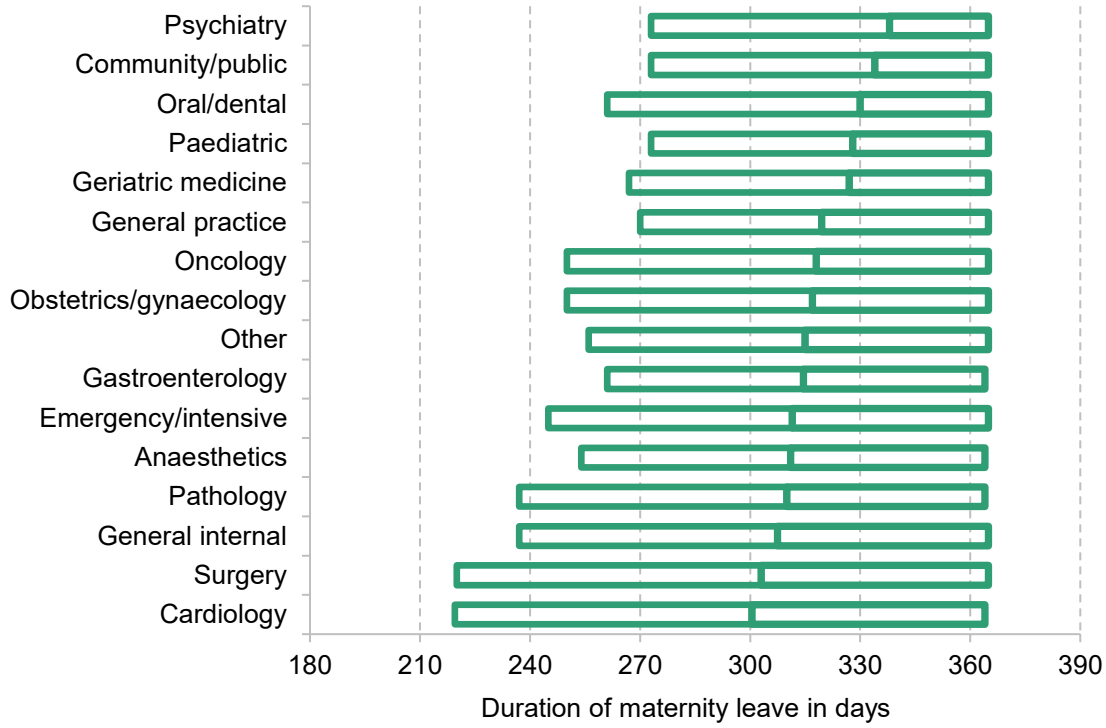
Variation across medical fields

Figure 3.1 shows how the duration of maternity leave differs across different fields within medicine for doctors, and Figure 3.2 repeats the same analysis for nurses and midwives.[5] The figures show three durations for each field. To interpret these, imagine that we lined up mothers in each field by the duration of their maternity leave from shortest to longest. The three points for each field on the graph show the duration for the woman who is, respectively, a quarter of the way through the line (the 25th percentile), in the middle of the line (the median) and three-quarters of the way through the line (the 75th percentile).

One striking commonality across all fields and among both doctors and nurses/midwives is that at least a quarter of mothers take a year's maternity leave or more. However, there is variation in the median duration and the 25th percentile. Among doctors, the lower percentiles are shortest in cardiology and surgery (two male-dominated areas), and highest in psychiatry, community/public health, paediatrics and geriatric medicine. This adds to patterns discussed in Kelly and Stockton (2022), whereby women doctors in male-dominated specialties are less likely to go on maternity leave in the first place and work more hours upon their return. In combination, these factors mean that the reduction in aggregate hours of work related to maternity will be concentrated in some fields of medicine.

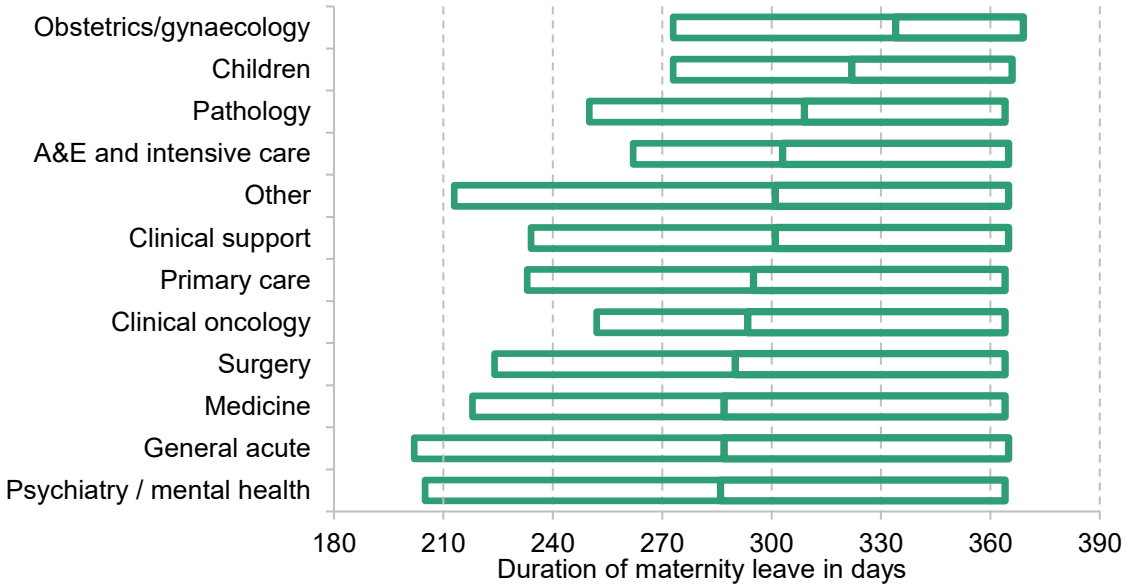
[5] For a list of specialties included in each field, see the appendix. For doctors, fields are groups of specialties as encoded in the doctor's occupation code. For nurses/midwives, fields are based primarily on 'primary area of work', supplemented by secondary area of work and occupation code in cases where the primary area is a generic one (general acute, medicine) or a non-clinical one.

Figure 3.1. Duration of doctors' maternity leave by field



Note: Emergency/intensive includes acute internal medicine. Oncology includes radiology and nuclear medicine. Excludes leaves already ongoing in January 2012 and those beginning in November 2020 or later.

Figure 3.2. Duration of nurses'/midwives' maternity leave by field



Note: Dental/oral, public health and imaging omitted due to small sample sizes. Excludes leaves already ongoing in January 2012 and those beginning in November 2020 or later.

Among nurses and midwives, leaves are shortest in psychiatry and general acute medicine, with the median duration also shorter than the overall average in surgery. It is interesting to note the contrast between professions in psychiatry, where we see shorter leaves for nurses but longer leaves for doctors. This is in the context of mental health nursing being the least female-dominated of all areas of nursing (with an average share of 'only' 73% women in our sample, compared with 90% overall). Psychiatrists, on the other hand, are more likely than other doctors to be women. Maternity leaves among nurses and midwives are longest in obstetrics and gynaecology (including midwifery) and children's nursing.

The typical duration of paternity leave is two weeks, which is the duration of 65% of paternity leave spells among doctors. It has not changed over time within our sample period and differs little across different fields of medicine. The 25th percentile, median and 75th percentile are two weeks for fathers in every specialty.

Among nurses and midwives, the median duration of paternity leave is also 14 days and does not vary across fields. Since there are fewer male nurses/midwives than male doctors going on paternity leave in the sample period,[6] the 25th and 75th percentiles within each field are more spread out, with a quarter of fathers within each field taking just a few days, and a quarter taking four weeks. This is true across all fields with sufficient observations.

In the appendix, we present multivariate regressions showing how length of maternity leave varies by staff characteristics and region. Doctors tend to take longer maternity leaves at later career stages, as do nurses/midwives in higher pay bands. But comparing doctors and nurses/midwives at the same career stage or in the same pay band, older mothers take shorter maternity leaves, and the first maternity leave is typically longer than subsequent ones for both staff groups. White British or Irish doctors take longer maternity leaves than other ethnic-minority colleagues, particularly black or black British doctors. By contrast, white British or white Irish nurses and midwives take shorter maternity leaves than their colleagues from other ethnic backgrounds, particularly compared with Pakistani or British Pakistani nurses and midwives.

There is also regional variation in the average leave duration that remains after taking into account other characteristics. The North East stands out as having short maternity leaves for both staff groups, alongside the East of England for doctors and the South East for nurses/midwives. Doctors in London take longer maternity leaves but this is not replicated for nurses and midwives.

[6] Recall that we are able to use two additional years of data for doctors compared with nurses/midwives, in addition to men being a small minority of nurses and midwives to begin with.

Again, there is much less systematic variation in the duration of paternity leave than in the duration of maternity leave. However, there are some differences that are statistically significant, and large at least relative to the average duration of two weeks: similar to mothers, paediatricians and doctors in London take longer paternity leaves, as do those who work lower hours after their leave. There are also differences across some ethnicity groups: black and Indian / British Indian doctors, and Indian / British Indian nurses/midwives, take shorter paternity leaves than those of other ethnicities.

4. Doctors' progression after parental leave

We now turn to career progression after new parents return to work. In this chapter, we analyse how the career progression of doctors after parental leave compares with that of their colleagues without a recent period of parental leave, before carrying out a similar analysis for nurses/midwives in Chapter 5. Box 4.1 provides a summary of the different stages of NHS doctors' careers and the key transition points that we study.

Box 4.1. Doctors' career stages in the NHS

In this report, we analyse two key career transitions for doctors. Our data include doctors at five stages:

- Foundation training, which takes a minimum of two years. The vast majority of doctors complete this stage before having a child.
- Early specialty training, taking a minimum of two years and sometimes labelled Core Training 1–2. This is usually broad-based and common to multiple specialties. **The transition from early to late specialty training is our first progression point of interest.**
- Late specialty training in a specific specialty, duration of which depends on the specialty in question, individual factors, and the type of position a doctor wishes to hold afterwards. **The completion of specialty training (and transition to either a specialty doctor or a consultant post) is our second progression point of interest.**
- Consultant positions, which usually require at least seven years of full-time specialty training (across early and late stages). The majority of those completing specialty training will become consultants.
- Staff, associate and specialist (SAS) positions, which differ from consultant positions by being more focused on direct patient care, being open to doctors after a shorter period of specialty training and being lower-paid. They are more geographically and temporally flexible than training positions. While doctors hold a range of different SAS positions in the NHS, new entrants in the period covered by our data are generally hired as specialty doctors, and we will use this term to refer to all SAS roles in the rest of the text.

Table A.1 in the appendix gives additional details on sample sizes and ages at each transition. It is worth noting that not all delays to progression through junior doctor training are a negative thing: they can reflect additional long-term career investments – for example, qualifications in multiple specialties or time out for further study or research. These investments may lead to higher earnings in the long run.

Most doctors (71% of women and 60% of men) are junior doctors in early or late specialty training at the start of their first parental leave. Figures A.1 and A.2 in the appendix show the career stages of doctors relative to when they went on maternity or paternity leave for the first time in greater detail.

As men are, on average, older when we observe their first paternity leave (see Table 2.1), there is a corresponding difference in the career stage at the start of family leave: 35% of new fathers have already completed specialty training and are consultants or specialty doctors, but the same is true of only 21% of new mothers. Only a small share of women (6%) and an even smaller share of men (4%) have their first parental leave during foundation training.

Given the career stage of most doctors going on parental leave, our focus for the analysis on doctors' career progression will be on transitions from early to late specialty training, and to specialty doctor and consultant roles. Since more mothers than fathers are yet to complete those training stages at the time of their first parental leave, any slowdown in progression associated with parenthood (even if that slowdown were the same for mothers and fathers) will impact more mothers.

Progressing through specialty training

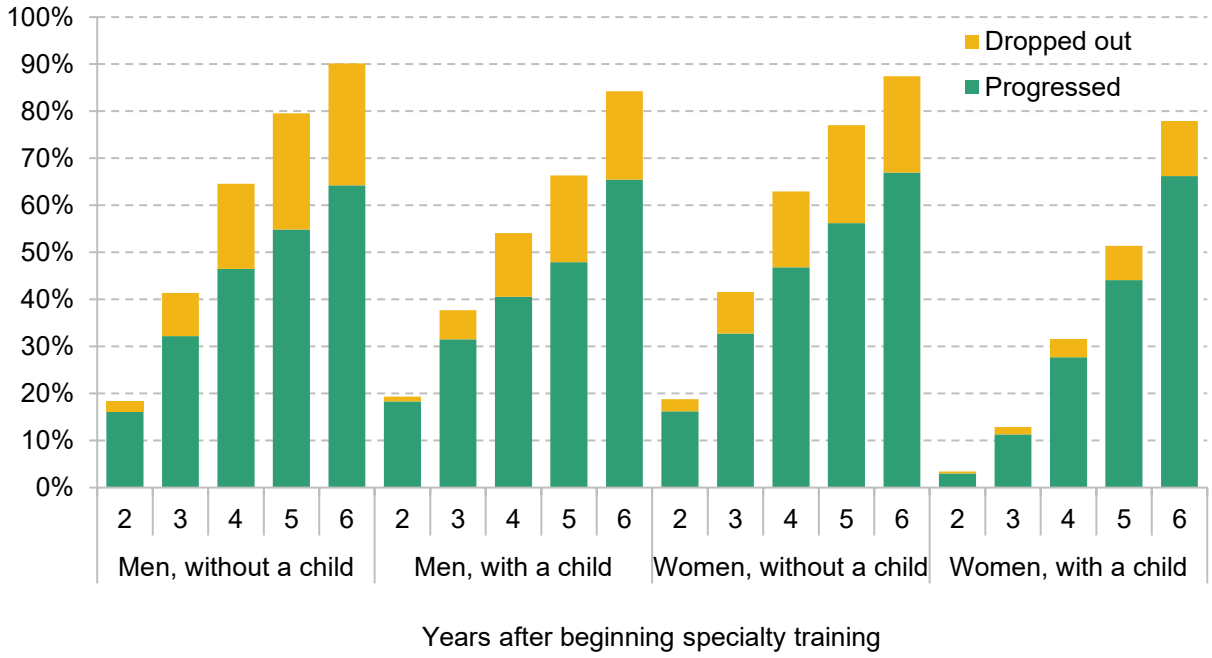
Figure 4.1 shows the progression of men and women doctors with and without children through specialty training (i.e. as registrars) for the six years following the start of specialty training. In this figure, doctors 'with a child' groups together all doctors who we observe taking parental leave before progressing to late specialty training, even though these children will be a mix of ages. Later in this section, we will specifically consider how the presence of children of different ages affects the progression of doctors.

The green bars in Figure 4.1 show the percentage of junior doctors who have progressed to the later stage of specialty training[7] after a given number of years of training, and the yellow bars represent those who left the acute and community sectors – either temporarily or permanently – without having progressed to the next stage of specialty training. The difference between the height of the combined bars and 100% is made up by junior doctors who remain in the early part of specialty training.[8]

[7] Grades corresponding to Core Training 3 or Specialty Training 3–8. Includes those who progressed and *then* left the acute and community sectors. For more details, see Box 4.1.

[8] This includes those who have begun core training in a second specialty.

Figure 4.1. Percentage of doctors who have progressed to late specialty training, by gender and whether they had a child during early specialty training



Note: 2012 to 2016 cohorts. 'With a child' groups refer to doctors who had a child before progressing to late specialty training. 'Without a child' refers to all others (i.e. both those we do not observe as a parent and those who have a child at a later career stage).

Throughout this analysis, it is important to remember that some reasons for slow progression through medical training, such as dual specialty qualifications and time taken out for research or further study, can be an investment that pays off in terms of career progression and earnings in the long term.

Early specialty training takes a minimum of two years.[9] However, as is clear from Figure 4.1, only a minority of doctors – 16–18% of childless junior doctors – progress at this earliest possible point. This is true for men with and without a child and women without a child. Among mothers it is much lower: only 3% progress after two years. Mothers start to catch up with other junior doctors over subsequent years. They remain behind after the fifth year after the beginning of specialty training, but have caught up after the sixth year, when two-thirds of doctors in all groups have progressed. However, mothers (and, to a lesser extent, fathers) are less likely to have left the acute and community sectors without progressing to the late stage of specialty training.

[9] We define the beginning of specialty training as the transition from foundation training to early specialty training. In cases where a person makes more than one of these transitions (less than 0.5% of observations), we disregard transitions from bank, locum or other atypical contracts. Where this still leaves multiple transitions, we use the earliest recorded transition.

Estimating progression gaps between mothers and comparable male childless doctors

The differences in the raw numbers only tell part of the story. Female doctors who have children (at this relatively early career stage) differ in many of their characteristics from their peers. These characteristics may affect the speed of their progress too and we want to understand to what extent those differences, rather than motherhood itself, explain gaps in progression. In order to account for these differences systematically, in this section we estimate the association between motherhood and progression using a methodology called a hazard model (discussed in detail in the appendix). We only analyse doctors who remain in the acute and community sectors here, with the decision to leave these sectors analysed separately below.

Intuitively, the hazard model compares different groups of doctors who are all at the same point in their training and calculates their probability of progressing to the next stage. The models estimate, for each month after the beginning of early specialty training, the rate of progression for women with a youngest child at a given age (e.g. youngest child aged 1) *relative to the progression rate for childless men* with the same characteristics, such as age and date training commenced. Rates of progression are always measured relative to childless men, because our sample window does not allow us to differentiate between women who do not have (young) children and those who had children shortly before the sample started. Comparing with 'childless' women would therefore bias our estimated associations downwards, as some of these women may also have experienced a slowdown in progression after their earlier maternity leaves.

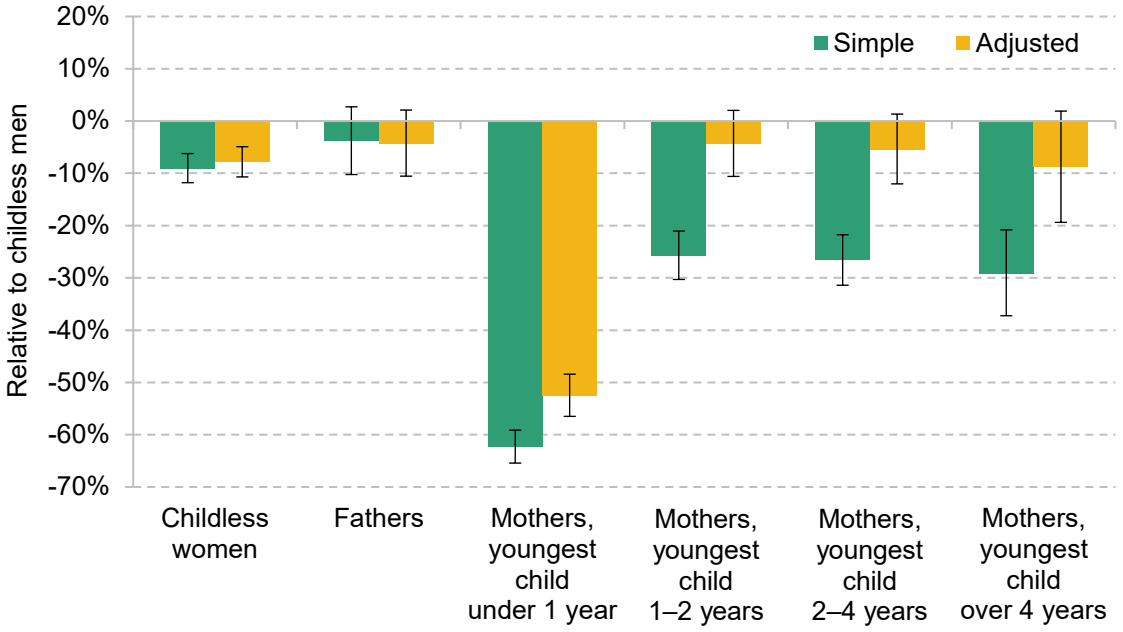
At each number of months into early specialty training, the hazard model only compares those doctors who have not already progressed with each other. Hence, the set of childless men that a woman (who does not progress) is compared with in a particular year will be different from (larger than) the group she is compared with in the following year, which will only include childless men who also did not progress.

We present the results from two models. The 'simple' model only conditions on age and when training began (cohort), and therefore compares three groups (women with children, women without children, and men with children) with childless men of the same age and cohort.[10] For women with children, we group by age of the youngest child. The 'adjusted' model also accounts for differences in experience and hours worked, and for different medical fields. This version will therefore account for women being much more likely to work less than full-time than both men and childless women after maternity leave, and therefore accumulating

[10] Taken together, cohort and time also capture any effects that affect all doctors at the same point in calendar time, such as the COVID-19 pandemic.

experience less quickly, and women being concentrated in specific medical fields that may vary in the standard training length.

Figure 4.2. Progression to late specialty training relative to childless men, by gender and parenthood, adjusted for differences in experience and characteristics



Note: Hazard ratio minus 1 and 95% confidence interval shown. 'Simple' effect adjusts for differences in age and cohort only. 'Adjusted' effect additionally adjusts for differences in past absences and current and past hours worked, plus differences in typical progression patterns by field and in contract types. Age of youngest child refers to time elapsed since start of last maternity leave (which may be slightly greater than the actual age of the child).

Figure 4.2 presents the first set of results from the hazard model. It shows how the probability of progression for fathers, childless women, and mothers whose youngest child is in different age brackets compares with the probability of progression for childless men. The green bars present the 'simple' model which only adjusts for doctors' age and their training cohort.[11] The leftmost bar gives the estimate for childless women. It can be interpreted as follows: if we compare two childless doctors of the same age, in the same cohort and at the same number of months after the beginning of specialty training, one a woman and the other a man, then the woman is 9% less likely than the man to progress to late specialty training. However, this number should be treated with particular caution as some women in this category will have children born before 2012. The corresponding estimate for fathers (versus childless men) is negative (slower progress) but not statistically significant. After a maternity leave, women with children are less likely to progress from the early to the late stage of specialty training than childless men of the same age, training

[11] The cohort is the calendar year when doctors began specialty training; this is to capture reforms and reorganisations over time which have, on average, sped up progression.

cohort and elapsed duration of specialty training. The gap is greater than 60% in the first year, when most mothers will be on maternity leave. In subsequent years, mothers are still between 25% and 30% less likely to progress than comparable childless men.

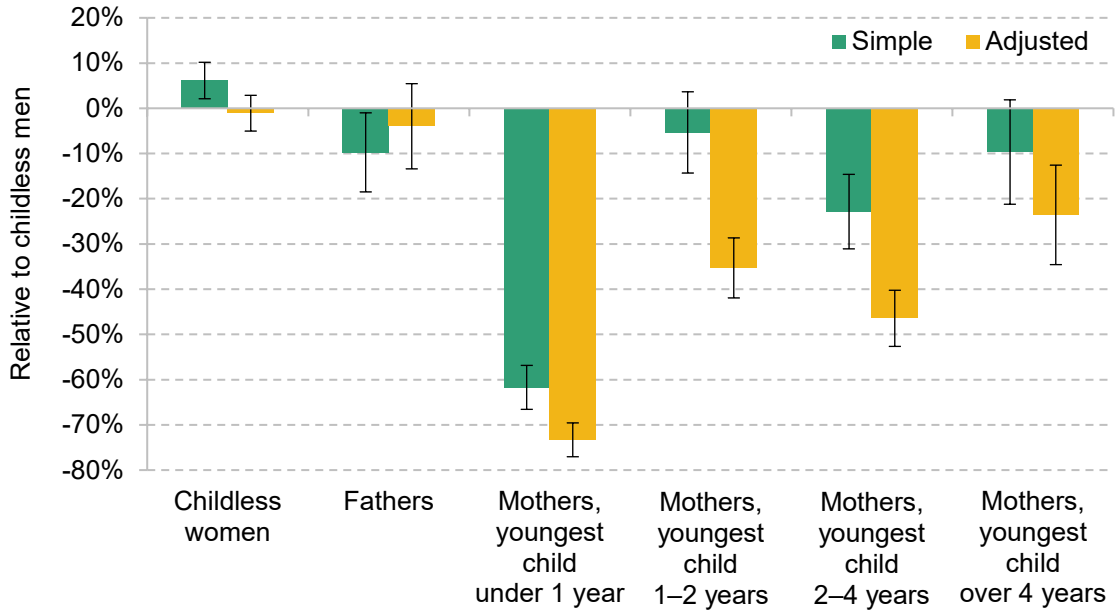
Results from the adjusted model, shown by the yellow bars, also account for differences in experience and hours of work, and for different medical fields. To estimate the association represented by the yellow bars, we only allow for a proportional effect of absences and current and past hours worked, i.e. a doctor reducing their hours by 10% of full-time has the same impact on their relative chance of progression no matter their starting hours. If part-time work is particularly penalised below a certain threshold and mothers are more likely to fall below this threshold, this will show up in the effect of motherhood.

The adjusted model makes very little difference to the relative progression rates for childless women and fathers (the green and yellow bars are similar heights). This is in part because, like childless men, most work full-time. For mothers, the adjusted model indicates that much of the gap in progression rates between mothers and comparable childless men shown by the green bars is explained by differences in absences, part-time work and specialty choice. Excluding the case where maternity leave started less than a year ago, when women are mostly on leave, accounting for these differences reduces the gap in progression between mothers and childless male doctors by around three-quarters (rightmost three yellow bars). The remaining gap is not statistically significant (though it is always negative).

We stress that both the simple and adjusted estimated associations are an important part of understanding the impact of motherhood and neither should be considered in isolation. The choices women make both before and after becoming mothers – for example, about which specialties to enter and how many hours to work – are themselves dependent on their expectations about future opportunities for progression, and the impact of these choices is not fixed but depends on local and system-wide decisions. For example, if time for activities relevant for progression is disproportionately ‘squeezed’ by going part-time, the probability of progression will be disproportionately affected as well. In turn, if these activities are protected and prioritised, progression in part-time roles could be closer to that in full-time ones.

Mothers and other doctors also differ in their propensity to exit the acute and community sectors without progressing to the late stage of specialty training, and this helps interpret the patterns we see for progression. Figure 4.3 shows that mothers are much less likely to exit these sectors – especially in the first year (during and shortly after maternity leave), but also beyond that. This is consistent with the idea that most women who are planning on becoming mothers first make a firm sector choice.

Figure 4.3. Rates of exit from early specialty training relative to childless men, adjusted for differences in experience and characteristics



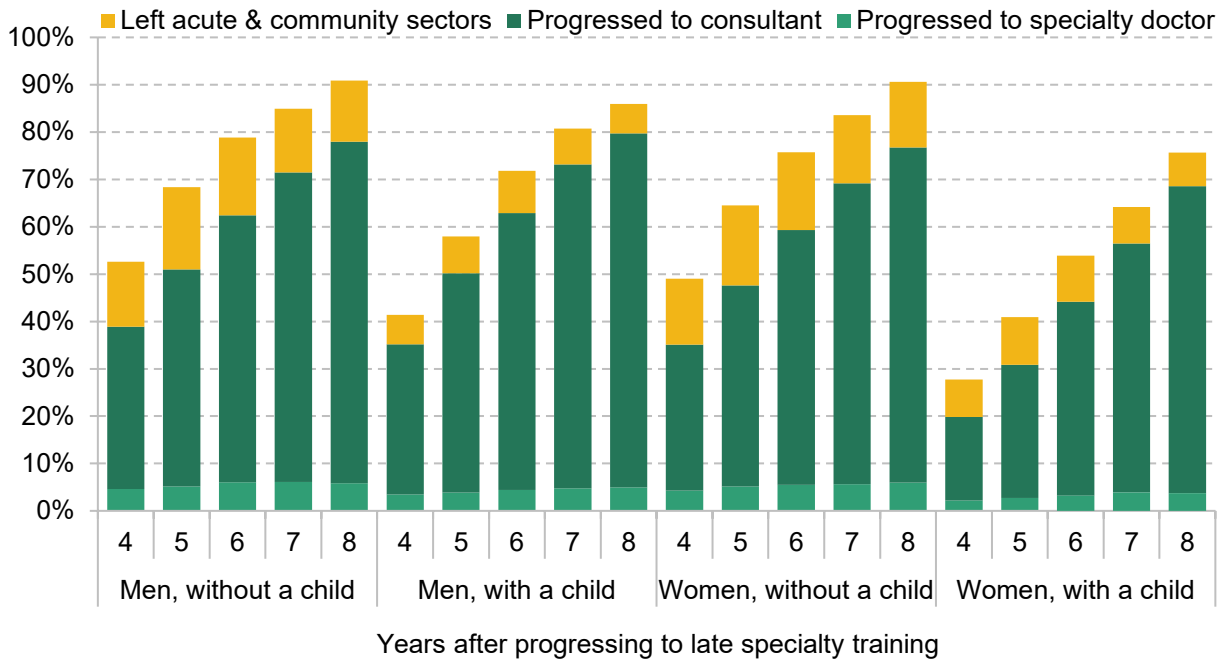
Note: Hazard ratio minus 1 and 95% confidence interval shown. 'Simple' effect adjusts for differences in age and cohort only. 'Adjusted' effect additionally adjusts for differences in past absences and current and past hours worked, plus differences in typical progression patterns by field and in contract types. Age of youngest child refers to time elapsed since start of last maternity leave (which may be slightly greater than the actual age of the child).

When we adjust for differences in experience and part-time work, mothers are less likely to exit by an even greater margin (and this is not the case among fathers). This is consistent with absences and part-time work for reasons *other than* motherhood being much more likely to result in a doctor eventually abandoning specialty training altogether. Therefore, if we compare a mother with a male childless doctor (or a father) with a similar history of absences and part-time work, a mother is much less likely to exit the acute and community sectors.

Completing specialty training

We now turn to doctors' next career step, completing specialty training. Figure 4.4 shows the percentage of doctors who have finished specialty training and progressed to a role as a consultant after a given number of years. Smaller numbers progress to a specialist doctor role. These roles are lower-paid, more focused on direct patient care and often seen as more family-friendly. They also require a shorter minimum period of specialty training. Because of this option, faster progression at this stage may mean lower earnings in the long run.

Figure 4.4. Percentage of doctors progressing from late specialty training to specialty doctors or consultant posts, by gender and parenthood



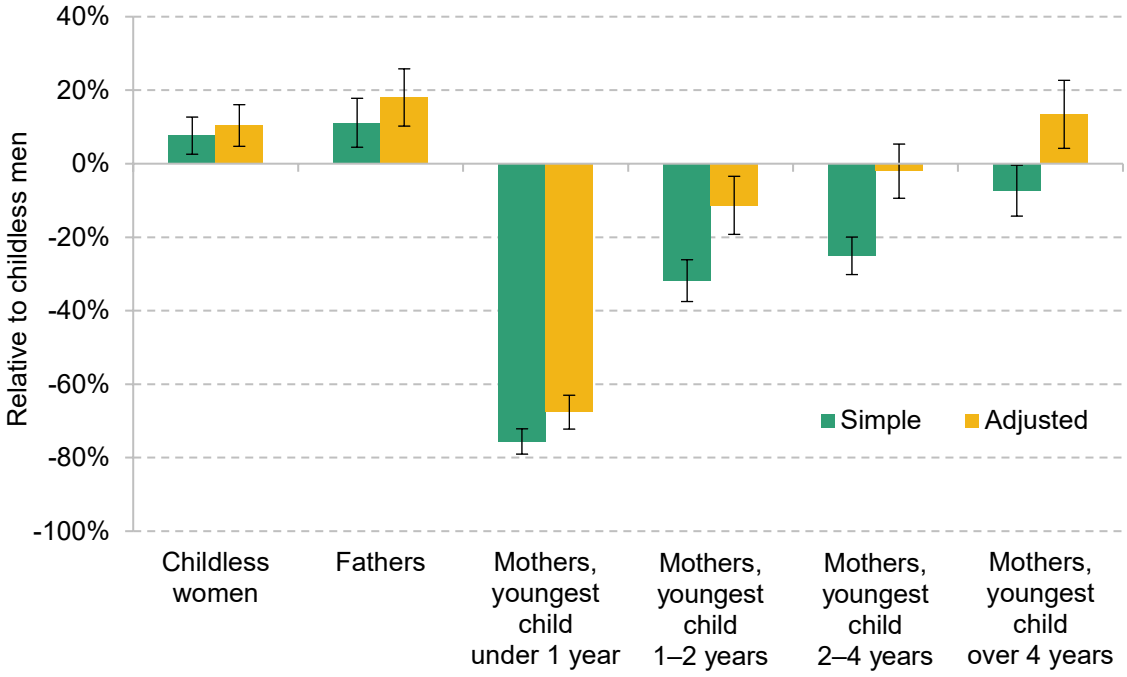
Note: 2012 to 2016 cohorts. 'With a child' groups refer to doctors who had a child before progressing to late specialty training. 'Without a child' refers to all others (i.e. both those we do not observe as a parent and those who have a child at a later career stage).

In Figure 4.4, the yellow bar of doctors who left the acute and community sectors now includes those who, having completed both stages of GP training, start work as a GP. Even in the eighth year after progressing to the 'late' stage of specialty training, almost one in four mothers remain in training compared with one in ten doctors, whether men or women, without children.

Figure 4.5 looks at the slowdown in progression (to any fully trained specialist role in the acute, mental health or community sectors, not just consultant roles) for parents using a hazard model. We compare doctors who remain in the acute and community sectors with each other, after the same elapsed duration since progressing to late specialty training. As in Figure 4.2, the green bars adjust for age and training cohort only, while the yellow bars additionally adjust for differences in experience and hours worked, and between medical fields.

Just as at the previous stage, progression is very unlikely during the first year of maternity leave. For mothers whose youngest child is aged between 1 and 2, accounting for a proportional effect of past and present part-time work shrinks the gap with childless men by nearly two-thirds, but it remains significant. For mothers of children aged 2–4, all of the remaining gap is explained by part-time work and experience, and those whose children are at least 4 are more likely to progress than comparable childless men. This last result is in contrast to the case of progression from early to late specialty training, and we also find that childless women and fathers progress faster than childless men as well as faster than mothers.

Figure 4.5. Progression to specialty doctor or consultant posts among those remaining in the acute and community sectors, relative to childless men, adjusted for differences in experience and characteristics



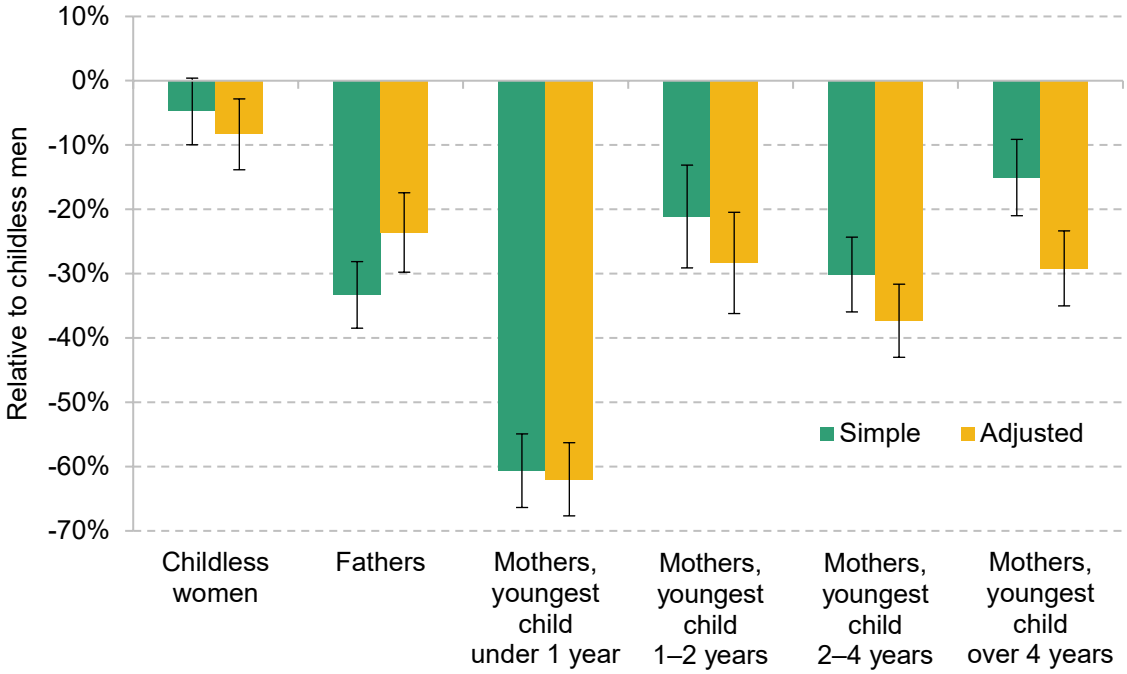
Note: Hazard ratio minus 1 and 95% confidence interval shown. 'Simple' effect adjusts for differences in age and cohort only. 'Adjusted' effect additionally adjusts for differences in past absences and current and past hours worked, plus differences in typical progression patterns by field and in contract types. Age of youngest child refers to time elapsed since start of last maternity leave (which may be slightly greater than the actual age of the child).

In this report, we do not focus on choices between different types of posts for fully qualified doctors (consultant versus specialty doctors). There are important gender differences: conditioning on characteristics such as age, ethnicity, nationality and medical field, women are much more likely to be in a specialty doctor as opposed to a consultant post. Specialty doctor posts could also be a more family-friendly option than remaining in training, as they give doctors more choice over their location and options for flexible working. If we re-estimate the model for those progressing to consultant *only*, the results are quite similar: the gap is still wholly explained by part-time work, absences and specialty for mothers whose youngest child is at least 2; and it is positive – although insignificant – for those whose youngest child is at least 4.

When we consider doctors who leave the acute and community sectors without having progressed to a fully qualified role in those sectors in Figure 4.6, we see that mothers are consistently less likely to leave, and if anything even more so when comparing them with doctors with the same part-time working history and in the same fields. The vast majority of those who train in general practice, where women and mothers are over-represented, leave to

join the primary care sector (a GP practice) when they qualify.[12] But even without this particular adjustment (i.e. including the fact that more mothers train as GPs in the motherhood gap, the green bars), mothers are still less likely to leave the acute and community sectors without having progressed to specialty doctor or consultant roles.

Figure 4.6. Rates of exit from late specialty training, relative to childless men, adjusted for differences in experience and characteristics



Note: Hazard ratio minus 1 and 95% confidence interval shown. 'Simple' effect adjusts for differences in age and cohort only. 'Adjusted' effect additionally adjusts for differences in past absences and current and past hours worked, plus differences in typical progression patterns by field and in contract types. Age of youngest child refers to time elapsed since start of last maternity leave (which may be slightly greater than the actual age of the child).

How does surgery compare with other fields?

We now turn to junior doctors training in surgical specialties[13] and compare them with junior doctors in other fields. When it comes to the progression of mothers, an important difference is that women training in surgical specialties are much less likely to go on maternity leave in the first place. Just 23% of women training in surgery have had a maternity leave five years after beginning specialty training, compared with 37% of women in non-surgical specialties. Surgical specialties remain more male-dominated than other fields within medicine, and this pattern

[12] There are some exceptions, such as GPs who are hired directly by trusts to provide out-of-hours cover, but the numbers are very small.

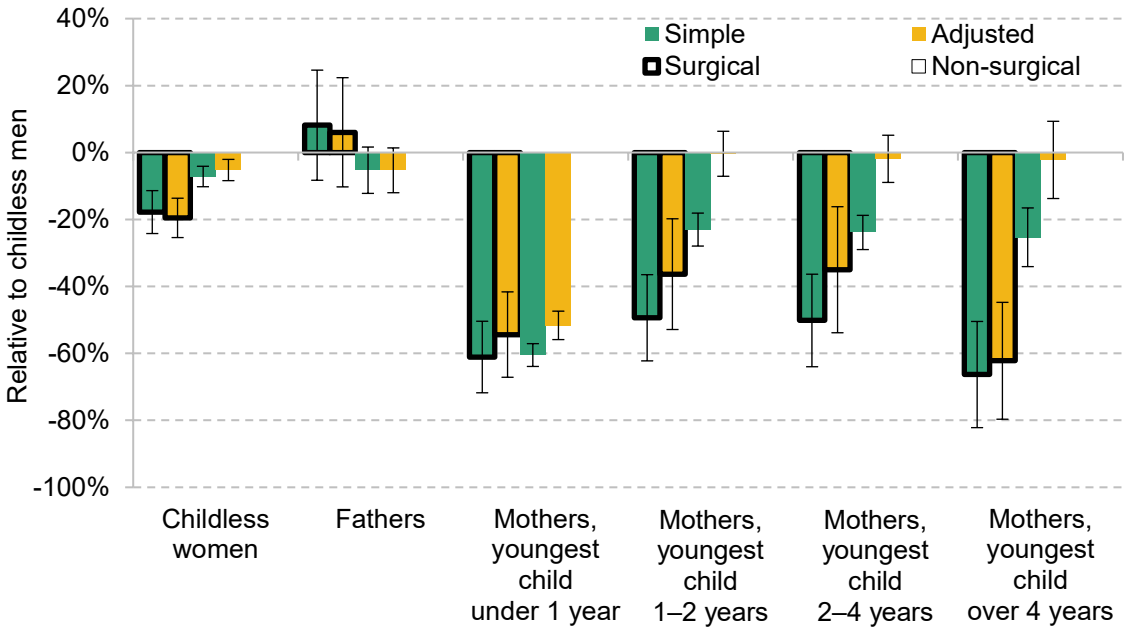
[13] General surgery, trauma and orthopaedic surgery, urology, otolaryngology, cardio-thoracic surgery, vascular surgery, neurosurgery, plastic surgery, oral and maxillofacial surgery, and paediatric surgery.

reproduces across other fields, with more and longer maternity leaves among women working in specialties where women make up a greater proportion of doctors (see Chapter 3 and Kelly and Stockton (2022)).

Those who do become mothers in surgical and non-surgical specialties also differ in their characteristics: mothers at either stage of specialty training in surgical specialties work 95% of full-time on average, whereas those in other specialties work 85% of full-time on average (which is still high compared with mothers in other industries). Only at later career stages (specialty doctors and consultants) do we see some mothers in surgical specialties working less than full-time. Women training in surgical specialties also tend to be slightly older when they become mothers (by about eight months).

As discussed above, men are generally less likely to become fathers during earlier career stages. The gap between surgical and non-surgical specialties is smaller, but it goes in the same direction: 12% of men in surgical specialties have had a paternity leave five years after the beginning of specialty training, compared with 16% of men training in surgery. Like mothers, men in surgery tend to be older when they become fathers than those in non-surgical specialties, by about nine months. However, less than full-time work is rare across all groups of men, and fathers across specialties actually work more than 100% of full-time on average.

Figure 4.7. Progression to late specialty training relative to childless men, grouped by surgical and non-surgical specialties



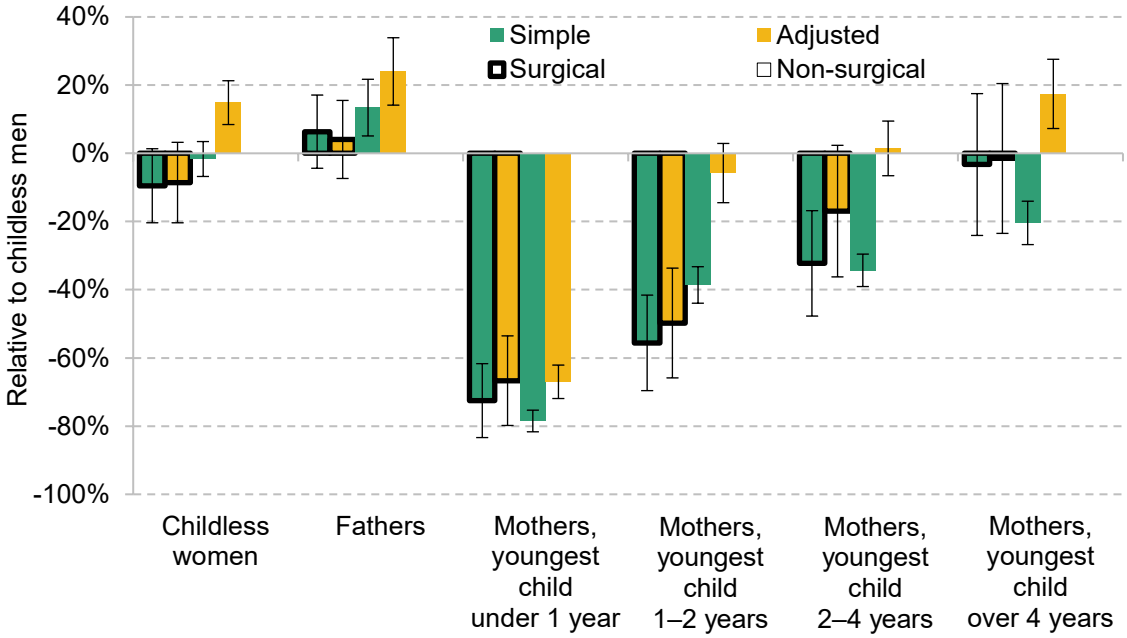
Note: Hazard ratio minus 1 and 95% confidence interval shown. 'Simple' effect adjusts for differences in age and cohort only. 'Adjusted' effect additionally adjusts for differences in past absences and current and past hours worked, plus differences in typical progression patterns by field and in contract types. Age of youngest child refers to time elapsed since start of last maternity leave (which may be slightly greater than the actual age of the child).

Figure 4.7 shows the impact of parenthood on the probability of progression in surgical and non-surgical specialties. The non-surgical specialties show a similar pattern to the overall results in Figure 4.2: mothers are less likely to progress than childless men, but this difference is proportional to their absences and part-time working – there is no separate 'motherhood penalty' above and beyond these.

In contrast, the pattern looks very different for mothers in surgical specialties. They are still one-third to two-thirds less likely to progress than comparable men *after* adjusting for absences and part-time working. When interpreting differences between groups of mothers with children of different ages, it is important to keep in mind that estimates for a group of women whose youngest child is older will place greater weight on women who had their child earlier on during their career. Further digging into differences among mothers in surgery suggests that this is an important distinction: the small group of mothers who begin surgical training after already having had a child during the foundation phase seems to progress especially slowly.

We now turn to progression to specialty doctor or consultant roles at the end of specialty training and once again compare surgical and non-surgical specialties (Figure 4.8). At this transition, the 'simple' association between motherhood and progression looks similar between surgical and non-surgical specialties for mothers whose youngest child is under the age of 4.

Figure 4.8. Progression to specialty doctor or consultant relative to childless men, grouped by surgical and non-surgical specialties



Note: Hazard ratio minus 1 and 95% confidence interval shown. 'Simple' effect adjusts for differences in age and cohort only. 'Adjusted' effect additionally adjusts for differences in past absences and current and past hours worked, plus differences in typical progression patterns by field and in contract types. Age of youngest child refers to time elapsed since start of last maternity leave (which may be slightly greater than the actual age of the child).

However, as with the progression to late specialty training in Figure 4.7, the role of absences and part-time work is very different. In non-surgical specialties (accounting for field-specific patterns among this diverse group), absences and part-time work explain most of the gap for mothers until their youngest child is 1 year old, and all of it thereafter. Mothers whose youngest child is aged at least 4 outside of surgery are actually more likely to progress than childless men with a comparable history of absences and part-time work and in the same medical fields.[14] In contrast, in surgical specialties, where part-time work is much less common, the 'adjusted' gap is closer to the 'simple' one and both only disappear more than four years after the maternity leave started.

This highlights the importance of looking at both raw and adjusted figures: mothers in surgical and non-surgical specialties face similar slowdowns in progression but, based on the high hours worked by mothers in surgery, we would expect the gap in their progression to be smaller than it is.

[14] An alternative interpretation, raised previously, is that part-time working junior doctors are able to prioritise 'progressable' activities, such that skills accumulation is slowed down less than proportionately to working hours.

5. Nurses' and midwives' progression after parental leave

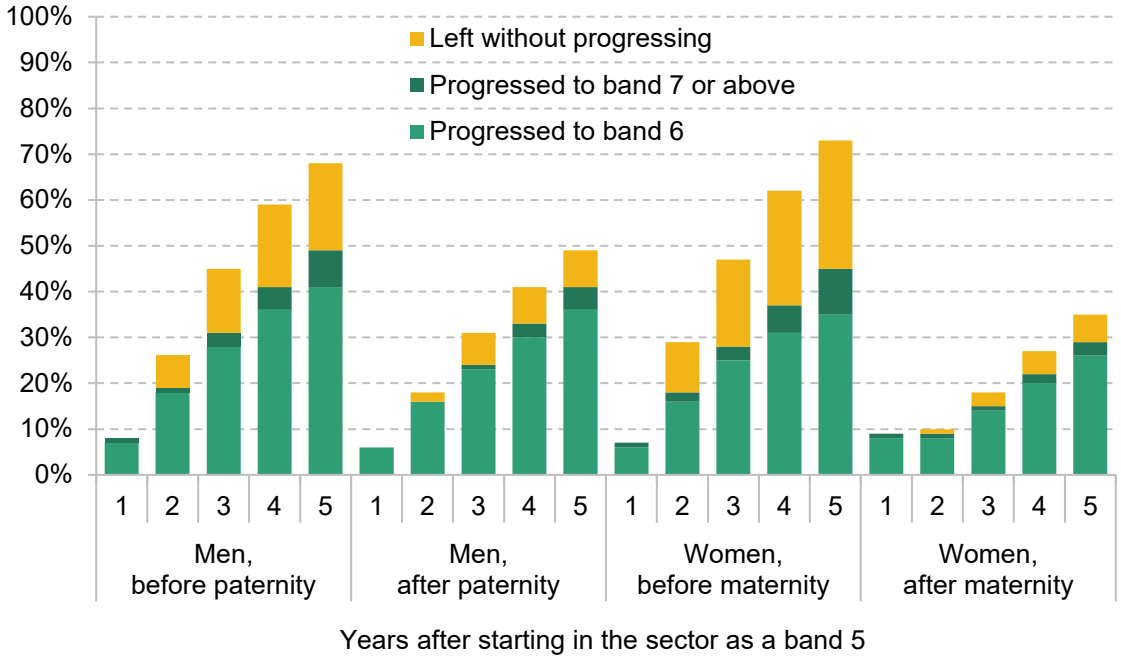
We now turn to discussing career progression for nurses and midwives. Whereas for doctors the relevant transitions for our analysis related to progressing through and completing training, for nurses and midwives we analyse those who have entered the profession after completing their training and focus on promotions thereafter. Nursing and midwifery are also heavily female-dominated professions (>90%), which provides an interesting contrast with doctors. As before, we pay particular attention to the field of surgery and compare it with other branches of nursing and midwifery.

Most nurses and midwives who go on maternity leave are in Agenda for Change band 5 (see Figures A.3 and A.4 in the appendix for details), which is also the largest pay band overall, accounting for approximately half of all registered nurses/midwives.[15] When analysing progression before and after parental leave for nurses and midwives, we therefore focus on transitions to band 6. Band 6 nursing roles are typically still focused on direct patient care, but require some additional training post-qualification, and include management and leadership responsibilities.

As for doctors, women nurses/midwives are on average younger at the time of their first maternity leave (32.3 years) than men at the time of their first paternity leave (35.6 years). However, this is less strongly reflected in the respective career stages, which look relatively similar for men and women: more than half of women (55%) as well as men (52%) are in band 5 at the time of their first maternity or paternity leave. Slightly under a third of both genders are in band 6, with only a minority in higher bands.

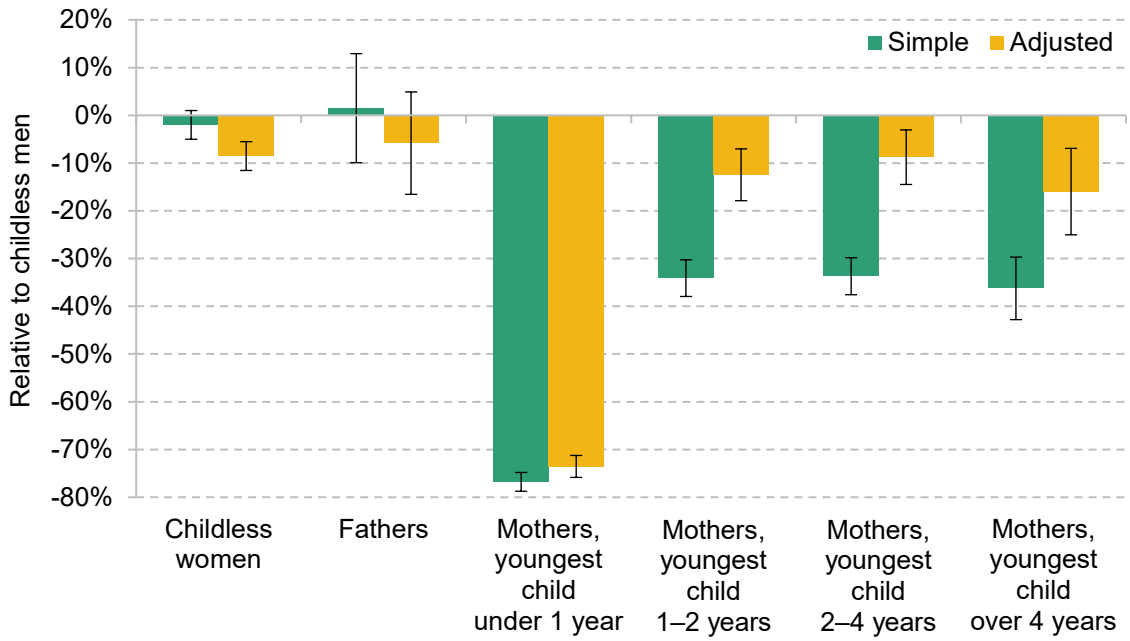
[15] 41% of all our data on nurses/midwives refer to band 5, or 45% when we exclude those with an unknown band or on a non-Agenda-for-Change pay scale.

Figure 5.1. Progression outcomes for parents and non-parents in nursing and midwifery



Note: 2014 to 2017 cohorts. 'After paternity/maternity' groups refer to doctors who had a child before progressing to band 6. 'Before paternity/maternity' refers to all others (i.e. both those we do not observe as a parent and those who have a child after progressing to band 6 or beyond).

Figure 5.2. Progression to band 6 relative to childless men, by gender and parenthood, adjusted for differences in experience and characteristics



Note: Hazard ratio minus 1 and 95% confidence interval shown. 'Simple' effect adjusts for differences in age, cohort, experience in the NHS and recruitment source only. 'Adjusted' effect additionally adjusts for differences in past absences and current and past hours worked, plus differences in typical progression patterns by field and in contract types. Age of youngest child refers to time elapsed since start of last maternity leave (which may be slightly greater than the actual age of the child).

As with doctors, there are differences between nurses/midwives who are new parents and others, and between genders (see Figure 5.1). Whereas junior doctors have comparable experience when at the same training stage, nurses and midwives may join the acute and community sector as a band 5 from another NHS or non-NHS employer, either in the UK or abroad, where they have gained previous experience. In addition to the role of absences and part-time work that we highlighted previously, we therefore adjust for time since first hired in the NHS, and recruitment source in both the 'simple' and 'adjusted' models, in order to compare nurses/midwives at similar points in their careers.

As we saw with doctors, the probability of progression is very low in the first year after childbirth, when most women will be on maternity leave (see Figure 5.2). This highlights that, although it is in theory possible to progress while on maternity leave, it appears to be very unusual in practice for both doctors and nurses/midwives.

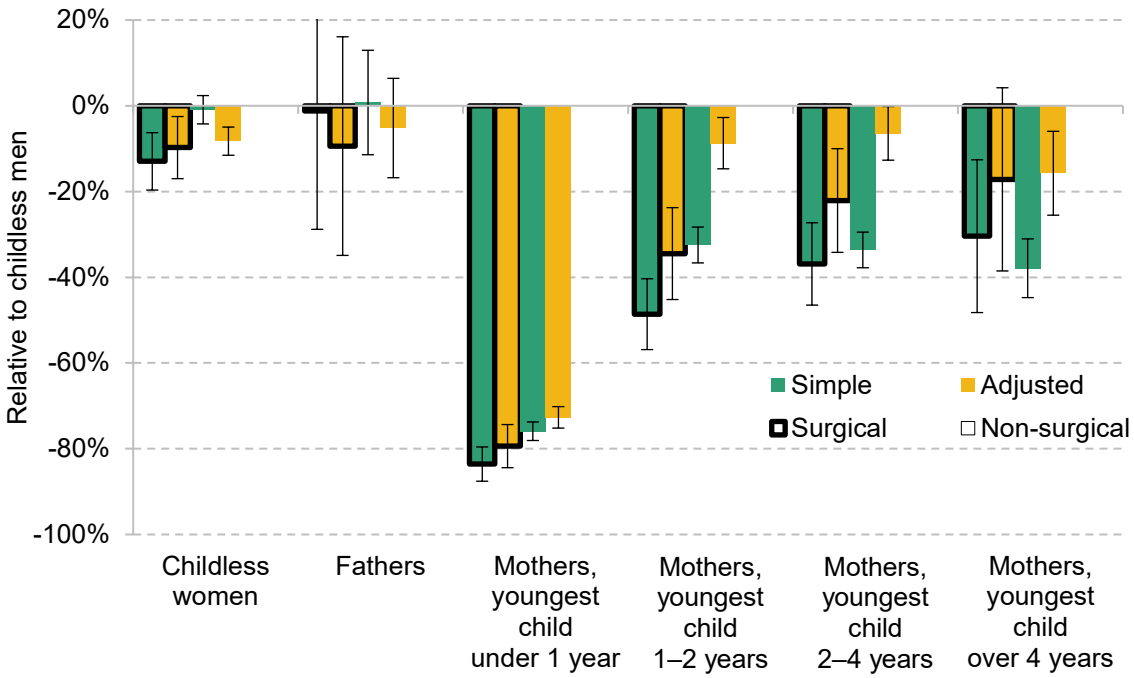
In the second year after going on maternity leave, the gap is smaller. But even after adjusting for a proportionate effect of part-time work and past absences, there is not a strong further reduction in the gap for mothers of older children. When the youngest child is over 4, mothers are still 36% less likely to progress than childless men at a similar point in their career, and 16% less likely after adjusting for absences and past and current part-time work.

How does surgery compare with other fields?

Echoing the results we found for doctors, the 'simple' estimate of the slowdown in progression for mothers looks similar for nurses in surgery and for nurses/midwives in other fields (see Figure 5.3). However, nurses in surgery work on average slightly closer to full-time hours than nurses/midwives in other fields – similarly to their doctor colleagues, albeit with a smaller gap. On average, nurses in band 5 in surgery work 76% of full-time after maternity leave, whereas midwives and nurses in obstetrics and gynaecology work 71% and nurses in other fields work 74%.[16] We also saw in Chapter 3 that nurses in surgery take shorter maternity leaves. Combined, these factors mean that the adjusted effect of motherhood is closer to the 'simple' effect – since there is not very much to adjust for. In adjusted terms, therefore, nurses in surgery face a much greater slowdown in progression than their peers in other fields.

[16] These figures exclude periods when staff are *on* maternity leave.

Figure 5.3. Progression to band 6 relative to childless men, grouped by surgical and non-surgical fields



Note: Hazard ratio minus 1 and 95% confidence interval shown. 'Simple' effect adjusts for differences in age, cohort, experience in the NHS and recruitment source only. 'Adjusted' effect additionally adjusts for differences in past absences and current and past hours worked, plus differences in typical progression patterns by field and in contract types. Age of youngest child refers to time elapsed since start of last maternity leave (which may be slightly greater than the actual age of the child). Estimates for fathers are very imprecise due to small sample sizes.

6. Conclusion

This report has examined variation in the lengths of parental leave for men and women in medicine and nursing/midwifery, and the relationship between parenthood and progression after new parents return to work.

Length of maternity leave varies by both staff characteristics and specialty. Women who are more advanced in their careers take, on average, longer periods of maternity leave. Maternity leave is typically longest for the first child, and average leave length falls with each subsequent child. Female medics in male-dominated specialties such as surgery and cardiology take shorter maternity leaves, although around a quarter still take a full year of leave. This augments evidence from Kelly and Stockton (2022), who find that women in male-dominated medical specialties have fewer children and return on more contracted hours after maternity than others. It is not that these outcomes necessarily require direct policy action in male-dominated specialties, but they help describe the context of an environment where women continue to be under-represented and mothers progress more slowly.

Whether policy action is warranted and the type of action that might be needed depends on why women in male-dominated specialties make different choices. It is possible that they reflect differences in the preferences of women choosing different specialties, who would have made the same choices no matter the specialty they were working in. If these preferences were truly immutable, there would be little scope (or need) for policy to affect these choices. It could also be that women make choices based on the working practices of the specialty that are necessitated by the tasks that need to be carried out within it. If these cannot be changed then this may always affect choices around fertility, length of leave, contracted hours, and what specialty to choose in the first place. The same specialties may therefore always be male dominated. However, it should be noted that obstetrics & gynaecology has relatively low shares of less than full-time working (presumably related to the needs of the service) but has high rates of women. Scope for less than full-time working and the share of women are therefore not inextricably linked.

However, some reasons for these decisions could be more amenable to change. It may be that the choices women make are affected by cultural norms, which distort decision-making. These norms can and do evolve over time. Finally, it may be that if current working practices lead to female surgeons and those in other male-dominated specialties making different choices about labour supply, not all are immutable. Changes may be possible that improve the options available to women without reducing productivity and make these specialities more attractive to women.

Most fathers take two weeks of paternity leave, which coincides with their period of occupational paid leave and is in line with the rest of the economy. There is little variation across specialties and staff characteristics. Flexible working policies and the ability to take shared parental leave provide an option for men to take more time off from work when their children are young. However, it may require more financial incentives, or a wider cultural change, before more men make use of those opportunities.

Although it is theoretically possible to be promoted during maternity leave, rates of promotion fall dramatically in the first year after women start maternity leave for both nurses/midwives and doctors. Rates of progression continue to be lower relative to childless men at the same career stage.

A large part of these differences for both doctors and nurses/midwives are explained by differences in working hours, as many women work less than full-time after returning from maternity leave. For many women who make this choice, the slowdown in progression is an acceptable or necessary trade-off for spending more time with their children or a manageable work–life balance. If working hours proportionately reflect skill acquisition rates (that is, if someone working at 0.8 full-time-equivalent acquires the clinical skills needed for progression at 80% of the rate of someone working full-time), then hours are a key factor and, in most groups we analyse, the only factor limiting women's progression. However, if there is a diminishing return to skill acquisition, so that the 0.2 full-time-equivalent that is not worked does not result in a proportionate decrease in learning, then controlling for hours will understate the career penalty mothers receive for working part-time.

The career impact of fatherhood appears limited and, for some transitions, fathers even progress faster than childless men. The slowdown in progression is therefore specific to motherhood, not parenthood more generally.

The reduction in progression rates for female surgeons is typically as great as or greater than the reduction across doctors as a whole, and much less is explained by conditioning on hours worked. This is because female doctors in surgery work much closer to full-time hours than other female doctors returning from maternity leave. As with length of maternity leave, our analysis cannot explain why we see these patterns. Whether slower progression can be addressed using policy levers, and how, depends on the cause. It could be that the essential requirements of surgical training mean that differences in progression rates between mothers in surgery and mothers in other disciplines can never be closed entirely. However, there may be aspects of culture and institutional structures not necessitated by the delivery of care which unnecessarily limit the ability of mothers to progress. If so, changes to working and training practices could achieve progress in closing the gap.

Appendix

Additional sample characteristics

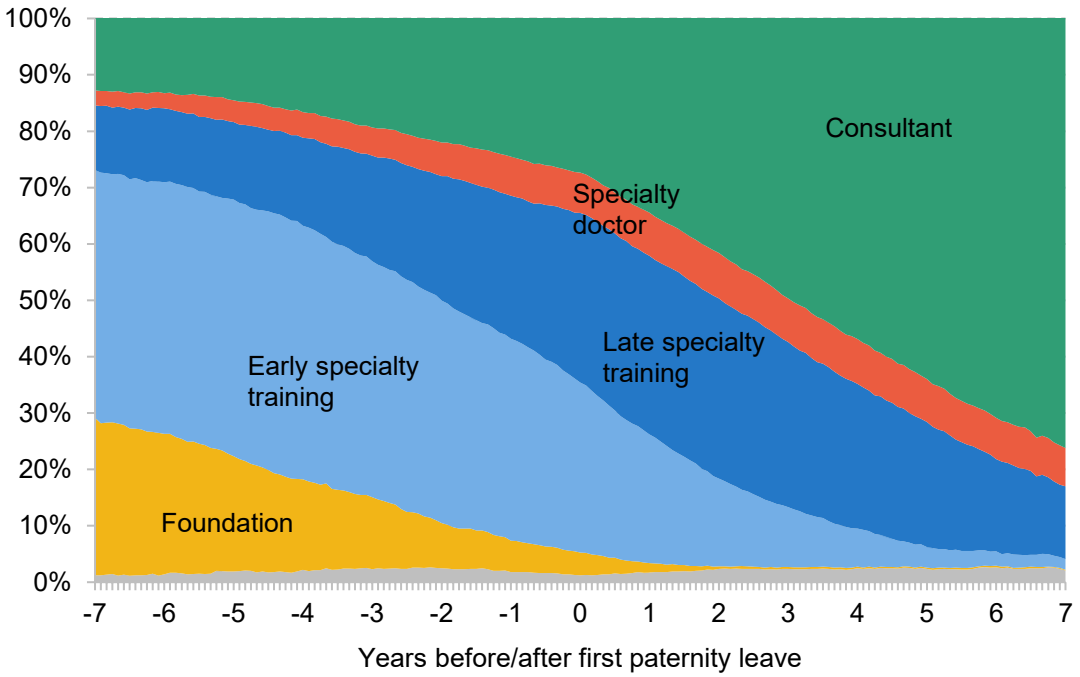
Table A.1 gives the sample sizes for each career transition we observe, as well as the average age of staff members at the time of making that transition. Combined with average ages at becoming a parent shown in Table 2.1 and the career stages around parental leave shown in Figures A.1–A.4, this motivates our decision to focus on the transition from early to late specialty training and the completion of specialty training for doctors, and on promotions from band 5 to band 6 for nurses/midwives. By contrast, entry to specialty training generally happens at younger ages, and promotions to bands 7 and above at older ages, than those ages when staff members tend to have young children.

Table A.1. Average age by career transition and sample sizes

	Average age	Number of transitions observed
Doctors		
Foundation training to specialty training	27.2	45,959
Early to late specialty training	32.4	55,677
Specialty training to specialty doctor	38.7	3,913
To consultant	38.3	27,538
Nurses/midwives		
From band 5 to band 6	33.8	141,350
From band 6 to band 7	40.2	68,317

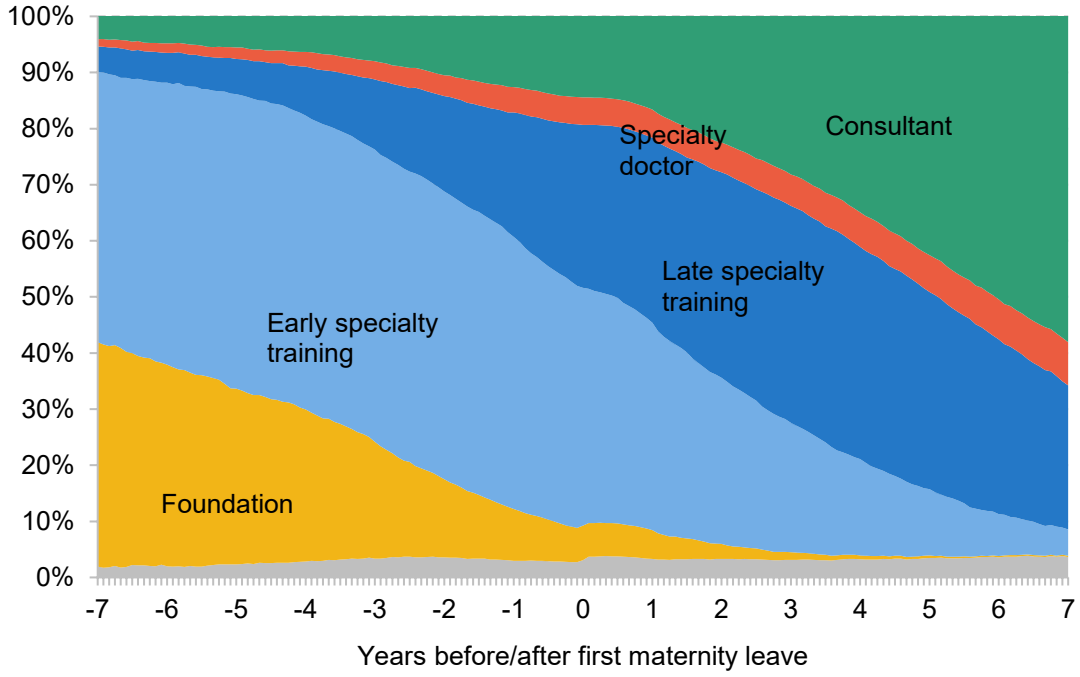
Note: Median ages shown. Transitions to consultant from late specialty training and from specialty doctor positions.

Figure A.1. Men's medical career stages before and after paternity leave



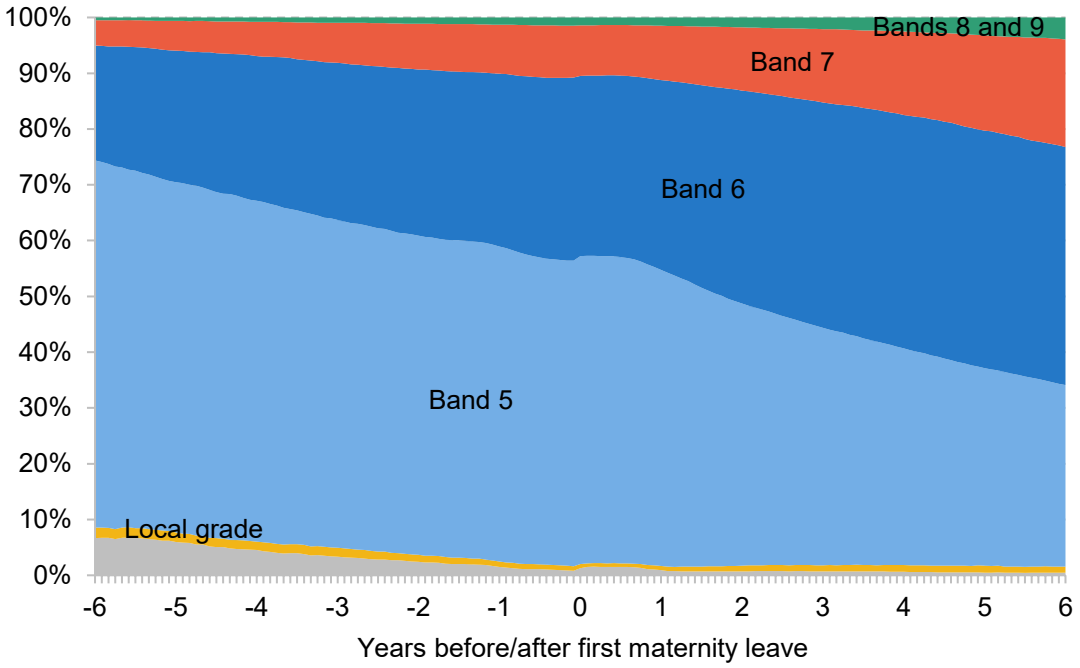
Note: Time relative to the first month of any birth- or adoption-related leave. Light grey area at the bottom of the graph denotes small groups in other types of position (locum registrars at unknown stage of training, salaried primary care dental staff, directly employed GPs or general dental practitioners) or at an unknown career stage. Career stage is assumed to remain constant during temporary absences, unless otherwise recorded in the ESR.

Figure A.2. Women's medical career stages before and after maternity leave



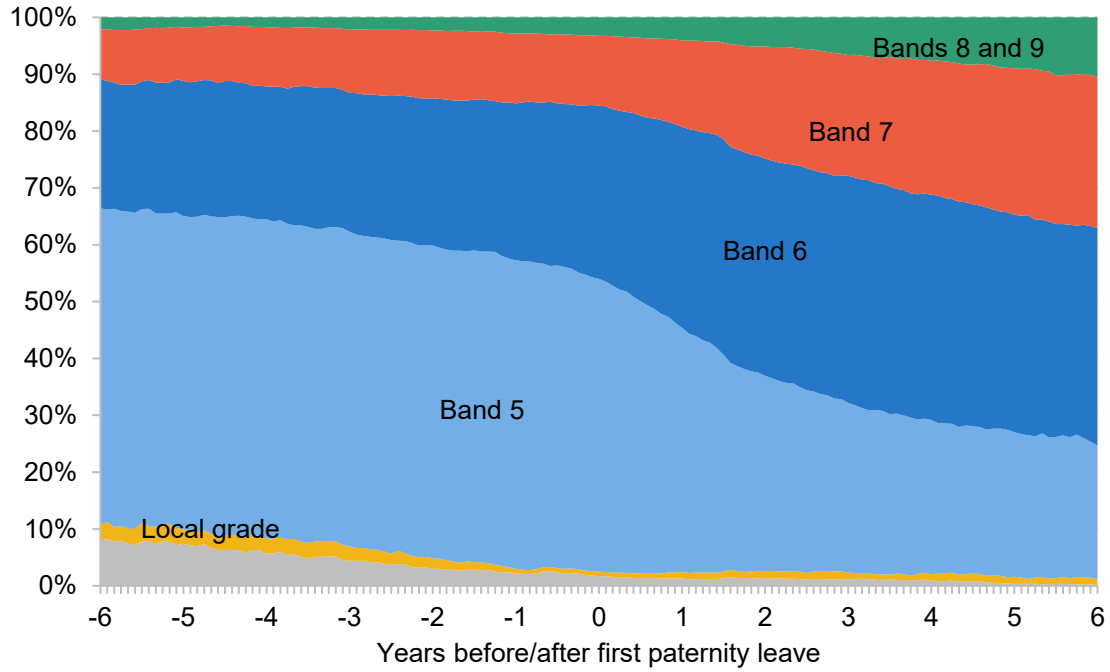
Note: As for Figure A.1.

Figure A.3. Women's nursing/midwifery pay bands before and after maternity leave



Note: Time relative to the first month of any birth- or adoption-related leave. Light grey area at the bottom of the graph denotes small groups in non-AfC or unknown pay bands. Pay band is assumed to remain constant during temporary absences, unless otherwise recorded in the ESR.

Figure A.4. Men's nursing/midwifery pay bands before and after paternity leave



Note: As for Figure A.3.

Variation in leave duration across other staff characteristics

To summarise how the duration of parental leave differs across other characteristics, Tables A.2 and A.3 present regressions of the duration of parental leave on a range of staff characteristics for doctors and nurses/midwives, respectively. Coefficients in this analysis can be interpreted as the association between a particular characteristic and the duration of leave after adjusting for all other characteristics included in the regression – for example, the association of ethnicity with the duration of maternity leave after adjusting for region, age, medical field, etc.

The results for doctors show that white British or Irish doctors take longer maternity leaves than comparable ethnic-minority colleagues, particularly black or black British doctors. By contrast, white British or Irish nurses and midwives take shorter maternity leaves than their comparable colleagues from other ethnic backgrounds, particularly compared with Pakistani or British Pakistani nurses and midwives.

There is also regional variation in the average leave duration after taking into account other characteristics. The North East stands out as having short maternity leaves for both staff groups, alongside the East of England for doctors and the South East for nurses/midwives. Doctors in London take longer maternity leaves but this is not replicated for nurses and midwives.

There are some nuanced results on the duration of earlier compared with later periods of leave. First, doctors tend to take longer maternity leaves at later career stages, as do nurses/midwives in higher pay bands. But comparing doctors and nurses/midwives at the same career stage or in the same pay band, older mothers take shorter maternity leaves, and the first maternity leave is typically longer than subsequent ones for both staff groups.

Comparing staff working the same hours before maternity leave, doctors and nurses/midwives who return on higher hours (i.e. closer to full-time) take shorter maternity and paternity leaves. In other words, there is no evidence from this comparison across staff members that part-time working facilitates an earlier return to work.[17]

[17] Note that these cross-sectional associations do not allow us to draw causal conclusions – it is still possible that the staff members who take long leaves and return on low hours compared with their colleagues would take even longer leaves if they had to return full-time.

Table A.2. Duration of doctors' maternity and paternity leave in days: regression

	Mothers		Fathers	
Parity				
Second leave	–14.8***	(0.00)	–1.4	(0.47)
Third leave	–35.8***	(0.00)	–6.0***	(0.00)
Ethnicity				
White: any other	–5.5	(0.11)	–1.0	(0.70)
Indian	–6.7*	(0.05)	–5.0**	(0.00)
Pakistani	–13.5**	(0.00)	–4.6	(0.07)
Other Asian	–4.4	(0.25)	–2.1	(0.60)
Black British	–24.3***	(0.00)	–5.1**	(0.00)
Region				
North East	–33.6***	(0.00)	–2.5	(0.38)
North West	–16.3***	(0.00)	–0.4	(0.78)
Yorkshire and the Humber	–12.3**	(0.01)	–2.1	(0.19)
West Midlands	–8.4	(0.09)	1.5	(0.69)
East of England	–33.6***	(0.00)	–1.2	(0.42)
Greater London	14.6***	(0.00)	12.9***	(0.00)
South East	–12.2**	(0.00)	1.5	(0.52)
South West	–10.6*	(0.02)	–1.3	(0.43)
Hours at start of leave	25.3***	(0.00)	4.1	(0.09)
Hours post-leave	–103.5***	(0.00)	–21.0***	(0.00)
Career stage				
Foundation	–24.6***	(0.00)	4.5	(0.55)
Late specialty training	12.5***	(0.00)	4.8**	(0.00)
Specialty doctor	–1.0	(0.85)	4.9	(0.19)
Consultant	26.0***	(0.00)	5.3*	(0.03)
Age at start of leave	–6.7***	(0.00)	–0.1	(0.59)
Field				
Surgery	4.8	(0.46)	1.9	(0.46)
Community/public	13.0	(0.17)	–6.9	(0.06)

Psychiatry	20.3	(0.06)	–0.8	(0.79)
Paediatrics	15.4*	(0.01)	11.1*	(0.04)
Emergency/intensive	19.9**	(0.00)	1.4	(0.51)
General practice	10.2	(0.13)	0.4	(0.84)
Anaesthetics	–2.2	(0.71)	–2.1	(0.32)
Obstetrics/gynaecology	19.8**	(0.00)	2.2	(0.36)
Cardiology	5.5	(0.38)	4.5	(0.31)
Geriatric medicine	0.7	(0.94)	17.7	(0.06)
Gastroenterology	11.0	(0.10)	1.7	(0.40)
Observations	28,085		12,729	

Note: *p*-values in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. OLS regression at the maternity/paternity spell level, standard errors clustered at the person level, selected coefficients shown. Reference categories are first leave for parity, white British/Irish for ethnicity, East Midlands for region, general internal medicine for field, and early specialty training for career stage. Excludes leaves already ongoing in January 2012 and those beginning in November 2020 or later. Where hours post-leave vary over time, we use the minimum.

Table A.3. Duration of nurses'/midwives' maternity and paternity leave in days: regression

	Mothers		Fathers	
Parity				
Second leave	–21.8***	(0.00)	–2.1	(0.35)
Third leave	–56.8***	(0.00)	–12.2***	(0.00)
Ethnicity				
White: Any other	14.3***	(0.00)	–4.2	(0.14)
Indian	14.2***	(0.00)	–9.1***	(0.00)
Pakistani	48.4***	(0.00)	–6.1	(0.35)
Other Asian	22.4***	(0.00)	–2.2	(0.76)
Black British	8.1**	(0.00)	–4.5	(0.49)
Region				
North East	–19.2***	(0.00)	–7.8	(0.33)
North West	–1.4	(0.55)	–8.2	(0.27)
Yorkshire and the Humber	–12.3***	(0.00)	–3.8	(0.64)
West Midlands	–16.3***	(0.00)	–11.7	(0.08)
East of England	–10.2***	(0.00)	–11.2	(0.09)

Greater London	–3.5	(0.14)	–4.4	(0.59)
South East	–22.1***	(0.00)	–12.2	(0.08)
South West	–5.7*	(0.03)	–7.9	(0.27)
Hours at start of leave	–17.5***	(0.00)	–5.9	(0.36)
Hours post-leave	–96.1***	(0.00)	–13.8*	(0.03)
Pay band				
Local grade	–8.7	(0.38)	–19.6***	(0.00)
6	24.2***	(0.00)	7.0	(0.05)
7	36.5***	(0.00)	5.3	(0.08)
8a to d	48.2***	(0.00)	6.6	(0.12)
9	43.9***	(0.00)		
Age at start of leave	–7.4***	(0.00)	–0.3	(0.05)
Field				
General acute	–0.9	(0.82)	1.1	(0.69)
Primary care	–3.9	(0.06)	8.0	(0.20)
Surgery	4.3*	(0.04)	5.2	(0.22)
Psychiatry / mental health	–13.5***	(0.00)	3.4	(0.42)
Obstetrics/gynaecology	17.4***	(0.00)	–1.3	(0.80)
Clinical support	8.9*	(0.02)	1.1	(0.79)
Non-clinical	10.9*	(0.03)	5.2	(0.32)
Pathology	2.2	(0.71)	3.7	(0.68)
Clinical oncology	14.7	(0.07)	2.6	(0.80)
Children	19.5***	(0.00)	2.2	(0.62)
A&E and intensive care	14.0***	(0.00)	4.2	(0.16)
Observations	105,274		6,061	

Note: *p*-values in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. OLS regression at the maternity/paternity spell level, standard errors clustered at the person level, selected coefficients shown. Reference categories are first leave for parity, white British/Irish for ethnicity, East Midlands for region, medicine for field, and 5 for pay band. Excludes leaves already ongoing in January 2012 and those beginning in November 2020 or later. Where hours post-leave vary over time, we use the minimum.

The results also show that the variation in leave duration across different fields highlighted in Figures 3.1 and 3.2 persists after adjusting for other attributes. After this adjustment, paediatricians, obstetricians and gynaecologists, and emergency/intensive care doctors still take longer maternity leaves. This is echoed for nurses/midwives, with those in these fields also taking longer maternity leaves. As highlighted in the simple comparison of averages in Chapter 3, psychiatric nurses take shorter maternity leaves, but this is not true for psychiatrists.

Unsurprisingly, the regressions, like the simple comparison of averages, show much less systematic variation in the duration of paternity leave than of maternity leave. However, there are some differences that are statistically significant, and large compared with the average duration of two weeks: similarly to mothers, paediatricians and doctors in London take longer paternity leaves, as do those who work lower hours after their leave. There are also differences across some ethnicity groups: black or black British and Indian or British Indian doctors, and Indian or British Indian nurses/midwives, take shorter paternity leaves than those of other ethnicities.

Progression of mothers in different regions

We examined variation in the association between parenthood and progression by region and ethnicity. We focus on women whose youngest child is at least a year old, i.e. we do not consider the direct impact of maternity leave here.

In Figure A.5, we analyse mothers' progression to late specialty training separately for each of eight regions of England.[18] The comparison is between mothers and childless male doctors within each region. The effects shown add to overall differences in the speed of progression between regions, which are not the focus of this report.

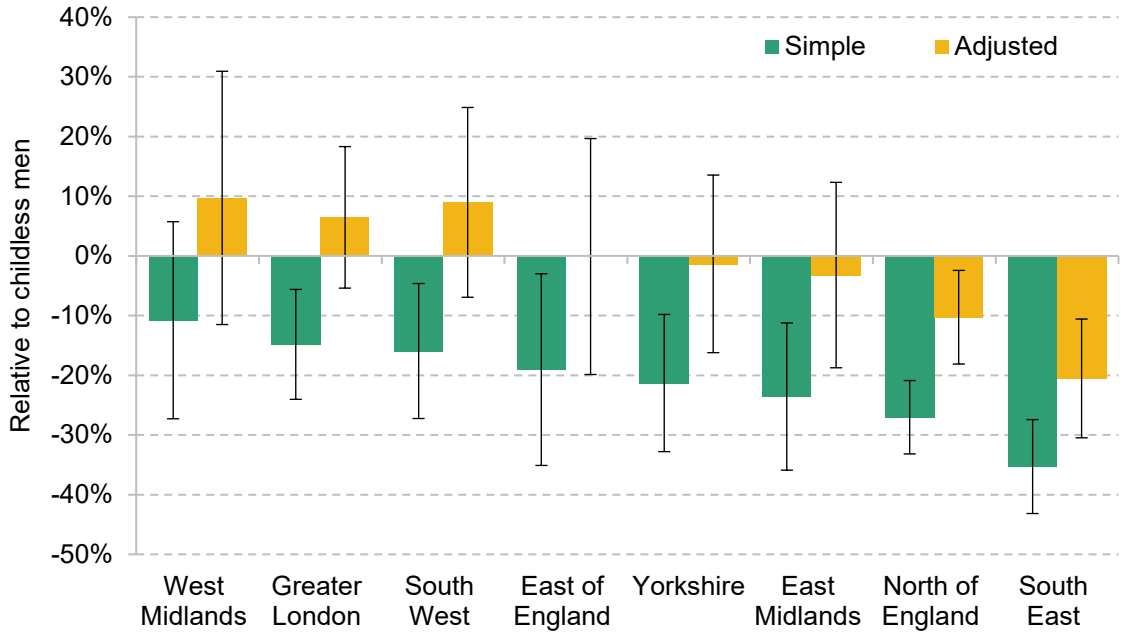
Adjusted figures show the association between motherhood and progression after accounting for a *national*, proportional impact of part-time work and absences. If part-time work and absences are penalised more in some regions compared with others, or if reductions below a certain threshold as a percentage of full-time are penalised disproportionately and mothers in a particular region are more likely to move below that threshold, this will show up as part of the motherhood effect.

Mothers in all regions are significantly slower to progress to late specialty training than the average childless man, except in the West Midlands, where the gap is small and not precisely estimated. However, only in two regions – the South East and the North of England – is this

[18] Regions are based on the location of the trust, not the doctor's home location. Due to small sample sizes, we combine the North West and North East regions.

slowdown disproportionate to absences and past and present part-time work. One thing to note is that adjusting for different medical fields, absences and part-time work makes a difference, but does not induce big, qualitative changes in the ranking of regions. This suggests that regional differences in the hours mothers work, their absences and their medical fields do not explain the pattern in motherhood gaps we see across regions.

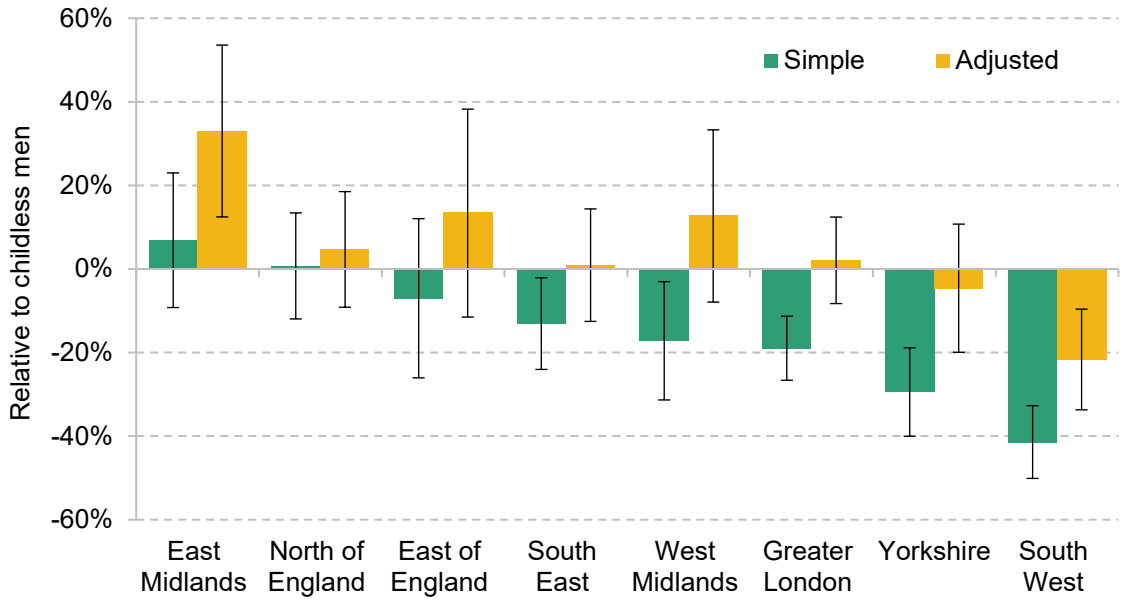
Figure A.5. Mothers' progression to late specialty training, within region



Note: Hazard ratio minus 1 and 95% confidence interval shown. 'Simple' effect adjusts for differences in age and cohort only. 'Adjusted' effect additionally adjusts for differences in past absences and current and past hours worked, plus differences in typical progression patterns by field and in contract types. Impact of motherhood is the average impact more than a year after maternity leave. 'Yorkshire' refers to Yorkshire and the Humber.

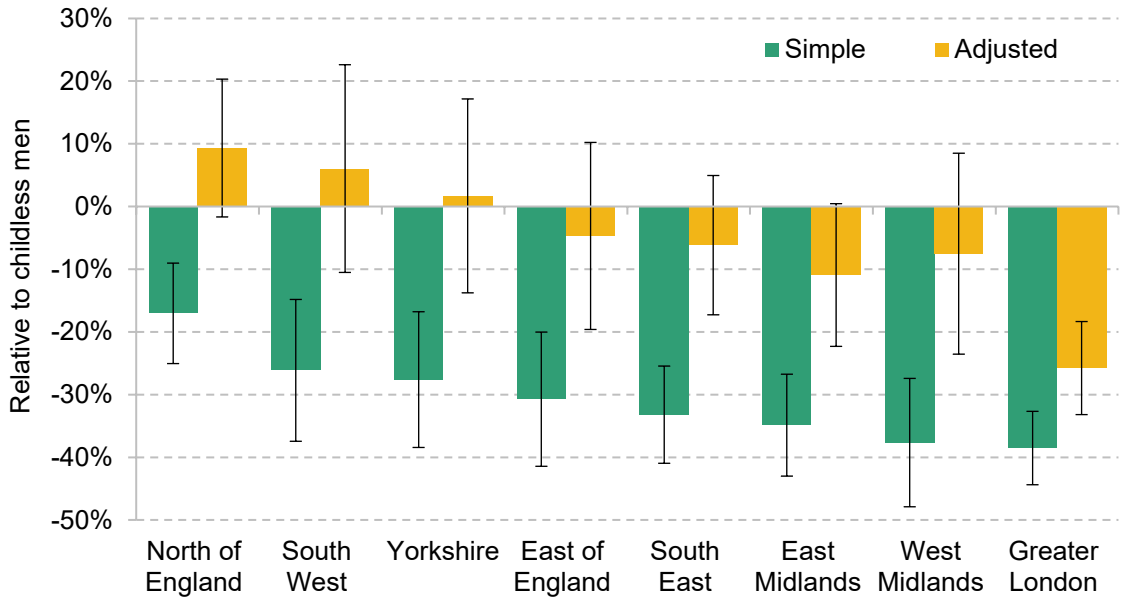
There is not a close relationship between the motherhood gap in progression in the same region at different career stages. At the transition to consultant or specialist doctor (Figure A.6), the gap is not statistically significant for doctors in the East Midlands, North and East. In all other regions, there is a gap between mothers and childless men in the 'simple' model. However, in every region but the South West, this slowdown is proportional to absences and part-time working. In the South West, mothers in specialty training on average work 79% of full-time, compared with 86% in the country as a whole and the lowest of all the regions. It is possible that this is related to disproportionately slower progression.

Figure A.6. Mothers' progression to consultant or specialist doctor, within region



Note: Hazard ratio minus 1 and 95% confidence interval shown. 'Simple' effect adjusts for differences in age and cohort only. 'Adjusted' effect additionally adjusts for differences in past absences and current and past hours worked, plus differences in typical progression patterns by field and in contract types. Impact of motherhood is the average impact more than a year after maternity leave. 'Yorkshire' refers to Yorkshire and the Humber.

Figure A.7. Mothers' progression to band 6, within region



Note: Hazard ratio minus 1 and 95% confidence interval shown. 'Simple' effect adjusts for differences in age and cohort only. 'Adjusted' effect additionally adjusts for differences in past absences and current and past hours worked, plus differences in typical progression patterns by field and in contract types. Impact of motherhood is the average impact more than a year after maternity leave. 'Yorkshire' refers to Yorkshire and the Humber.

Figure A.7 shows the motherhood gap in nursing/midwifery within each region (i.e. compared with a male childless nurse/midwife in the same region). Mothers are less likely to be promoted than male childless nurses/midwives at a comparable career stage in every region, with the size of the gap ranging from 17% in the North to more than a third in the South East, the Midlands and London. However, these gaps are fully explained by a proportional impact of absences and past and current part-time work in every region except London. Even after these adjustments, nurses/midwives in London are a quarter less likely to be promoted than their male childless colleagues.

Progression of mothers of different ethnicities

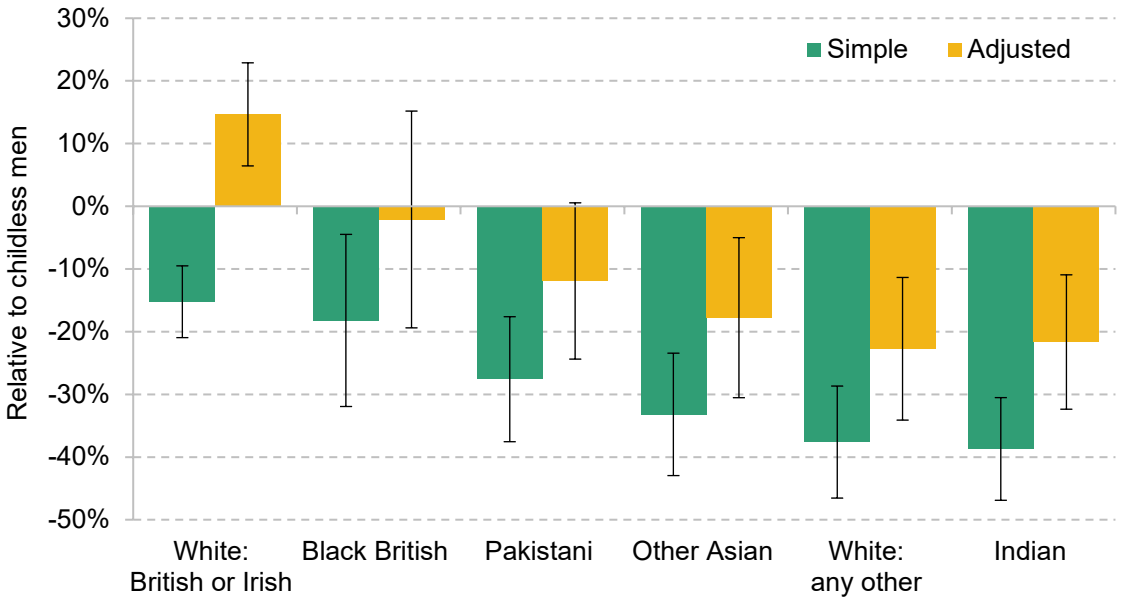
We now turn to differences by ethnicity.[19] In an analogous approach to the regional analysis above, we show motherhood gaps compared with childless men *of the same ethnicity*. In other words, these gaps are in addition to overall gaps in progression by ethnicity, which are not the focus of this report. Again, the effect shown is for women whose youngest child is at least a year old, i.e. we do not consider the direct impact of maternity leave here. Figure A.8 shows that in the hazard model, mothers of all ethnicities see slower progression to the late stage of specialty training than childless men of the same ethnicity. For white British or white Irish mothers, this is less than proportional to their absences and part-time work. However, a significant gap remains for mothers from other white backgrounds, and from Asian (except, possibly, Pakistani) backgrounds. These three ethnicity groups see childless men progress as quickly as or more quickly than their white British peers. In contrast, Pakistani doctors progress more slowly than white British/Irish doctors, even if they are childless men. Any *additional* gap for Pakistani mothers is explained by their absences, part-time work and specialty choices.

By contrast, at the completion of specialty training, male childless doctors from all ethnic-minority backgrounds are less likely to progress than white British or Irish doctors at a similar stage, with ethnicity gaps ranging between 19% for non-British-or-Irish white doctors and 44% for black doctors.[20] The largest *within-ethnicity* motherhood gap in both adjusted and unadjusted terms, and the only one that remains significant in adjusted terms, is for white British or Irish mothers (Figure A.9).

[19] The data record self-reported ethnicity. Where ethnicity is missing in some periods for a given staff member, we fill it in by assuming it is constant over time. We include a separate category for staff members where ethnicity information is missing throughout.

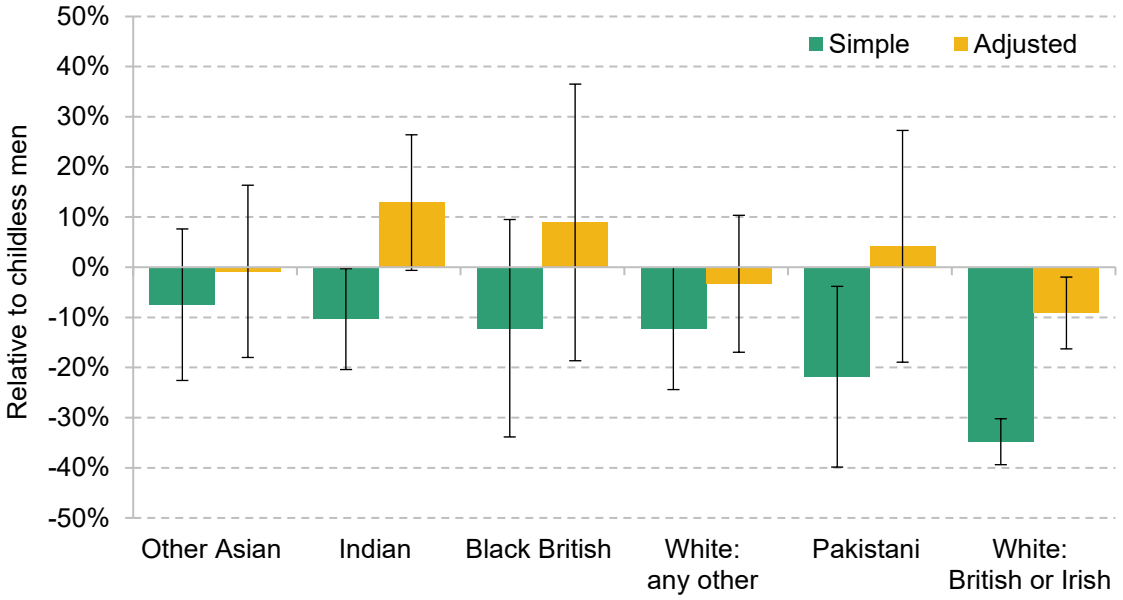
[20] The figures given are for the unadjusted model; the adjusted figures in this case are even larger.

Figure A.8. Mothers' progression to late specialty training, within ethnicity



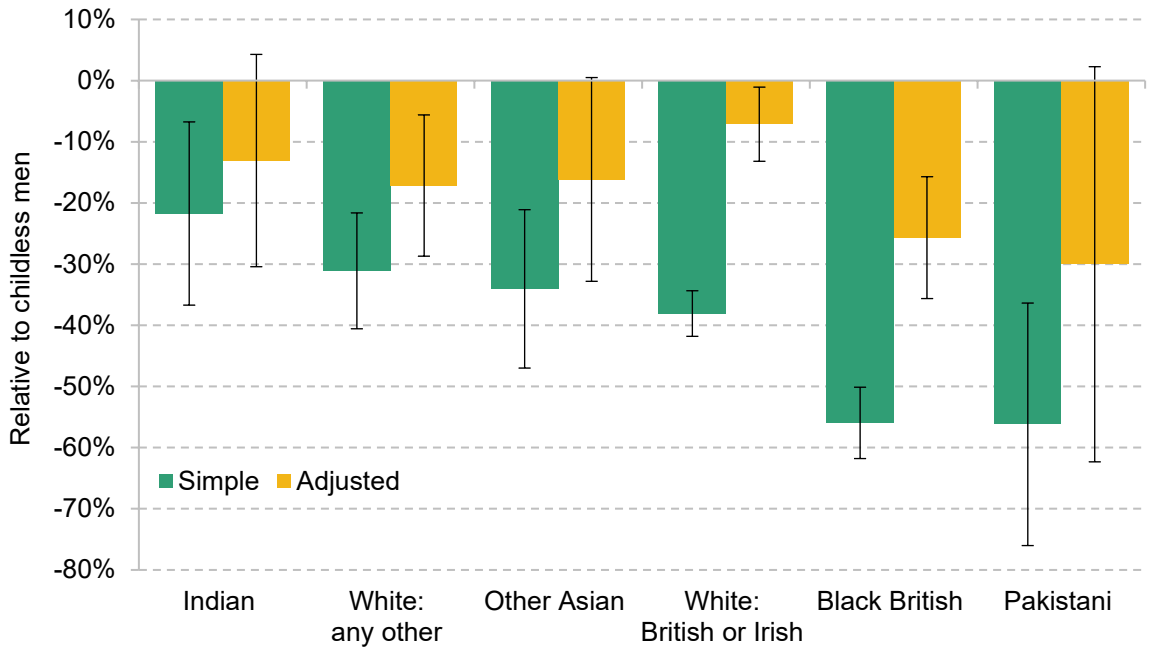
Note: Hazard ratio minus 1 and 95% confidence interval shown. 'Simple' effect adjusts for differences in age and cohort only. 'Adjusted' effect additionally adjusts for differences in past absences and current and past hours worked, plus differences in typical progression patterns by field and in contract types. Impact of motherhood is the average impact more than a year after maternity leave. In addition to coefficients shown, model includes categories for other ethnicities and missing ethnicity.

Figure A.9. Mothers' progression to consultant or specialist doctor, within ethnicity



Note: Hazard ratio minus 1 and 95% confidence interval shown. 'Simple' effect adjusts for differences in age and cohort only. 'Adjusted' effect additionally adjusts for differences in past absences and current and past hours worked, plus differences in typical progression patterns by field and in contract types. Impact of motherhood is the average impact more than a year after maternity leave. In addition to coefficients shown, model includes categories for other ethnicities and missing ethnicity.

Figure A.10. Mothers' progression to band 6, within ethnicity



Note: Hazard ratio minus 1 and 95% confidence interval shown. 'Simple' effect adjusts for differences in age and cohort only. 'Adjusted' effect additionally adjusts for differences in past absences and current and past hours worked, plus differences in typical progression patterns by field and in contract types. Impact of motherhood is the average impact more than a year after maternity leave. In addition to coefficients shown, model includes categories for other ethnicities and missing ethnicity.

In part, this reflects the fact that white British and Irish mothers are more likely to transition to consultant roles rather than specialty doctor roles than mothers from all other backgrounds. Since specialty doctor roles are open to doctors after fewer years of specialty training, this speeds up relative progression for mothers from ethnic minorities.

It is beyond the scope of this report to explore interactions between the different dimensions of variation described, such as the progression of ethnic-minority women in surgery before and after maternity leave, compared with other fields. However, it is worth noting that these attributes are interrelated in our data: women from many ethnic-minority backgrounds are more likely than white British or Irish women to be training in surgery, a pattern that is driven by the most recent years and the early stages of training, suggesting that it is becoming more prevalent. However, trainee surgeons (of either gender) are also more likely to not report an ethnicity than doctors in non-surgical specialties, or to report an 'other' ethnicity outside the large categories, which could distort reported results.

Figure A.10 compares the motherhood gap for nurses/midwives of different ethnicities. Mothers from every ethnic background are less likely to be promoted than childless men with the same experience and ethnic background. After adjusting for differences in fields of nursing/midwifery,

absences and past and present part-time work, the gap remains large and significant at more than 25% for black nurses/midwives, and large – although imprecisely estimated and not significant, since this is a small group – for Pakistani nurses/midwives. This is in addition to Pakistani nurses/midwives being much less likely to be promoted even if they are childless men (in both adjusted and unadjusted terms), meaning that Pakistani mothers have some of the lowest probabilities of promotion to band 6.

Other indicators of progression

Looking at indicators of career success beyond reaching the consultant stage, there are also differences in the rates at which mothers, fathers and childless doctors receive clinical excellence awards.[21] These are difficult to capture precisely in our data, since clinical excellence awards are typically awarded at older ages than the ages when we observe new parents. In our data, adjusting for age and compared with childless men, doctors are 5.6% less likely to be in receipt of a clinical excellence award after a paternity leave, 8.5% less likely after a maternity leave and 3.9% less likely if they are women who have *not* had a recent maternity leave. Differential rates of progression to consultant (which is a precondition for receiving a clinical excellence award) and sorting into fields (where award rates can vary quite widely) do not explain more than a third of any of these gaps, and the fatherhood gap is actually larger after adjusting for these factors.

Technical details on duration models

Duration analysis provides statistical tools to examine systematic differences in the timing of an event, in this case progression to the next career stage, between doctors and nurses/midwives with different characteristics. Rather than making a single, sharp distinction between two groups of those who progressed and those who remain in the earlier stage, this method focuses on the evolution of progression rates over time (since beginning the earlier career stage).

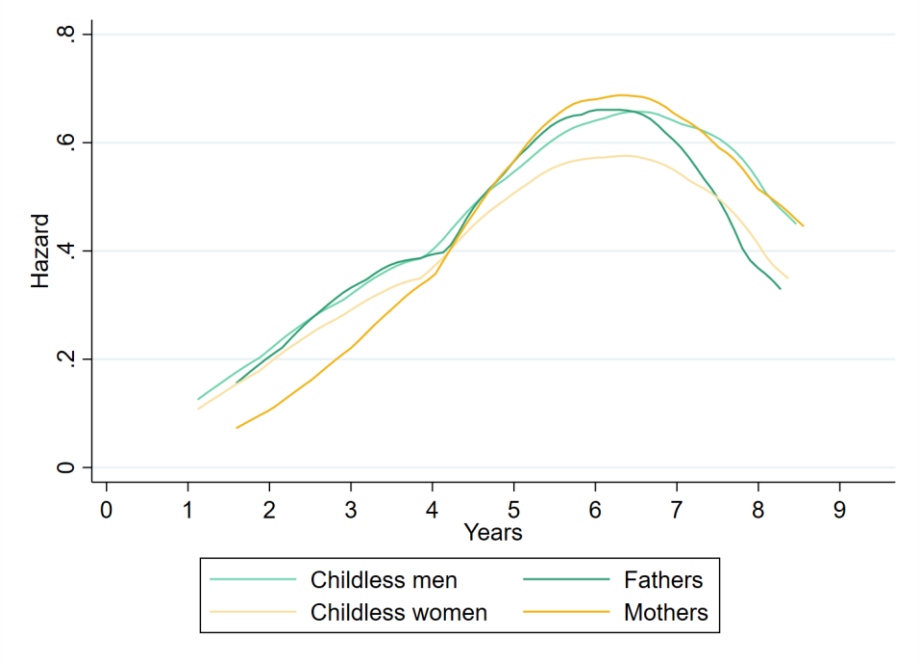
The model answers a series of question of the form:

- Of those who began a career stage, how many progressed within the first year?
- Of those who were still in the earlier stage after a year, how many progressed during the second year?

[21] We consider those with recorded local or national clinical excellence awards of £500 or more in a given month (two-thirds of those who receive any money in a given month, although lower payments are less likely to reflect a current award).

And so on, over time. We then construct a function reflecting the likelihood of progression at every point in time. Because this approach was originally developed to model the risk of death or illness, it is called a hazard function – even though in our application the event is a good thing and not 'hazardous' at all! Figure A.11 shows such a function for a very simple 'model' that does not adjust for any characteristics but just groups doctors by whether or not they have had a child. In other words, this function calculates the probability of progressing at each point in time, given a doctor has not progressed previously. We exclude mothers (and fathers) in the first year after a birth to abstract from the direct impact of being away from work during maternity leave.

Figure A.11. Hazard function for transitions from early to late specialty training, for parents and childless doctors



Note: Excludes mothers and fathers in the first year after a birth.

In the analysis in this report, we estimate a hazard function at the monthly level, with a flexible 'baseline' hazard that reflects the probability of progressing after a given number of months in a career stage – similar to the hazard function in Figure A.11. We then enrich the model by including characteristics such as age, gender, parenthood and experience, which enter into the model to 'shift' the baseline hazard up or down.

In 'adjusted' models, we allow the baseline hazard to vary in an arbitrary way (i.e. not necessarily by the same, constant amount at every duration of the career stage) between specialty groups, in order to flexibly capture different patterns of progression in different specialties.

The estimates in Chapters 4 and 5 are from Cox proportional hazard models estimated by partial likelihood. Analysis time is time since beginning the earlier career stage:

- For transitions to late specialty training, analysis time is number of months since beginning specialty training.
- For transitions to specialty doctor or consultant, analysis time is number of months since transitioning to late specialty training.
- For nurses'/midwives' transitions to band 6, analysis time is the number of months since entering the ESR in band 5.

We use the Breslow method for tied failures. The 'simple' model is unstratified, with the hazard $\theta_i(t|X) = \theta(t) \cdot \exp(X_i(t)'\beta)$ for doctor i with the vector of characteristics $X_i(t)$ composed of age (time-varying) and cohort (constant).

The 'adjusted' model is stratified by medical field j, with the hazard $\theta_{ij}(t|X) = \theta_j(t) \cdot \exp(X_i(t)'\beta)$, with the vector of characteristics $X_i(t)$ additionally including the doctor's or nurse's/midwife's cumulative past months absent, cumulative past contracted hours and current contracted hours (both of the latter as a percentage of full-time), and dummies for bank and locum contracts.

For the heterogeneity analysis by ethnicity, the log relative risk is

$$\begin{aligned}\beta_1 \cdot (ethnicity \times firstyear \times I\{parent = 1\} \times female) \\ +\beta_2 \cdot (ethnicity \times I\{parent = 1\} \times male) \\ +\beta_3 \cdot (ethnicity \times I\{parent = 0\} \times female) \\ +\beta_4 \cdot (ethnicity \times subsyear \times I\{parent = 1\} \times female) + \beta_5 X_i(t)\end{aligned}$$

where $firstyear$ is an indicator for the first year post-maternity leave and $subsyear$ is an indicator for subsequent years. The model for regions is analogous.

Definitions of fields

The list of fields for doctors is:

- general internal
- emergency/intensive/acute: emergency medicine, intensive care medicine, acute internal medicine
- surgery: general, trauma and orthopaedic, urology, otolaryngology, cardio-thoracic, vascular, neurosurgery, plastic, oral and maxillofacial, paediatric
- cardiology
- gastroenterology
- anaesthetics
- pathology: histopathology, general, chemical

- oncology and radiology: clinical oncology, medical oncology, clinical radiology, nuclear medicine
- geriatric medicine
- obstetrics and gynaecology
- paediatrics and paediatric cardiology
- oral and dental: additional dental specialties, community health service (dental), dental and maxillofacial radiology, endodontics, oral medicine, oral microbiology, oral surgery, oral and maxillofacial pathology, orthodontics, paediatric dentistry, periodontics, prosthodontics, restorative dentistry, special care dentistry
- community and public health: community health service (medical), community sexual and reproductive health, occupational medicine, public health
- general practice
- psychiatry and mental health: child and adolescent psychiatry, forensic psychiatry, general psychiatry, medical psychotherapy, old-age psychiatry, psychiatry of learning disability
- other: respiratory medicine, endocrinology and diabetes mellitus, renal medicine, haematology, neurology, rheumatology, (medical) ophthalmology, rehabilitation medicine, infectious diseases, palliative medicine, genito-urinary medicine, medical microbiology/virology, dermatology, clinical pharmacology and therapeutics, immunology, clinical genetics (including cyto- and molecular genetics), audiovestibular medicine, clinical physiology, allergy, sport and exercise medicine, tropical medicine, clinical neurophysiology, administrative and research positions

The list of fields for nurses and midwives is:

Based solely on the primary area of work

- general acute
- medicine
- primary care
- clinical support
- non-clinical, including corporate, facilities and estates
- pathology
- clinical oncology
- imaging
- public health, including occupational health
- dental/oral

Using supplementary information in cases where the primary area is generic or non-clinical

- psychiatry/mental health, if the primary area is one of these, or the primary area is generic or non-clinical and the secondary area references mental health, psychiatry or psychotherapy or the occupation code is in mental health

- obstetrics and gynaecology if the primary area is one of these, or the primary area is generic or non-clinical and the secondary area is obstetrics and/or gynaecology or maternity or the occupation code is for a midwife
- children, if the primary area is generic or non-clinical and the occupation code is children's nurse or children and young people, or the secondary area is paediatrics

Fields of particular interest for the analysis that 'override' primary area

- surgery, if the primary area is surgery or the secondary area is operating department, surgery, general surgery, cardio-thoracic surgery, neurosurgery, plastic surgery, paediatric surgery, or trauma and orthopaedic surgery
- A&E and intensive care, if these are the secondary areas

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