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Elaine Kelly
Isabel Stockton

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# A senior doctor like me: Gender match and occupational choice

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# A senior doctor like me: Gender match and occupational choice*

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Elaine Kelly† and Isabel Stockton§

Men and women consistently sort into different occupations and fields within occupations. In this paper, we use data on doctors in the English National Health Service, where women make up more than half of all senior pediatricians but only 1 in 8 senior surgeons and cardiologists. We estimate how the gender of supervisors early in one's career affects subsequent choice of finely-defined occupations, exploiting features of the doctor training pathway in England that generate quasi-random variation in junior doctors' exposure to senior women. We find greater exposure to senior women specialists increases the probability of junior women subsequently training in their specialty, but only in very male dominated training placements. A junior woman exposed to a 10pp higher share of senior women specialists during a placement is 1.6 percentage points or 24% more likely to pursue training in the placement specialty, if the share of senior women doctors is below 1 in 5. This effect corresponds to two-fifths of the gender gap in training choices, and appears even in specialties that are not particularly male-dominated as a whole. Heterogeneity analyses suggests that access to and relatability of potential role models matter, and that gender match effects interact with preferences for geographic and schedule flexibility.

**Keywords:** occupational choice, gender, role models, stereotypes, medical specialties

**JEL Codes:** D91, J24, J45, J71

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† Health Foundation and Institute for Fiscal Studies
§ Institute for Fiscal Studies, 7 Ridgmount Street, London WC1E 7AE, E-mail: isabel_s@ifs.org.uk

# 1 Introduction

Gender-based sorting into occupations as well as fields within occupations is a key driver of persistent gender inequality in earnings and other economic outcomes[1]. In some part, it reflects differences in job characteristics and in women's preferences over those characteristics [Gronberg and Reed, 1994, Deleire and Levy, 2004, Felfe, 2012, Mas and Pallais, 2017, Amer-Mestre et al., 2024]. But in addition to job characteristics and preferences over them, non-economic or social factors including gender norms and stereotypes have historically played a central role in men's and women's career choices. Throughout the 20th century, the vast majority of formal impediments to women (and men) participating in different professions were removed, but informal barriers remain. Social factors that are uncorrelated with ability are of concern to economists as a source of distortions to decision-making. Limiting their influence will not only improve women's access to prestigious and well-paid occupations, but has the potential to improve the allocation of human capital. In this paper, we take job attributes as given and focus on how social influences shape women's choices over occupations, examining how they contribute to gender-based sorting into finely defined occupations.

Our setting is medical specialty choice in the English National Health Service. Medicine, like the law and other high-skilled, high-paid, high-status professional occupations, has seen a large influx of women who now make up a majority of newly qualified doctors in the UK.[2]. But at the same time, substantial specialty segregation by gender remains: just 13% of senior surgeons and cardiologists are women, compared to 56% of senior pediatricians.[3] In England as well as elsewhere, male-dominated specialties are typically the best-paid and most prestigious specialties [American Medical Association, 2022, Kelly and Stockton, 2022, Amer-Mestre et al., 2024].

[1] Bertrand [2020] called it one of the "two outstanding, quantitatively significant pain points" for economic gender equality, the other one being the gendered impact of parenthood.

[2] 57% of UK graduates joining the medical register in 2020 were women [General Medical Council, 2021]

[3] Consultants in acute trusts in December 2019, by primary assignment, shares of headcounts.

There are many social influences that could affect medical specialty choices. We focus on one in particular: early-career exposure to senior female colleagues in a particular medical specialty. In most workplace settings, exposure to colleagues is endogenous due to worker sorting into workplaces, and the effects on junior workers' choices are difficult to disentangle from senior workers' input into the hiring process [e.g. Profeta et al., 2023].

To overcome these challenges, we exploit the structure of the first two years of junior doctor training immediately after finishing medical school. During this stage, known as Foundation training, junior doctors rotate through placements in six different specialities. Allocation to a set of placements takes place via a national platform, without the input of doctors working at the hospital hosting the trainee. The detailed outcomes of the competitive allocation process are difficult to predict for applicants. After the end of the two-year programme, doctors start training in a particular specialty. Our main outcome of interest is whether a woman goes on to pursue specialty training in the Foundation placement's specialty. [4]

Data come from the Electronic Staff Record, which contains the payroll records of all those directly employed by the English National Health Service, including doctors undertaking Foundation training. Our data cover the period from 2012 to 2021. We use a fixed-effects strategy to account for observed and unobserved differences between hospitals and specialties, and argue that the remaining variation would be difficult to predict for medical students at the time of their application to the Foundation programme. This mitigates concerns around junior doctors sorting into placements with more senior female colleagues based on aptitude for or interest in a particular specialty.

Our main finding is that junior women who are exposed to more senior women doctors during a placement are more likely to go on to train in the placement specialty, but only

[4]We measure this outcome once doctors have reached the later stage of specialty training, typically five to eight years after Foundation training began. At this point, junior doctors have made settled specialty choices.

at low shares of senior women. There is no equivalent effect on junior men on average. In placements where fewer than one in five senior doctors are women, the estimated effect of a ten percentage point increase on the probability of the junior woman subsequently going on to train in the placement specialty is 1.6 percentage points, or a 24% increase relative to the baseline probability among women completing this type of placement. The baseline probability is higher for men; in other words, after completing a placement with few senior women colleagues, junior men go on to specialty training in the placement's specialty at higher rates than junior women. A ten percentage-point increase in senior women closes 41% of this gender gap. While the effect is concentrated in male-dominated *placements*, it is not only relevant to particularly male-dominated *specialties*. If anything, we find somewhat stronger effects in specialties that are less male-dominated *on average*. This is consistent with exposure to senior women (or lack thereof) shifting choices at the margin, between specialties with similar expected utility, and with the most male-dominated specialties being far from preferred for most female junior doctors.

Further increases in the share of senior women in departments that are already more gender-balanced have no effect, and we do not find an effect on whether junior women remain in the hospital sector at all. Again, specialty choice within-sector is plausibly a more marginal choice than exiting the hospital sector altogether, and may consequently be more malleable by exposure to senior women. Another possibility is that the hospital sector as a whole is sufficiently gender-balanced for the effect to have faded out altogether (the average hospital placement has a 1-in-4 share of senior women).

We use a theoretical framework to set out the mechanisms that could explain the impacts of senior women role models. Heterogeneity in our estimates by specialty attributes and the characteristics of senior women then provides evidence on the relative importance of those mechanisms. Variation by specialty indicates that effects are driven by specialties with job attributes that women likely have a stronger preference for, including a lower prevalence

of on-call work and greater geographical flexibility. These patterns are consistent with the impact of exposure to senior women shifting specialty choice at the margin but not changing junior women's views on job characteristics. Heterogeneity by the characteristics of senior women indicates that the effect on specialty choice is driven by placements where the senior women present are younger and not in receipt of performance-related pay. These senior women may be more relatable; they are closer to junior doctors' own age. They are also likely to have more direct contact with junior doctors, since performance-related bonuses often require involvement in hospital leadership and clinical research that may take doctors away from front-line patient care. This evidence, too, is therefore consistent with the effect operating through changing junior doctors' perception of the share of women in the specialty (a type of peer effect) rather than of specialty-level job attributes.

Our work contributes to three literatures. The first shows that exposure to a woman instructor affects young women's subsequent educational and occupational choices in male-dominated fields. Specifically, Carrell et al. [2010] and Mansour et al. [2021] find that at a US Navy academy, exposure to female faculty influences women's choice of a STEM major and subsequent choice of a STEM or 'professional' occupation, including as a surgeon. In a non-military context, Griffith and Main [2021] show that exposure to female teaching assistants increases the likelihood of female students choosing to major in one of the three highest-paying fields within engineering, particularly in classrooms that also have a comparatively high share of female peers and are taught by a female instructor. Related papers study gender match effects on undergraduate [Birdsall et al., 2020, Maurer et al., 2023] and graduate [Bostwick and Weinberg, 2018, Rossello et al., 2023] students' performance.[5] This literature is still relatively small, and each of the existing papers studies a single university. We show that a similar type of effect generalises to exposure to senior women in a setting with fully

[5]One might, somewhat loosely, also group Butcher et al. [2023] with this literature, who study the impact of attending a particular selective women's college on majoring in Economics. While this university differs from others in many respects, one of them is a much higher share of female faculty. A similar effect is highlighted as a key channel in the literature on historically Black colleges and universities Price and Viceisza [2023, and the references therein].

qualified workers as opposed to children or students, to choices over occupations as opposed to college majors, and to doctors across the English National Health Service hospital sector.

Second, we contribute to a related and larger education literature examining a wider range of social influences on choices over gender-typical education paths and careers [Zafar, 2013, Reuben et al., 2017, Philipp, 2022, Patrick et al., 2023, Dahl et al., 2023]. This includes papers experimentally studying short talks or other interventions from visiting female 'role models' [Porter and Serra, 2020, Breda et al., 2021, Agurto et al., 2021, Patnaik et al., 2023], and finding some effects on subsequent major choice, though the evidence is mixed [Basiglio et al., 2023]. This experimental evidence illuminates the role of a very specific effect – the 'role model' effect of a single, short exposure. Our work builds on theirs to examine the impact of a more sustained and 'natural' interaction such as is typical in many workplaces.

Finally, we contribute to a literature in economics and medicine on gender-based sorting across medical specialities. Closely related to the subject of this paper, Jagsi et al. [2014] study associations between exposure to female faculty at US universities and subsequent medical specialty choice. Conditional on observable characteristics, they find no association between the two, but they do not make a causal argument. We build on this work by exploiting the quasi-random allocation of early career doctors to training placements to establish causation. The economics literature has used policy-induced changes in job characteristics [Wasserman, 2023] or quasi-random assignment of training [Fadlon et al., 2022] to address endogenous matches and causally study gender-specific choices of medical specialties. Results show that the specialty choices of women respond to such variation in job characteristics while the choices of men are unaffected, at least in the longer term. Our empirical approach is similar to Fadlon et al. [2022], who exploit a lottery that allocates young doctors to training placements in Denmark. However, while they focus on the perceived attractiveness of the placement, we examine the match between the trainee and senior doctors.

Section 2 gives more detail on our setting, medical training in the English NHS. Section

3 sets out an illustrative framework characterising the mechanisms through which the share of senior women doctors present during a placement may affect junior women's subsequent choice of medical specialty. Section 4 describes the administrative data we use, the Electronic Staff Record, and sets out our empirical strategy. Sections 5 to 7 present and discuss results, heterogeneity analysis, and robustness checks. Section 8 concludes.

# 2 Institutional background

## 2.1 Women's representation in medicine

Medicine is one of several highly paid and academically competitive professions where the share of women has increased dramatically over the past fifty years. In the UK, fewer than 3 in 10 of those accepted to medical school in 1963 were women. This increased to 4 in 10 by 1980 and since the mid 1990s, women starting medical degrees have outnumbered men [Jefferson et al., 2015, Moberly, 2018]. This growth is not specific to the UK, and female representation in other professional occupations, such as the Law, has followed a similar trajectory [Michelson, 2013, United States Census Bureau, 2018]. Rising female representation in the professions is at least partly attributable to changing social norms and more meritocratic admissions policies [Jefferson et al., 2015].

The rise in women entering medical school has gradually increased the share of all doctors who are women and the majority of doctors under 50 are now women. However, the increase has not been evenly spread across medical specialties, and some specialties remain very gender-imbalanced even among junior doctors currently in specialty training. In July 2019, 71% of doctors training in paediatrics were women. This contrasts with a share of just 35% of those training in any surgical specialty, and 20% of those training in cardio-thoracic surgery. Again, this uneven distribution is not specific to the UK, with the distribution of male and female doctors across medical specialities similarly uneven in the US [Association

of American Medical Colleges, 2021]. Gender-based sorting into fields is also common in other professions: For example, 39% of criminal lawyers are women, compared to 56% of lawyers working mainly with private clients [Solicitors Regulation Authority, 2022].

There are several potential reasons for this gender sorting by specialty. It is likely that some specialties have job characteristics that are less attractive to women [Wasserman, 2023], or that there are real or perceived gender differences in returns to specialty choice.[Sarsons, 2017, Zeltzer, 2020, Brewer et al., 2020] Access to same-gender colleagues – in particular, senior colleagues – has also long been highlighted as an important factor to promote equal representation: For example, the 2009 Deech report recommended "identifying female role models who champion local women; providing opportunities to network; mentorship" [Deech, 2009] to overcome what it calls psychological barriers to women's success in the medical profession. Understanding the sources of under-representation is crucial for identifying whether and how to intervene.

Efforts to address the under-representation of women in fields such as surgery and cardiology stem from both concerns about fairness and the potential inefficiencies.[6].

One of the reasons why gender segmentation by medical specialty could be perceived as unfair is that male dominated specialties typically have higher earnings, as demonstrated by Figure 1. Among fully qualified doctors, the share of women in a specialty is closely related to average earnings (scaled according to contracted hours). This is somewhat surprising since in principle, doctors employed by the NHS are paid according to common pay scales that do not vary across specialties.[7] This in part reflects the fact that performance-related pay, as well as the likelihood of doctors taking on additional paid clinical and management

[6]The Royal College of Surgeons of England [2022]'s Women's Committee states that "The ratio of male to female consultant surgeons in the UK is approximately 8:1 and we are on a mission to change that", while the British Cardiovascular Society [2022] is "committed to increasing the number of women training in cardiology".

[7]In line with this intuition, earnings diverge even more starkly, and with a similar pattern e.g. between surgical and non-surgical specialties, in the United States [American Medical Association, 2022], a medical labour market where pay is less regulated.

responsibilities vary systematically across specialties.

[Figure 1 about here.]

There are also concerns that gender-based sorting may be inefficient and that male-dominated specialties could be missing out on female talent (and vice versa). In addition, a growing literature highlights the importance for patient outcomes of demographic matches between patients and doctors in terms of gender, ethnicity and socioeconomic status [Hill et al., 2018, Greenwood et al., 2018, Alsan et al., 2019, Wallis et al., 2022, Kristiansen and Sheng, 2022]. Increasing the number of women in male-dominated specialties may therefore be beneficial to female patients, even if they are equally good as their male colleagues at treating male patients.

### 2.2 Medical training in the NHS

Figure 2 summarises the stages of medical training in the English NHS, notably the point of medical training at which we exploit variation in exposure to female role models (Foundation training), and the one where our specialty choice outcomes are observed (the late stage of specialty training).

[Figure 2 about here.]

All of our analysis focuses on doctors who graduated from medical school in the UK[8]. The first step for (prospective) doctors is to complete a first degree in medicine, which typically takes 5 or 6 years. Medical graduates then receive provisional registration from the General Medical Council, which allows them to begin Foundation training.

[8]The training pathway for UK-qualified doctors is highly standardised; in contrast, for doctors with an overseas qualification who join the NHS part-way through their training we observe a greater variety of pathways, making their outcomes less comparable and affecting our identification strategy.

Health Education England, the public body tasked with overseeing medical education and training, calls Foundation Training the 'bridge between [doctors'] learning as an undergraduate in medical school and the transition into caring for patients on the frontline of the NHS'. This early stage of professional medical training when junior doctors are in the workplace but have not yet chosen a medical specialty is when we measure exposure to senior female doctors.

The assignment of junior doctors to Foundation placements is centralised at the national level. Medical graduates submit ranked preferences using a national platform and get allocated in a multi-step process. In a first step, they rank and are allocated to a Foundation School. There are seventeen Foundation Schools in England, each encompassing broad non-overlapping geographical regions. Applicants must rank them all in order of preference. In a further step, they rank and are allocated to a *programme*, an ordered sequence of placements in a hospital and specialty.[9] A typical programme encompasses six placements of four months each, bringing the total duration of the Foundation stage to two years. Programmes typically include one surgical placement and one community (out of hospital) placement.

To allocate sets of placements, all applicants are ranked based on test scores and their preferences are then considered in rank order.[10] A minority of doctors are preferentially allocated to their location (but not programme) of choice based on health reasons or caring responsibilities. Applicants submit their preferences in March, with the first placement beginning in August. We will refer to doctors who are completing the Foundation programme as *Foundation doctors*.[11]

[9]In some Foundation Schools, this step is further split in two, with applicants first ranking groups of programmes.

[10]For the cohorts we consider, rank is based on the combination of an academic performance school determined by the applicant's medical school and the results of a "situational judgement test", which is a multiple score test that assesses an applicant's professional judgement; both are weighted equally. There is a very limited additional role for other factors such as academic publications or further qualifications. In 2024, the ranking process changed, with ranks now generated at random.

[11]Doctors are not required to complete a Foundation placement in a specialty in order to apply for specialty training but the British Medical Journal in an article on preparing the best possible specialty training application advises applicants to demonstrate their commitment to the specialty through choosing a relevant Foundation placement. Other suggestions include keeping a logbook of procedures performed,

The application process for specialty training is also centralised, meaning it is unlikely that senior doctors can intervene directly to assist a junior doctor who completed a Foundation placement in their department to access specialty training. Those in higher specialty training posts will have typically gone through two open competition processes. The role for input from Foundation supervisors even at the earlier competition is limited and highly formalised. It is designed to screen for red flags (fraud, very serious performance concerns, patient safety risks), not identify excellent candidates. The second round of competitions takes place several years after the initial Foundation placement. This makes it even less likely that senior doctors will have the ability or indeed the inclination to influence late-stage specialty training allocations.

Based on these institutional features, we argue that our estimates reflect an effect on junior doctors' choices, rather than interventions by senior doctors. In section A.9 in the appendix, we show that there is no heterogeneity based on either the competitiveness of entry to specialty training, or whether junior doctors take up specialty training in the same hospital where they completed Foundation Training. Both of these findings support our interpretation that it is mainly the junior doctor's application decision that is affected.

## 3 Framework

The presence of senior women doctors during a placement could impact junior women's subsequent specialty choice in a number of ways, which we describe in this section using an illustrative model following Delfino [2021]. We do not present this model in order to structurally estimate a specific behavioural parameter. Instead, it will serve to more precisely characterise the effects we are looking for, illuminate connections to the previous literature, and generate empirical predictions.

choosing to complete elective experience during their medical degree, taking professional exams and joining professional societies. We capture the fact that medical graduates interested in training in a specialty in future are more likely to complete a Foundation placement in the specialty through specialty fixed effects.

Let $i$ be a junior doctor of gender $g \in \{men, women\}$ choosing among a set of specialties $j = 1, 2, \ldots, J$. In order to make their choice, they consider prospective utility in specialty $j$, which is given by

$$U_i^j = w^j + \lambda_g^j + \alpha_i(s_g^j)$$

where $w^j$ is basic pay in the specialty, and $\lambda_g^j$ is a gender-specific return to working in specialty $j$. This could include monetary returns; for example, we observe higher and more dispersed performance-related pay in surgery. It could also include non-monetary job attributes such as the specialty's social contribution or 'warm glow' as highlighted by Amer-Mestre et al. [2024], or its occupational prestige.[12] An increase in $\lambda_{women}^j$ relative to $\lambda_{men}^j$ - for example, because women's opportunities for career progression have improved - increases the number of women entering a specialty, independently how many other women also choose to do so.

$\alpha_i(\cdot)$ is a taste for working with same-gender colleagues, whose share in the specialty is $s_g^j$. This could include preferences for direct interaction with same-gender colleagues, or preferences for a group dynamic that arises when more same-gender colleagues are present, for example if senior women's presence causes senior men's behaviour to change in a way that women consider favourable. Literatures in economics, social psychology and neuroscience have discussed many underlying reasons for such a preference, an in-depth discussion of which is beyond the scope of this paper. They include gender-specific preferences for a particular management style [Alan et al., 2023], more favourable evaluation by same-gender managers [Drechsel-Grau and Holub, 2023], as well as additional cognitive effort in the presence of stereotype or social identity threat Steele et al. [2002], Akerlof and Kranton [2000, 2005], Eisenberger et al. [2003], or the fear thereof.

Exposure to more senior women could affect the perceived return from choosing a spe-

[12] A longstanding medical and sociological literature analyses status or prestige hierarchies of specialties, diseases or parts of the body among medical professionals [e.g., Rosoff and Leone, 1991, Hinze, 1999, Norredam and Album, 2007, Creed et al., 2010, Hindhede, 2019].

cialty in a number of ways: Firstly, it may increase the perceived share of women $s^j_{women}$ in the specialty. Delfino [2021] shows that applicants' beliefs about the gender share in their desired occupation can be manipulated by simply showing a photo of a woman versus a man working in that occupation, so exposure to female doctors during a placement could plausibly have a similar effect. If women prefer to work in a specialty with more other women ($\alpha_i'(s^j_{women}) > 0$), this would increase the utility they expect in the specialty and therefore their likelihood of choosing to train in it. However, a marginal increase in the expected utility of a specialty would not translate into a different observed choice if the specialty is far from preferred. We note that here, as with all other mechanisms, it can be illustrative to think about a *reduction* in the share of senior women present during a placement instead of an increase, analogous to the related literature in education on demographic *mis*match [Birdsall et al., 2020, McGrady and Reynolds, 2012]: Completing a placement alongside *fewer* senior women may reduce junior women's perceived share of women in the specialty, and hence, their expected utility of working in a specialty, deterring them from entering it at the margin.

Secondly, exposure to senior women may increase the perceived utility of working in the specialty as a woman $\lambda^j_{women}$, however many other women may be present. This includes raising the perceived probability of a woman progressing to a senior doctor role, or female junior doctors' perception of their own ability, perhaps by mitigating stereotype threat. In principle, it could also include changes in the perceived utility of job attributes such as flexibility, although we find little evidence for this mechanism (cf. section 5.2). We further discuss these channels, and their connection to the literature on role models [Gershenson et al., 2016, Pagani and Pica, 2021] and on 'culture as learning' [Fernández, 2011, 2013] in the appendix (Section A.1).

Several of the mechanisms could lead the relationship between the share of women doctors and the utility from a specialty to be non-linear, with bigger gains in utility when the share

increases from a low base. The presence of just a few senior women may be enough to signal that skilled women can progress to senior levels in this specialty, raising women's perceived return in the specialty $\lambda^j_{women}$. Stereotype threat could affect flow utility of working in the specialty ($\alpha_i(s^j_g)$) or perceived own ability (which could then impact $\lambda^j_{women}$, whatever the gender composition of the future specialty environment).

In a laboratory setting, the impact of stereotype threat has been shown to be approximately linear in the share of same-gender peers in a domain where a clear adverse stereotype is in place [Inzlicht and Ben-Zeev, 2000], but is also thought to aggregate a whole host of situational cues in many real-life settings [Steele et al., 2002], potentially including the composition of the group, and other work [Sekaquaptewa and Thompson, 2003, and the references therein] has shown stereotype threat imposes particular costs on the *only* woman in a group, an extreme form of nonlinearity. Mansour et al. [2021] do not find strong evidence of nonlinearities in the match effect for students and college professors they estimate, but the estimate is imprecise for higher shares of women instructors and their setting is very male-dominated overall. Ultimately, the functional form of the effect is an empirical question, which is why we use a flexible form in our estimation. We also examine heterogeneity with respect to the overall share of senior women in a specialty as well as across surgical and non-surgical specialties in section 6, and conclude that our effect is *not* limited to specialties that are very male-dominated *as a whole*, or where a particularly strong gender stereotype is in place.

# 4 Data and empirical strategy

## 4.1 Data

We use the Electronic Staff Record, a payroll dataset covering the universe of staff directly employed by the NHS during the period from January 2012 to November 2021.[13] We observe the hospital[14] employing a doctor, their seniority and specialty, and some basic demographic information including age and gender.[15] We use this information to match junior doctors to senior doctors working alongside them in the same hospital and specialty. The data also provides some very detailed information on earnings and hours which we use to identify patterns of work such as part-time working and on-call duties.

We focus on the specialty choices of three cohorts of Foundation doctors, who started their Foundation training between July 2012 and June 2015, typically in August 2012, 2013 or 2014. This is to ensure allow enough time to observe their subsequent specialty choice before the end of our sample in 2021.[16]

**Initial placement sample** The data provide a sample of 87,726 regular placements and excluding placements in general practice (family medicine), corresponding to 18,250 junior doctors.[17] We implement various sample restrictions to improve measurement of the junior-senior doctor match, full details of which can be found in the appendix alongside estimation results for alternative sample definitions (section A.2). This leaves us with 64,660 placements,

[13]Most doctors start Foundation Training in August. For our main analysis, we use starters between July 2012 and June 2015. While the original data is monthly, our independent variable is measured at the level of a placement with a typical duration of four months and our outcomes are measured at the level of the career stage, typically the late stage of specialty training, reached four years after beginning Foundation Training at the earliest.

[14]Throughout, we use the word 'hospital' to refer to an NHS trust. Many NHS acute trusts have a main hospital plus additional smaller sites but some, especially in London, include several major hospitals.

[15]The ESR records gender as a binary, placing any analysis of other gender identities beyond the scope of this analysis.

[16]While it is possible to progress to the late stage of specialty training after just two years (i.e. four years after starting Foundation training), this is unusual in practice [Kelly and Stockton, 2022].

[17]Figures exclude observations with incomplete junior doctor information.

corresponding to 17,442 doctors. We combine this placement data with characteristics of the specialty (for example, amount of out of hours or on-call duties), and the age and gender composition of senior doctors during the placement.

To analyse the impact of exposure to senior women during Foundation placements on subsequent choices, we collapse sector and specialty choices to the doctor-career stage level (early specialty training, later specialty training, fully qualified consultant or other, non-consultant specialist).[18] Together with the placement-level information, this gives us an indicator for each placement for whether the junior doctor chose the acute sector and the placement specialty at each subsequent career stage.

**Specialty choice sample** Our focus is on specialty choice during late specialty training.[19] Due to the coverage of the data, we analyse specialty choice conditional on remaining in the hospital sector[20]. Excluding those doctors who are not observed in the hospital sector during the early stage of specialty training removes 34% of placements from the placement sample (just over half of whom are junior doctors in general practice training), with a further 16% dropped for outcomes in the late stage of training. We discuss the potential relationship between exposure to female role models and exiting the acute sector in Section 4.3.2.

After these exclusions, we are left with a final sample of 25,638 placements corresponding to 6,640 doctors (3,529 women and 3,111 men) who go on to pursue higher specialty training in one of forty-two acute (hospital-based) specialties. The average number of placements or observations per doctor in our sample is therefore close to 4. These sample restrictions are summarised in Appendix Table 9.

[18]This means that we observe outcomes in three stages for a fully qualified doctor.

[19]Early specialty training is often broader and common to multiple specialties, meaning we measure (intended) specialty choice less precisely at that stage. While the pattern of point estimates at the early stage is similar to the main result, the effects are smaller, noisily estimated and mostly insignificant (full results available upon request).

[20]Remaining in the hospital (or acute) sector is defined as being observed for at least twelve months in the data during a given career stage, with non-zero basic or maternity/occupational absence pay, a regular contract and a main assignment in the hospital sector (i.e., in an acute specialty *and* in an acute trust). Regular contracts include permanent and fixed-term contracts, but exclude locum and bank contracts.

At the end of our observation window, 89% of those in the first observed cohort who remain in the hospital sector covered by our data are still in specialty training, with only a small minority having completed their training and progressed to fully-qualified (consultant or other specialist) roles, and in selected specialties. We therefore analyse the outcome of pursuing specialty training, rather than practicing as a fully-trained specialist.

Table 1 shows the distribution of placements across specialty groups, and the shares of women and men who go on to specialty training in the placement specialty. The first two columns show the number of placements, alongside the share of placements filled by junior doctors who are women - and indicate that placements are relatively gender-balanced. The share of junior women across all placements is 53%, and for half the specialty groups the share of junior women during placement is within 2 percentage point of this. The specialty group with the highest number of placements is surgery, as all Foundation Programme should include one surgical placement, followed by emergency and intensive care medicine. Cardiology and anaesthetics have the lowest shares of placements filled by women, but even here the share is almost 50%. The least balanced specialty groups are paediatric specialties and obstetrics and gynaecology, where more than two-thirds of placements are filled by women.

The third column gives the mean share of senior women among doctor present during placements. The average share of senior women is 0.25, or less than the half the average share of junior women on placements (0.53). This reflects a combination of cohort effects as well as women exiting the hospital sector or taking up less senior roles. As previously discussed, shares of women in Surgery (0.11) and Cardiology (0.10) are particularly low, and very different from the gender-balanced cohort of junior doctors undertaking placements in these specialties. But specialties with the greatest share of junior women on placements also have the highest share of senior women.

[Table 1 about here.]

The final two columns give the share of junior women and men who subsequently go on to pursue higher specialty training in the placement specialty. In the two specialties where placements were dominated by women (paediatrics and obstetrics and gynaecology), women are also more likely than men to go on to train in the specialty, conditional on having completed a placement. Junior women are also more likely than men to pursue specialty training after a placement in geriatric medicine and oncology. These four specialties are those with the highest shares of senior women (third column). Their choices will therefore reinforce existing segmentation of specialties by gender.

Conversely, junior men are more likely than junior women to go on to specialty training in cardiology (15% vs 6%), surgery (10% vs 6%) and gastroenterology (8% vs 5%) after placements in those specialties, despite shares of junior women during placements being close to half. These are also the specialties with the highest share of male senior doctors during placements. This again reinforces existing segmentation. The patterns of specialty choice by gender that we find are largely consistent with the gender-based self-selection into specialties Amer-Mestre et al. [2024] find for high-achieving medical graduates in France.

## 4.2 Empirical method

### 4.2.1 Specification

In our baseline specification, we estimate the impact of exposure to senior female doctors during Foundation training on specialty choice using a linear probability model, specified below. We estimate the model separately for male and female Foundation doctors.

$$\begin{aligned} Y_{hsi} =& \beta_0 + f(wshare_{hs}) + \\ & \beta_4 \Gamma_h + \beta_5 \Delta_s + \beta_6 \mathbf{X}_i + \beta_7 \mathbf{Z}_{hsi} + \epsilon_{hsi} \end{aligned} \tag{1}$$

where $Y_{hsi}$ is a dummy taking the value 1 if doctor $i$ who completed a placement at hospital $h$ and specialty $s$ is observed with $s$ as a main specialty during the later stage of training (i.e., two stages after the Foundation stage). $wshare_{hsi}$ is the share of women present during $i$'s placement. We use a piecewise linear function in the share of senior women (a linear spline), with knots at 20% and 40% senior women:

$$f(wshare_{hs}) = \begin{cases} \beta_1 wshare_{hs} \text{ if } wshare_{hs} < 0.2 \\ \beta_2 wshare_{hs} \text{ if } 0.2 < wshare_{hs} < 0.4 \\ \beta_3 wshare_{hs} \text{ if } wshare_{hs} \geq 0.4 \end{cases}$$

We discussed reasons why the effect may be nonlinear in the share of senior women in section 3 [Sekaquaptewa and Thompson, 2003]. We believe this approach strikes a balance between choosing a sufficiently high number of knots to capture actual non-linearities without overfitting.

The coefficients of interest are $\widehat{\beta_1}$ to $\widehat{\beta_3}$, the marginal effects of increasing the share of senior women at different points in the distribution of share of senior women. $\Gamma_h$ and $\Delta_s$ are sets of hospital and specialty. These aim to control for observed factors that might be correlated with exposure to senior women in a placement and subsequent specialty choices[21]. The estimated $\widehat{\beta_1}$ to $\widehat{\beta_3}$ are there estimated as effects of deviations of what might be expected based on hospital and specialty.

We additionally control for placement characteristics $\mathbf{Z}_{hsi}$ and doctor characteristics ($\mathbf{X}_i$), crucially cohort to account for time trends in female representation among senior doctors. $\mathbf{Z}_{hsi}$ includes the average age of senior doctors to avoid the pattern that senior women are on average younger than senior men confounding the estimates, as well as the share of senior

[21] This includes specialty attributes such as predictable hours that women both junior and senior may have a stronger preference for than men; another example would be some hospitals being located closer to a local amenity that women value more than men do.

doctors that are younger than 45 which may proxy for more egalitarian views about gender and occupational choice.[22] We also allow for a possibly non-linear effect of department size, to account for very low or very high shares of senior women being more likely to arise in very small departments.[23] Other conditioners include the duration of the placement in four bins relative to the omitted category of four months, which is the typical duration, placement order (a dummy for each parity, with a small number of seventh and higher-parity placements are grouped with the sixth one), and starting month (August, December, April, or any other, "off-schedule" month).

$\mathbf{X}_i$ includes the junior doctor's age at the start of the Foundation stage, whether they are a UK national, their cohort, the number of years we observe them in the late stage of specialty training (when we measure the outcome) and whether their training (in or before the outcome stage) has overlapped with the Covid pandemic.[24] Standard errors, $\epsilon_{hsi}$, are clustered at the junior doctor level. All the variables included in $\mathbf{Z}_{hsi}$ and $\mathbf{X}_i$ are summarised in Table 10 in the appendix.

We estimate the same specification for junior men. This allows us to separate a gender match effect on junior women from a potential impact of senior women being better or more inspiring teachers than senior men in general, which would lead to more junior men and women going on to specialty training in the placement specialty.

[22]The British Social Attitudes Survey for roughly the relevant period for our analysis [Phillips et al., 2018] reports that 53% of respondents aged 35 to 44 agree that men and women are in general equally suited to doing "all jobs" or "almost all jobs", compared to 36% of those aged 55 to 64.

[23]We use a piecewise linear function of department size, with knots at five, ten and twenty senior doctors. In addition, note that the fixed effects jointly explain around 70% of variation in department size in a linear model.

[24]This is defined as an indicator whether any stage of training (Foundation, early or late specialty training overlaps with the period March 2020 to March 2021. This applies to nearly all (96%) of the estimation sample and unsurprisingly, is typically not significant.

### 4.3 Pre-checks

#### 4.3.1 Threats to identification

The identifying assumption in 1 is that $wshare_{hs}$ is uncorrelated with residual determinants of whether the junior doctor goes on to train in the placement specialty. In this section, we discuss potential threats to this assumption.

**Omitted placement characteristics** Our fixed-effects specification addresses concerns that there may be omitted placement characteristics (at the level of the specialty or hospital) that are correlated with the share of senior women and that impact junior women's specialty choices[25]. However, omitted placement characteristics may vary at a more fine-grained level. To more comprehensively address this concern, we have estimated a specification that conditions on hospital-specialty ("department") fixed effects (Table 15), thus purely relying on variation over time for identification.[26] While the main effect of interest is more noisily estimated in this specification, the point estimate is very similar to our main specification.

One such possible characteristic that could vary across departments within the same hospital (or indeed within departments over time) would be male senior doctors' attitudes. If in some departments, male senior doctors have more egalitarian attitudes, they may be more supportive colleagues for their senior female peers, whose share may consequently increase through better retention of women or increased applications from senior women to join the department if information about this spreads via word-of-mouth. These egalitarian senior men might be especially committed to increasing the share of women in their specialty in

[25]Note that our outcome is specialty choice, and the effect we estimate is robust to conditioning on junior doctors pursuing specialty training in the same hospital where they did their Foundation training. In other words, the effect on specialty choice is not fully mediated through location choice, as would be the case if the effect were really a 'department choice' effect. However, it is possible that a generally more positive experience during a Foundation placement 'spills over' into specialty choice in some way.

[26]Note that our specification already conditions on the junior doctor's cohort, as well. It is, of course, theoretically possible that relevant department characteristics could vary over time within cohort. It is not possible to test for this type of unobserved time-varying heterogeneity in observational data.

the future and hence may also particularly encourage junior women completing placements in their department to choose the specialty. If this were the case and their encouragement indeed shifted junior women's choices, then we would be capturing an effect of what Bostwick and Weinberg [2018] call the 'female-friendliness' of a department, rather than the presence of senior women *per se*. The main implications are for the academic interpretation of results – in practice, any initiative to increase the share of senior women would likely target the 'female-friendliness' of the department anyway.

**Junior doctor sorting** Our identifying assumption would not hold if the share of senior women affected the sorting of junior doctors into placements. For example, if junior doctors with a particularly strong preference or intention to pursue training in the specialty in future seek out Foundation placements with more senior women *because* they are looking for mentors or role models (but would have chosen to pursue training in the specialty regardless), then this could create a spurious relationship between exposure to senior women and subsequent specialty choice in the data. We argue in Section 2 that this kind of sorting is unlikely to occur: Foundation programme placements are allocated through a centralised mechanism that is hard to predict and occurs five months to two years before a placement begins.

To test for junior doctor sorting empirically, we regress a dummy for the junior doctor's gender on the same set of fixed effects and other observables as in our main regression (described in detail in the previous section). The results in the first column of Table 2 show that there is no statistically significant relationship between the junior doctor's gender and the share of female senior doctors present during the placement. In other words, female junior doctors are no more likely than male junior doctors to sort into placements with more female senior doctors.

[Table 2 about here.]

Of course, this does not preclude the possibility that *all* junior doctors would prefer to

be in placements with more senior women, which could be the case if senior women are, or are perceived to be, better teachers or otherwise create a better training environment for Foundation doctors. We discuss a number of results for junior men in Sections 5 and 6. They do not support the hypothesis of an equal effect on junior men and women. We also provide additional evidence from the NHS Staff Survey on junior doctors' general satisfaction in workplaces with more senior women in the appendix, section A.8.

The remaining columns of Table 2 show analogous regression results for the outcome of junior doctors' age at the beginning of the Foundation stage, and for a dummy for the junior doctor having UK nationality. They show that likewise, there is no sorting based on these characteristics.

#### 4.3.2 Potential selection into persistence in the hospital sector

Our main outcome of interest is whether doctors go on to train in the specialty of the Foundation placement, among those doctors who remained in the hospital (acute) sector. In other words, the choice we examine is (arguably) downstream from the choice of sector, on which we condition. It is therefore important to assess whether exposure to senior women affects sector choice, since this would affect who remains in the sample for our main estimation and hence, how our results are best interpreted. Women doctors are underrepresented in the hospital sector relative to the main alternatives within the NHS, namely general practice and the community and mental health sectors.[27]

Results in Table 3 show the results for the outcome whether the junior doctor remains in the acute sector during higher specialty training.[28] There is no evidence of such an effect

[27] 57% of fully qualified general practitioners were women at the end of our observation period in late 2021 [NHS Digital], and the share of women among specialists working in non-acute trusts covered by the Electronic Staff Record was above 45% on average across our observation period for each type of trust.

[28] As in equation 1, the specification is at the placement level but includes the larger sample of 65,222 placements corresponding to 26,625 doctors before conditioning on persistence in the acute sector. Remaining is defined as having non-zero earnings in a regular contract in the acute sector in at least three months of the year.

for either men or women. This suggests that for our sample, any impact of exposure to senior women on specialty choice operates through changing the specialty choice of those who would otherwise have remained elsewhere in the hospital sector, rather than changing the sector they choose to work in.

[Table 3 about here.]

# 5 Baseline results

## 5.1 Baseline specification

The results of our baseline specification for the probability that junior doctors go on to choose the Foundation placement specialty are shown in Table 4.

The first two columns present the results for junior women. Column 1 omits hospital and specialty fixed effects, with column 2 presenting the full baseline specification (1). In column 1, the estimated $\widehat{\beta_1}$ and $\widehat{\beta_2}$ (corresponding to increases in shares of women across the range below 40%) are statistically significant with increasing shares of women associated with a higher probability of junior women subsequently choosing the specialty. $\widehat{\beta_3}$ is not statistically significant, indicating that an increasing share of women when the share is above 40% is not associated with more junior women choosing the specialty after Foundation training. We interpret this effect as encompassing both the causal impact of exposure to senior women and specialty attributes that are valued more highly by women (both junior and senior) than by men.

When hospital and specialty fixed effects are added in column 2, the estimated $\widehat{\beta_1}$ for the lowest share of female doctors remains statistically significant at the 0.1% level and of a similar magnitude to that in column 1. This indicates that exposure to a greater share of senior women increases the probability a junior woman will subsequently choose the

specialty, if the share of senior female doctors present during the placement is less than 1 in 5. However, $\widehat{\beta_2}$ is now close to zero and no longer statistically significant. The change in the coefficients between columns 1 and 2 after the addition of the fixed effects indicates that, as expected, the share of senior women in a placement in column 1 picks up not just the effect of exposure to senior women, but also the simple pattern that some specialties attract many more women than others, both junior and senior. For placements in the 20% to 40% range of senior women, this can explain the whole (significant) effect.

To contextualise the size of the marginal effect for placements with a share of senior women below 20% in column 2 ($\widehat{\beta_1}$), an increase of ten percentage points in the share of senior women is associated with a 1.6pp increase in the probability of a female junior doctor subsequently choosing the placement specialty. Relative to the mean for women in that same sample, this increase in the probability of working in the specialty at the final training stage represents an increase of 24%, or 41% of the gender gap.[29] For comparison, Carrell et al. [2010] estimate an effect size of 2.6 percentage points for a ten percentage-point increase in the share of female faculty in introductory Maths and science classes on the probability of female students choosing a STEM major, about a tenth of the gender gap in their sample.

Columns 3 and 4 show the corresponding results for junior men. In column 3, which does not include hospital and specialty fixed effects, $\widehat{\beta_1}$ is not statistically significant. $\widehat{\beta_2}$ is positive and statistically significant at the 1% level, while $\widehat{\beta_3}$ is also statistically significant at the 1% but negative. This suggests that at relatively high shares of women, a further increase in the share of women is associated with a reduction the probability a junior man chooses that specialty. As discussed above, this includes both the impact of gender differences in preferences over specialty characteristics and that of exposure to a greater share of senior women (or equivalently, a lower share of senior men). When our fixed effects are added in column 4, $\widehat{\beta_1}$ and $\widehat{\beta_2}$ are no longer statistically significant and $\widehat{\beta_3}$ only remains statistically

[29]The gender gap here is the difference in the probability of pursuing training in the placement specialty after a placement with a share of senior women below 20% in the baseline estimation samples for junior men and junior women, respectively.

significant at the 10% level.

[Table 4 about here.]

Taking the point estimates in column 4 at face value might suggest that there is some evidence of a gender match effect for both genders: in placements that are already fairly gender-balanced or have a majority of female senior doctors, the presence of additional senior women appears to make it less likely that junior men go on to train in the placement specialty. This is consistent with the idea that there is a 'tipping point' in the female share, after which men can be discouraged from entering [Pan, 2015]. However, the effect is around half the size of that for women in male-dominated placements, and only significant at the 10% level.

### 5.2 Interpreting our main estimates

Table 4 shows that impacts of exposures to senior women are concentrated in placements with low shares of senior women. Here we explore how this result should be interpreted. As we include specialty fixed effects, the estimated coefficients capture the effect of exposure to a low share of senior women *relative to what might be expected in the specialty as a whole*. In Table 5, we allow the effect to vary across specialties where the *average* placement (in the same cohort) has a share of senior women of below 20%, versus above. These are relative equal-sized groups of placements (46% of placements in the analysis sample have a specialty-wide share of senior women below 20%) and give us sufficient variation to estimate all three splines.[30]

[Table 5 about here.]

[30]The only place where the sample gets problematically small is the third spline (a share of senior women in the placement of $\geq 40\%$) in the male-dominated group of specialties (a specialty-average of below 20%) – only 0.6% of placements fall in this group, and hence the estimated coefficients (the third row of Table 5) are difficult to interpret; both the estimated coefficients are far from significant.

For junior women, we find the largest effect, and the only significant one, in placements with a share of senior women below 20% but in specialties that are less male-dominated than that. The most common specialties for placements in this group (accounting for nearly two-thirds of the group overall) are emergency medicine, respiratory medicine and geriatric medicine. The only surgical specialty in this group is paediatric surgery, a rare Foundation placement specialty. The difference between this coefficient and the effect in placements with a share of senior women below 20% in specialties where the specialty-wide *average* share is also below 20% is not significant ($p = 0.109$), which means that the estimates should be interpreted with caution. As an alternative way of assessing the importance of role models in male dominated specialties, we have re-estimated equation (1) allowing the match effect to to vary across surgical and non-surgical placements for the first two splines (less than 1% of surgical placements are in settings with more than 40% senior women, meaning that we cannot estimate the third spline well). The effects of exposure to senior women where the share is below 20% are very similar in surgical and non-surgical specialties, and similarly precisely estimated (results available upon request).

Taken together, these results suggest that our results are not primarily driven by specialties strongly stereotyped as masculine or very heavily dominated by men. They thus contrast somewhat with results found by Eble and Hu [2020] for children. In their setting, gender match effects between teachers and children were stronger when there is a societal belief or stereotype that men are more talented in a particular area – which we might expect to be areas where men are in a large majority. Many or most hospital specialties may be stereotyped as masculine to some extent (and almost all are majority-male at the senior level). But junior doctors choices may be easier to shift in areas where the stereotype is less strongly ingrained. So instead of being relevant only in the most male-dominated areas, low representation of senior women in a placement matters just as much or more when the specialty as a whole is more gender balanced, or gender stereotypes are less pronounced – with potentially relevant lessons for other professional contexts.

Table 5 also shows a statistically significant effect on junior men: In non-male dominated specialties and in placements with a share of senior women above 40%, junior men are less likely to choose the specialty after a placement with additional senior women present, providing some evidence of a gender match effect for men in this setting. More than two-thirds of these placements are in geriatric medicine, emergency medicine, paediatrics, or obstetrics and gynaecology.

**Ongoing mentoring** An alternative explanation for our results is that they may capture support that senior women give junior women after the Foundation placement has ended, rather than the effect of exposure during Foundation placements. This support could, in theory, come in two forms. The first is direct intervention from senior women in the allocation of specialty training places. The institutional setting makes this mechanism unlikely. We measure specialty choice several years after the placement, after two national competitions for specialty training places with a very formal and limited role for feedback from Foundation supervisors even at the earlier competition. Direct interference in the allocation of specialty training places is therefore an unlikely mechanism for our effect. The second is continued informal advice and mentoring once the placement has ended. It may be that junior women seek out this ongoing mentoring relationship more after a male-dominated placement. Whilst we cannot rule this out, we test whether the role model effects differ among those who remain in the same hospital for higher specialty training (a small minority, but one for whom the scope for such ongoing mentoring should be much greater). The estimated effects for those who move to a different hospital for specialty training are very similar to our baseline results (see Table 13 in the appendix), making the 'ongoing mentoring relationship' channel less plausible.

**Specification checks** We now briefly discuss a series of specification checks, with more detail provided in the appendix. We included general internal and acute internal medicine,

which were excluded from the main specification due to concerns about identifying junior-senior matches in these "generalist" placements. In addition, we considered alternative sets of splines (Table 16), and conditioned on the share of white British doctors. In each case, our main results remain substantively unchanged. As a further check, we used an alternative method – similar to but distinct from our fixed-effects strategy – to address concerns around omitted hospital and specialty characteristics and junior doctor sorting. This method, using the same intuition as Bettinger and Long [2005] and Bostwick and Weinberg [2018], isolates residual variation in the share of senior women after conditioning on specialty, hospital group, and time dummies in an auxiliary regression.

As discussed in section 4 above, other placement characteristics that are correlated with both the share of senior women present and with the attractiveness of the specialty to junior women but not caused by the presence of senior women would threaten our identification strategy. To address this, we have considered the robustness of our results to the inclusion of additional fixed effects (see Table 15 in the appendix). We first add hospital-cohort and specialty-cohort fixed effects to our baseline specification, capturing hospital- or specialty-specific time trends that are correlated with the share of senior women present - perhaps local processes of 'modernisation'. The results are very similar to our main specification.

We then add departmental (hospital *times* specialty) fixed effects, so that effects are estimated using only within-department variation in female share over time. However, with 1,826 departments and conditioning on cohorts, over-fitting and loss of statistical power becomes an issue. The point estimate of the main effect - a large positive effect on junior women in male-dominated specialties - remains very similar when we condition on hospital-by-specialty (e.g., Trauma and orthopaedic surgery at Manchester University NHS Foundation Trust) fixed effects. However, as expected, the remaining variation is relatively small and the effect is less precisely estimated than in our main specification and no longer significant ($p = 0.11$).

# 6 Heterogeneity

We now examine heterogeneity in the impact of exposure to senior women during Foundation training on subsequent specialty choice. The patterns we uncover help shed some light on the relevance of the different mechanisms outlined in section 3. We first examine heterogeneity by the characteristics of senior women present during placements. We then assess how the impact of female role models varies by other specialty characteristics.

## 6.1 Access, relatability and part-time opportunities

The channels linking exposure to senior women to specialty choice discussed in Section 3 may depend on the characteristics of senior women. Specifically, the signals junior women receive from observing senior women about their own ability, the gender-specific return to working in the specialty and the composition of the specialty may all depend on senior women's characteristics. Our effect appears driven by more relatable senior doctors that junior doctors are likely to have frequent close interactions with, rather than a particularly impressive but perhaps remote 'figurehead' in the department. To support this argument, we present analysis of the impact of senior doctors receiving performance-related pay, and part-time working senior doctors. In the appendix, we additionally discuss heterogeneity by senior doctor age.

### 6.1.1 High-performing senior doctors

We first examine senior doctors' receipt of performance-related additional pay.[31] Performance-related pay is widespread. On average, 40% of senior doctors receive an award payment in

[31] This is mainly in the form of clinical excellence awards; distinction awards and bonus pay are much rarer. National clinical excellence awards are given for "achievements over and above what [doctors] would normally be expected to deliver" [Department of Health and Social Care, 2022]. This includes achievements in teaching and training. While the precise criteria for local clinical excellence awards – by far the most common type of award in our data – may vary, they are broadly intended to reward similar kinds of achievements.

any given month in our observation period, although the frequency of awards has declined over time. The median monthly pro-rata award (conditional on receiving any award) is £754, or just over 10% of median basic earnings.[32] To avoid conflating a potential discontinuity in the effect of exposure to senior women in general with the presence of women with particular characteristics, we introduce a dummy for placements with no senior women, here and for all senior doctor heterogeneity specifications that follow.

Observable senior doctor characteristics predict receipt of performance-related pay: men receive more awards than women, and rates of receipt increase steeply with age up to about fifty. Conditionally on doctor's age and gender, awards are more common, higher and more dispersed in some specialties (e.g., cardiology, gastroenterology).

It is a priori unclear whether match effects would be strengthened or attenuated in settings with high-performing senior doctors. Key achievements that help make a case for an excellence award are participation in hospital leadership and clinical research, both of which may take senior women away from training and supervising or from the placement department itself. Junior doctors' effective exposure may therefore be reduced. Observing a female senior doctor receiving performance-related pay could raise junior women's belief about the return to ability in the specialty or their own ability.[33] Senior women whose excellence awards are partly due to their achievements in teaching and training may also quite simply be better teachers and thus increase junior women's actual ability by more. In contrast, if very high-achieving senior doctors are less relatable, the effect may be detrimental – junior doctors may perceive that only extremely high-ability women progress in the specialty, which could deter less (over)confident would-be specialty training applicants.

To explore the impact of exposure to these high-performing female senior doctors, we

[32]Note that awards are typically made as absolute sums rather than a percentage of basic pay. The amount awarded varies widely: The 90th percentile of pro-rata performance-related pay is £2,957, and the 90th percentile of performance-related pay as a share of a doctor's basic earnings is 37%.

[33]In the appendix (section A.1, we further discuss these channels and how they fit into the conceptual framework.

allow the effect of interest to vary depending on whether at least one women in receipt of high performance-related pay[34] was present during the placement. We condition on the same set of characteristics as in the baseline specification, notably including specialty fixed effects, cohort dummies, and age of senior doctors present during the placement as well as the share of senior doctors aged under 45, which are all important determinants of the prevalence of performance-related pay.

[Table 6 about here.]

The results in Table 6 show that the effect on junior women in male-dominated placements is attenuated when senior women receive performance-related pay and no longer significant at conventional levels. The difference between the effect in male-dominated placements with and without a senior woman receiving high performance-related pay just misses conventional significance levels ($p = 0.057$). There is some evidence of a deterrence effect on junior men in placements that have a high share of female doctors and where women receive clinical excellence awards. Moreover, junior men are less likely to go on to train in a specialty if the placement has no senior women at all – perhaps indicating that there is some preference for gender diversity (not just gender match) at the very lower bound.

Our data do not allow us to conclusively determine whether the weaker gender match effect for senior women with performance-related pay is because female junior doctors have fewer interactions with them, or because they seem less relatable. In the appendix, we also consider the relationship between the average age of senior doctors and continuing in the specialty. Consistent with the results on performance-related pay, the impacts are concentrated in departments where the average age of female senior doctors is under 48. The pattern of heterogeneity suggests that having a successful female figurehead who is

[34]We define this as receiving an award of more than the median amount. This definition applies to nearly half (46%) of placements in the analysis sample. Disregarding low payments is likely to capture more salient awards.

removed from junior doctors by work commitments or age, is not enough to influence their specialty choice.

In section 2, we argued that the national specialty training allocation mechanisms means that it is unlikely that senior doctors could intervene on behalf of junior doctors who have completed a Foundation placement. The pattern of heterogeneity in gender match effects provides further reassurance on this issue. The senior doctors that appear to generate the largest match effects are those who would we expect to have the least power to influence such decisions.

### 6.1.2 Part-time working senior doctors

The potential effects of exposure to part-time relative to full-time female senior doctors on specialty choice are ambiguous. On the one hand, there may be fewer opportunities to observe or interact with part-time working female senior doctors, reducing the influence they could have. This effect could be exacerbated if time for training and advising junior colleagues is disproportionately "squeezed" relative to other duties when senior doctors work part-time. On the other hand, senior doctors who work part-time to accommodate caring responsibilities may demonstrate that a successful career in the specialty is possible while working part-time, and thus have a particularly strong impact on (some) junior women's specialty choice.[35]

There is a positive correlation between the share of senior female doctors working part-time and the share of senior women in the specialty. However, we exploit the variation in part-time working *within* specialty to identify the potential impacts on subsequent specialty choice with the specialty-level differences being absorbed by specialty fixed effects, as before.

[35]Throughout this section, we focus on part-time work by senior doctors under the age of 55, to abstract from part-time working in the run-up to retirement. The latter type of part-time working is subject to very different incentives and perceptions and exhibits different empirical patterns. We also define part-time as working 80% of full-time or less to capture part-time work that is clearly noticeable for colleagues and is likely to have a non-trivial impact on the balance between market and non-market work.

The share of senior women working part-time is zero in more than 70% of placements in our estimation sample. We therefore focus on the binary distinction of any versus no women working part-time, rather than exploring heterogeneity with respect to the share of part-time working women.

[Table 7 about here.]

Table 7 shows that at low shares of senior women, the estimated effect of exposure to senior women on junior women's specialty choice is larger in departments with at least one part-time working senior woman. However, the coefficient is not significantly different from the one in the case without a part-time working senior woman ($p = 0.268$ for the difference). This provides only suggestive evidence that a senior women working part-time exerts a stronger gender match effect, but certainly speaks against the idea of the match effect being proportional to the number of days a senior doctor works. The coefficients are negative, close to zero, and not statistically significant for shares of women above 20%, whether part-time working or not, re-affirming that gender match effects are concentrated in male-dominated settings.

As before, the estimates for junior men indicate that male junior doctors are less likely to pursue training in the placement specialty when there are no senior women at all. In gender-balanced or female-majority placements without any women working part-time, there is a 'deterrence' effect on junior men, who are less likely to pursue training in the specialty after being exposed to more senior women. This, as well as the similar effect for gender-balanced or female-majority departments where some women receive performance-related pay, suggests that while there isn't a match effect for men on average across all placements, there may be combinations of circumstances where a similar gender match effect to the one we find for junior women operates for junior men as well – perhaps in those situations where senior women appear competitive with senior men.

### 6.2 Gender match effects and other specialty characteristics

In addition to their experiences during Foundation placements, there are many specialty attributes that a junior doctor will take into account when making their specialty choice. The average preferences for these attributes can vary by gender. In this section, we present evidence that the impact of exposure to senior women varies with some specialty characteristics. In particular, our effects are concentrated in specialties where attributes are likely to be otherwise favourable to women's entry. We consider three such characteristics: the predictability of schedules through the level of on-call duties, the level of geographical flexibility, and the length of training pathways. All results are presented in Table 8.

**On-call duties** On-call work is a type of 'negative flexibility', since it implies both atypical hours (i.e., nights and weekends) and a degree of unpredictability of the timing of completed work. The wider literature in labour economics has shown that all workers strongly dislike these types of schedules, but women do so in particular [Mas and Pallais, 2017, Qian et al., 2023]. In a similar context to ours, Amer-Mestre et al. [2024] estimate that female medical graduates have a "particularly strong taste for time flexibility [and] are willing to give up important shares of their earnings to avoid working longer, more inconvenient hours".

We exploit information on the composition of senior doctor earnings in a specialty (across all hospitals) to characterise specialties as having a high prevalence of on-call duties if either the share of senior doctors who receive on-call allowances or the amount of on-call allowances relative to basic earnings, fall in the top quintile.[36] Specialties with a high prevalence of on-call duties by this definition include obstetrics and gynaecology, anaesthetics and some

[36]This corresponds to cut-off values of 81% of doctors and 4.3% of basic earnings, defined as the top quintile of Foundation placement in our analysis sample. The aim is to capture both specialties where on-call duties are very common and those where a small share of doctors take on a lot of on-call duties. On-call allowances are not typically paid to junior doctors, and are much less common among non-consultant specialists, which is why we focus on consultants to classify specialties. Results are qualitatively and quantitatively similar if we tighten the definition to the top decile or loosen it to the top 40%, although in both cases there is a loss of precision.

surgical specialties (but accounting for fewer than 1 in 5 surgical placements), as well as some specialties where there are relatively few Foundation placements, such as intensive care medicine, renal medicine and haematology.

[Table 8 about here.]

Panel A of Table 8 shows that the gender match effect when there is a low share of senior women exists only for specialties with a low prevalence of on-call duties [37]. The corresponding coefficient when there is a high prevalence of on call is both negative and not statistically significant [38]

**Geographically concentrated specialties** Specialties differ in their geographic concentration, and hence, in the geographic flexibility they offer to doctors. Senior doctors in the specialties we analyse work in a maximum of 174 different hospitals.[39] We split our analysis into specialties present in more or less than half that number. Most placements are in common, geographically dispersed specialties, meaning that the former group is much larger than the latter. The most common (in terms of placements in our analysis) geographically dispersed specialties are general surgery, emergency medicine, geriatric medicine, trauma and orthopaedic surgery, and paediatrics. 7% of placements are in geographically concentrated specialties, most commonly in renal medicine, intensive care, clinical oncology, cardiothoracic surgery and neurosurgery. Placements in geographically concentrated specialties are more likely to have an intermediate share of senior women doctors (between 20% and 40%),

[37] 90% of placements that fit this description are in surgery, emergency medicine, cardiology or respiratory medicine.

[38] The two coefficients on shares of senior women below 20% in high- and low-prevalence of on-call duties specialties, respectively, are statistically significantly different from one another ($p = 0.033$).

[39] Note that this is greater than the number of hospitals where the placements happen (137) both because senior doctors can work in types of hospitals not included in our analysis (e.g., some physical health specialists go on to work in mental health trusts), and because some (typically smaller) hospitals don't host Foundation doctors. Both of these are options that meaningfully increase geographic flexibility after specialty training, which is why we include them in the count.

and less likely to be either very male-dominated or be gender-balanced/have a female majority. Literatures in economics and geography [England, 1993] have long been interested in the idea that female-dominated occupations ('pink-collar' jobs) are more geographically dispersed than male-dominated ones and, relatedly, that women are more likely to move to accommodate a spouse's career [Mincer, 1978]. If women junior doctors anticipate such moves, strong geographic concentration of a specialty would represent a barrier to women's entry.

Panel B of Table 8 provides some evidence that the main effect – among male-dominated placements – is concentrated in specialties that are geographically dispersed. The difference between the two coefficients (the impact of a change in the share of senior women at low levels in a geographically dispersed versus a geographically concentrated specialty) just misses conventional significance levels ($p = 0.06$).

In addition, the impact of a change in the exposure to women at intermediate shares of senior women in geographically concentrated specialties is large and significantly different ($p = 0.03$) from the effect in geographically dispersed specialties, albeit fairly noisily estimated. This suggests that increases in the share of senior women may be impactful further up the distribution in specialties where other barriers to women's entry are high (the estimated effects in specialties with a high prevalence of on-call duties and in specialties with a low share of women across placements described in 5 and 8 above as well as in surgical specialties are qualitatively consistent with this, although too imprecisely estimated to provide strong evidence).

**Typical age when starting to work as a senior doctor** Specialties differ in the typical duration of training and hence the age at which doctors typically begin working in senior roles. Given that progressing through specialty training with young children can be difficult [Kelly and Stockton, 2023], and that specialty training typically takes up most of a doctor's

thirties, long training durations may be a barrier to entry for women who have children or want to have them in future. We therefore calculate the median age at which men become senior doctors[40] and classify specialties as having a long training duration if this age is 40 or older. 22% of placements in our analysis are in specialties where new senior doctors are older than 40, most commonly in general surgery where the average new male senior doctor is aged 40.2. In contrast, the average new male senior doctor in Emergency Medicine – the most common specialty in which new male senior doctors are aged below 40 – is aged 37.8.

In panel C of Table 8 we allow our effect to vary between these two groups of specialties. While the effect is only significant in the group of specialties where doctors start working as senior doctors at younger ages, the point estimates are close together and not significantly different from each other. This is not an artifact of this particular age cutoff - if we shift the cutoff further upward in the age distribution, the group of "long training pathway" specialties becomes very very small (because general surgery gets reclassified), and the effect for that group becomes very imprecisely estimated. If, in contrast, we shift it downward to create roughly equal-sized groups, the coefficients are similar. In summary, there is some evidence for a stronger effect in specialties with shorter training pathways, but it is not very strong.

In summary, our results are consistent with a gender match effect operating when job characteristics are otherwise favourable to women's entry into the specialty. Exposure to senior women is more likely to affect specialty choice at the margin when schedules are more predictable, there is more geographic flexibility and, tentatively, where less extended training pathways allow doctors to start working in stable, senior roles at relatively younger ages. This fits with junior doctors making a specialty choice that maximises utility: if there are other specialty characteristics that junior doctors have a strong preference over, exposure to senior women is less likely to change their specialty preference ordering.

[40]We calculate this by using every male doctor observed as both a specialty trainee and consultant in our data (between 2012 and 2021) and recording the minimum age at which they were observed working as a consultant, and then averaging within each specialty.

This suggests that a short exposure to senior women does not change junior women's assessment of or preferences over job characteristics (a change in $\lambda_g^j$ in the model set out in section 3): Junior women do not appear to conclude that on-call duties, geographical inflexibility or lengthy training pathways are less onerous for women when they observe senior women working in jobs with those characteristics. Instead, the effect is more likely to operate via a change in the perception of the share of women present in a typical department in the specialty ($s_g^j$ in the model). The earlier result, presented in Table 3, that female role models do not affect whether junior doctors remain in the acute sector, also supports this story of a change in choices at the margin without 'overriding' other considerations.

# 7 Discussion

Our results show that an economically a priori irrelevant factor – individual early-career exposure to female senior doctors – can meaningfully shift women junior doctors' specialty choices. If we assume junior women's comparative advantage across specialties is unaffected by a short exposure to senior women, then this will introduce noise, and potentially a distortion. In addition, there is a stated policy aim of moving towards a more gender-balanced allocation of doctors across specialties. However, whether being allocated to a placement with an above-average share of senior women induces a junior doctor to make a specialty choice that is closer to the optimal allocation – or in other words, whether allocation to more than usually male-dominated placements distorts junior women's choices away from the private or social optimum – will depend on several factors.

**Private welfare effects** From junior women's own point of view, the welfare impact of exposure to senior women will depend on whether it reduces any biases in their predicted payoffs from different specialties when they make their specialty choice. The variation we use is idiosyncratic after accounting for specialty and hospital fixed effects, and therefore

represents exposure which is not reflective of the hospital and specialty averages. This could distort choices if the impact of exposure to senior female role models was operating primarily through the impact on perceptions of the average share of women across the specialty as a whole, rather than junior women's perception of their own ability or the gender-specific return to ability. On the other hand, if women underestimated their own comparative ability or the return to women's ability in male-dominated specialties, an overestimation of the specialty-wide share of women could correct for this, even if in itself inaccurate.

For those induced to choose a specialty by exposure to more senior women, the measurement of specialty choice during higher specialty training goes some way to allaying the concern that the variation generates beliefs that are so inaccurate that they result in very poor matches. By the time junior doctors are in higher specialty training, they will have completed two rounds of selection in a national competition and several years of core training, often in multiple hospitals. This provides time to correct any misperceptions generated during their Foundation training, while repeated competitive processes to allocate placements should allay any concerns about bad doctor-specialty matches from a productivity perspective. If anything, we find stronger effects at the later compared to the earlier stage.

There is also no impact on dropping out of specialty training in the acute sector before reaching the later stage, which might indicate a lower than expected pay off to the initial specialty choice. This can be partly explained by junior doctors having the choice of over 40 specialties. Our results are consistent with exposure (or lack of exposure) to senior women altering the expected payoff from training in that particular specialty, and thereby changing junior doctors' ranking of specialties at the margin. For those induced to choose a specialty due to higher-than-expected exposure to senior women, they will typically not now pick a specialty that has many attributes that they dislike. For those who do not choose a specialty after lower-than-expected exposure to senior women, they are opting for a different specialty that they also rank highly.

**Potential impacts on senior women** One policy implication of our findings could be that increased access to senior women could be an effective way to increase the share of women entering male-majority fields – although our results suggest that this might not be enough for the most male-dominated specialties. In addition, when designing a policy along these lines, it would be important to weigh any gains for junior women or the specialty as a whole against potential costs for senior female women who would act as role models, mentors or sources of information. A large literature finds women are more likely to volunteer for or agree to non-promotable and internally facing tasks [Babcock et al., 2017, Nelson et al., 2023]. The patterns of heterogeneity we find are consistent with larger impacts coming from senior women who are more likely to work closely with junior doctors (younger senior women and those not in receipt of performance-related pay), so it is these women – rather than a very successful but potentially remote figurehead – that one would want to involve in such an effort. While all the senior doctors in our setting are already in senior roles, they still compete for performance-related pay, academic grants, and prestigious committee positions. All of these require activities that might compete for time with teaching and mentoring. Any policy that aims to facilitate junior women's contact with senior women, for example by establishing networks across hospitals, should therefore also consider how senior women are rewarded for those mentoring activities relative to the activities they may displace.

**Impacts on social welfare** There are potential welfare impacts of changing specialty choices that extend beyond individual junior doctors and their supervisors. There is plausibly a cost, in terms of process utility and/or productivity, of being in a small gender minority in the workplace, for example due to stereotype threat causing distress and harming performance [e.g. Brewer and Hewstone, 2004, and our discussion in section 3]. This means that there could be an externality from women choosing specialties or departments where women are currently a small minority (though not ones where they are currently completely absent), since their presence will increase utility and/or productivity for other women. Equally, there

could be a negative externality from not entering a specialty if there is low representation of women in a particular department or specialty in a hospital, even when the specialty across the health service is more gender balanced.

If health outcomes are better when doctors and patients are matched on demographic characteristics including gender [Hill et al., 2023, Greenwood et al., 2018, Alsan et al., 2019, Wallis et al., 2022, Kristiansen and Sheng, 2022], the planner would additionally value matching the gender mix of doctors in the specialty to the patient gender mix – but only insofar as this then allows matching individual doctors to individual patients that are similar to them. As this type of matching seems difficult to implement in our context, a learning channel seems more relevant: If, as Greenwood et al. [2018] find, male doctors achieve better outcomes for female patients after having worked with more female colleagues, there could be particularly large benefits from attracting more women into specialties that are currently the most male-dominated. As discussed above, our heterogeneity analyses are consistent with larger impacts in specialities whose characteristics are otherwise more favourable to women's entry, including high geographical flexibility and low prevalence of on-call duties. This suggests that exposure to senior women interacts with other job characteristics relevant to gendered choices. Some of these will be amenable to intervention either in the workplace, in other policy spheres, or the household. Our results suggest that such interventions – e.g. aimed at decreasing the cost of commuting or of unsocial hours for women – could work better when combined with exposure to senior women, and vice versa.

## 8 Conclusion

Even as the share of women has increased steeply across cohorts of doctors, medical specialty choices continue to differ starkly by gender. This pattern appears in our setting in the English National Health Service as well as in many other health systems, and mirrors occupational choice patterns in other professions. In this paper we highlight the role social influences play

in this gender segmentation. We exploit features of a national centralised mechanism for allocating medical graduate to a series of post-graduate training placements, which creates quasi-random variation in exposure to senior female colleagues. Our principal results are threefold.

First, we find that female junior doctors whose early training placements expose them to a greater share of senior women are subsequently more likely to pursue specialty training in the placement specialty. The effect is highly nonlinear and concentrated in male-dominated environments. For placements with a share of senior women below 20%, an increase of ten percentage points in the share of senior women is associated with a 1.6pp (24%) increase in the probability of a female junior doctor subsequently choosing the placement specialty. Impacts are present for male-dominated placements across specialties, not just placements in surgical specialties and cardiology, which are male-dominated overall. If anything effects are larger when the specialty as a whole is more gender balanced (a specialty-wide female share of 20% or more). Male-dominated placements may therefore discourage female applicants into that specialty, even if good progress is being made towards recruiting women in the specialty as a whole.

Gender-based occupational sorting has been shown to matter for productivity in other settings. For a large multinational company, [Ashraf et al., 2023] show evidence that due to varying strength of selection across countries, women employees are more productive where female labour force participation is lower. At the aggregate level, Hsieh et al. [2019] argue that the unwinding of past occupational sorting by gender and race in the United States contributed significantly to growth, and Cuberes and Teignier [2016] make a similar argument for sorting into entrepreneurship. It is plausible that reducing barriers unrelated to comparative advantage in different specialties, including gender stereotypes, could similarly improve the productivity of the medical profession in the health service in England.

Second, the magnitude of the impact of exposure to senior female doctors in male-

dominated environments depends on the characteristics of the senior doctors. Effects are greater when senior doctors are younger and do not receive performance-related pay. This suggests an important role for relatability as well as contact time or frequency of interactions between senior and junior doctors. The rise in the share of senior women over time, reflecting female-dominated medical school cohorts since the 1990s, should increase the presence of senior women and reduce the number of male-dominated placements in most specialties. If it had been very senior women with performance related pay that had been driving results, this would have taken longer to achieve. However, the importance of relatability and availability also runs the risk of creating increasing burdens for recently promoted senior doctors, which are typically not rewarded by the pay and performance system.

Third, the impact of exposure to senior women is greater in specialties where other job attributes are on average favourable to women. In particular, effects are strongest in specialties with a low prevalence of on call duties, greater geographical flexibility, and where the training pathways are shorter. This indicates that, as expected, the presence or absence of senior women interacts with other characteristics of the specialty. Efforts to increase the number of junior choosing a specialty by providing them with senior women colleagues may therefore be less successful if other attributes are unchanged and are less favourable to women's entry to the specialty. We find no evidence of an effect on the decision to stay in the hospital sector in the first place, indicating that choices are shifted between hospital specialties, rather than between sectors.

Taken together, our results indicate that exposure to senior women matters for medical specialty choice when environments are very male-dominated. However, efforts to improve access should focus not just on stereotypically male-dominated specialties. In this setting, the relatability of potential role models is important. Efforts to use recently promoted senior doctors to provide support for junior women should take into account the possible impacts of their subsequent careers to ensure they are not disadvantaged relative to their

male colleagues.

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# A Appendix

## A.1 Further discussion of channels and connections to the literature

In this subsection, we add nuance to the discussion in section 3. Following Delfino [2021], gender-specific utility in the specialty could be further split into two components, $\lambda_g^j = \theta_g^j a_i^j$, where $\theta_g^j$ is a gender-specific return to doctor $i$'s ability in specialty $j$, $a_i^j$. This would give prospective utility in specialty $j$ for doctor $i$ of

$$U_i^j = w^j + \theta_g^j a_i^j + \alpha_i(s_g^j)$$

Exposure to senior women may then increase the perceived return to women's ability $\theta_{women}^j$, by increasing the perceived probability of a woman progressing to a senior doctor role in the specialty.[41] This is sometimes called a 'role model effect' [Gershenson et al., 2016] – although this term has not been used fully consistently across the literature.

This effect could also be framed in terms of the 'culture as learning' approach of Raquel Fernández [2011, 2013], which explains the economy-wide dynamics of women's labour force participation as resulting from an inter-generational learning process about the consequences[42] of women's market work. Applying this lens to our setting, a junior woman would use her observation of senior women during specialty training to update her prior about women's return to ability in the specialty. Note that unlike in our model, in Fernández's framework women have no 'social' preferences over the gender composition of their colleagues and gain no utility from eventually working around more other women.[43] Fernández [2013]

[41] The true underlying model of returns to ability may be much more complex than this multiplicative form suggests. We do not separately measure or attempt to estimate ability here.

[42] Defined broadly to include potential impacts on child welfare, marital stability, identity, etc.

[43] Nevertheless, like effects operating via beliefs about the share of women $s_w^j$ described in the main text in sections 3 and 7, culture change-as-learning could lead to a form of overoptimism: Trainees exposed to many senior women during Foundation training may overestimate $s_w^j$ or $\theta_{women}^j$, which could lead to (privately) sub-optimal choices. We cannot test for this directly without data on beliefs. However, our results do not just measure initial specialty training preferences but realised choices in the late stage of specialty training. If

shows that this model can generate a process of 'culture change' that exhibits tipping points.

Equally, junior women's ability $a_i^j$ or, equivalently for the purposes of the decision problem, their perception of their own ability could be improved through exposure to senior women. Such an effect – exposure to a high-ability woman increasing women's beliefs about their own ability – is also sometimes referred to as a 'role model effect' [Pagani and Pica, 2021]. A similar effect might arise if the presence of senior women mitigates stereotype threat and consequently improves performance during the rotation, which junior doctors may in turn take as a signal of their own ability. There could be also an effect on actual ability and not just perceived ability, if teaching in gender-matched senior-junior pairs is more effective. This is what Dee [2005] and Eble and Hu [2020] refer to as 'active' effects. Evidence for this type of effect in school settings is mixed[44], and there is little direct evidence for adults.

### A.2 Sample restrictions and descriptives

In this section, we supplement the discussion in section 4 with further details on the sample restrictions, and provide full descriptive statistics. The Electronic Staff Record includes doctors employed in both hospital and community settings and in both physical and mental health; however, our main analysis focuses on acute (short-term physical health) hospitals and specialties. Our initial sample of placements is restricted to primary, regular (i.e. not overtime mediated through a staff bank) assignments; since Foundation trainees do not typically have more than one concurrent assignment, this has little impact in practice. We only use placements with at least one senior doctor in the same specialty present throughout. Junior doctors in placements that do not meet this definition could be supervised by a senior doctor in a related specialty, but one or both specialties could also be misrecorded.

overoptimism were strong enough to induce women to drop out when confronted with the specialty's reality, this would reduce or eliminate our effect in later years, which is not consistent with our results.

[44]For example, De Gendre et al. [2023] find significant effects on job preferences, but not other outcomes such as subject enjoyment and confidence, for England.

We are unable to conclusively match junior doctors to the senior doctors they work alongside outside the acute sector in psychiatric, public health or community specialties and general practice, as well as dentistry. In the case of general practice, this is because fully qualified GPs are not typically directly employed by the NHS (in the UK, GP practices work for the NHS as independent contractors). For the other specialties just listed, there are major difficulties with matching junior and senior doctors. This is because junior doctors typically remain employed by a 'lead' acute trust during those placements, but work in another type of trust, for example a local mental health trust. In many cases, there are several potential mental health trusts that a placement could be happening at, which makes the junior-senior match difficult.

Table 9 summarises the restrictions used to delineate our analysis sample. We start with a sample of 87,726 regular placements. These exclude observatuions with missing information or recorded as beginning more than two years after the start of a junior doctor's first Foundation placement, Bank assignments of Foundation doctors (a type of overtime mechanism) and placements in general practice (family medicine).[45] We drop 4,940 placements outside the hospital (acute) sector, including psychiatric and public health or community specialties and dentistry, where the match between the Foundation doctors to the senior doctors (consultants and fully qualified General Practitioners) they work with is poor.[46] We also drop placements in general internal medicine and acute internal medicine (12,604 'generalist' placements) as there is not enough information about who Foundation doctors would actually be working with.[47] We also drop doctors who qualified outside the UK (4,266) and placements that go on for more than a year (178) or where at least one senior doctor in the

[45]Extending Foundation training beyond the regular two-year period is rare, as is Bank work during this stage of training.

[46]In these specialties, Foundation doctors typically work alongside senior doctors employed by community, primary and mental health providers, rather than the acute trust leading on the training programme's delivery and employing the Foundation trainee, which makes the matching difficult.

[47]Estimating our specification with those 'generalist placements' added back in produces qualitatively and quantitatively similar estimates. The slightly smaller main coefficient of interest of 0.12 is still significant at the 1% level.

same specialty isn't present throughout the placement, or information on senior doctors is missing (1,078).Tables 10 and 11 give summary statistics for the secondary and the main analysis sample split by gender, and separately for the intervals of shares of senior women covered by each of the three splines in our specification. Table 12 provides additional sorting tests, discussed in section 4.

[Table 9 about here.]

Table 10 gives full summary statistics.

[Table 10 about here.]

[Table 11 about here.]

### A.3 List of specialty groups

Specialty groups and specialties within each group listed in order of frequency in our main analysis sample:

- Surgery: General, Trauma and Orthopaedic, Urology, Otolaryngology, Cardio-thoracic, Vascular, Neuro, Plastic, Paediatric, Oral and Maxillo-Facial
- Emergency/Intensive: Emergency Medicine, Intensive Care Medicine
- Geriatric Medicine
- Other: Endocrinology and Diabetes Mellitus, Renal Medicine, Haematology, Neurology, Rheumatology, Rehabilitation Medicine, (Medical) Ophthalmology, Palliative Medicine, Genito-urinary Medicine, Infectious Diseases, Medical Microbiology/Virology,

Dermatology, Clinical Pharmacology and Therapeutics, Immunology, Clinical Genetics (incl Cyto- and Molecular), Audio Vestibular Medicine

- Paediatrics
- Respiratory Medicine
- Gastroenterology
- Obstetrics and Gynaecology
- Cardiology
- Anaesthetics
- Oncology/Radiology: Clinical Oncology, Medical Oncology, Clinical Radiology, Nuclear Medicine
- Pathology: Histopathology, General, Chemical

### A.4 Details of variable definitions

- **Main specialty** We allow for two specialties during training and the outcome is one if one of the two matches the placement specialty. For doctors with assignments in more than two specialties, we keep specialties recorded as the primary assignment with a regular (non-Bank, non-locum) contract. If more than two remain, we choose the one with the highest contracted hours. If they are contracted for equal hours (as a proportion of full time) in multiple specialties, we choose the specialties with the highest basic earnings.
- **Regular contracts** include permanent and fixed-term contracts and exclude locum and bank contracts.

### A.5 Placement characteristics correlated with the share of senior women

Table 12 complements the discussion in section 4, where we showed that junior doctors do not sort into placements with more or fewer senior women based on observable characteristics. The table shows that placements with more senior women do not differ in terms of their duration, but that placements with more senior women are more likely to occur towards the end of the programme, and less likely to occur in the first year. There is no difference in the probability of a placement being a junior doctor's fourth, the one just before specialty training applications, and whose specialty junior doctors are more likely to pursue. All our estimates flexibly condition on the parity of the placement among the typical six (using a full set of dummies).

[Table 12 about here.]

### A.6 Specialty training in the Foundation placement hospital

In this section, we provide some additional evidence on potential mechanisms. Specifically, if an ongoing mentoring relationship between junior and senior women, or information gathered or beliefs formed about a particular department were the main or only channel through which our effect operated, we would expect the hospital-stayer dummy to absorb most of the effect. However, while women who stay in the same hospital are also more likely to train in the placement specialty, the effect of exposure to senior women is virtually unchanged from the baseline specification .

Only 9% of placements in our baseline specification correspond to junior doctors who remain in the same hospital they did the Foundation placement in during the higher stage of specialty training.[48] In Table 13, we condition on, and allow our main effect to vary by

[48]There is some regional variation, with lower numbers staying on around London (in most of the London Foundation schools as well as Essex and Bedfordshire), and higher numbers staying on in Yorkshire as well as the Peninsula Foundation School (covering Cornwall and Devon). Differences across broad groups of

whether the junior doctor is completing specialty training in the same hospital where the Foundation placement took place. In theory, this effect has an ambiguous sign: Doctors who particularly enjoyed their Foundation placement may try to train in the same hospital *and* specialty, which would introduce a positive relationship between the two variables. On the other hand, doctors with a particularly strong *location* preference could, for example, be willing to compromise on their preferred specialty and choose one that looks arbitrary to us in the data, if their specialty choice is of secondary importance to them.

[Table 13 about here.]

Point estimates for the main effect of interest among 'stayers' and 'switchers' are very similar, although the estimate for stayers is imprecisely estimated (reflecting the relatively small size of the group). These results do not support the idea that an ongoing mentoring relationship is driving our effect.

### A.7 Additional specification tests

**Using residual variation in the share of female senior doctors** As an alternative strategy to address concerns around omitted hospital and specialty characteristics and junior doctor sorting, we isolate residual variation in the share of senior women after conditioning on specialty, hospital group, and time dummies in an auxiliary regression. We interpret this residual variation as the 'unexpected' or idiosyncratic variation in senior women. This strategy is a straightforward extension of Bettinger and Long [2005] and Bostwick and Weinberg [2018], who use deviations from the average to estimate the impact of a higher share of female faculty and peers, respectively. Directly applying their strategy would not work well in our setting, where there is a very strong time trend in the share of senior women, and deviations from average are therefore much more positive on average in later periods.

specialties are modest and there are no meaningful differences between men and women.

Adding time fixed effects to the auxiliary regression addresses this issue.

To construct the residual variation, we estimate the following auxiliary regression for hospital $h$ and specialty $s$ in month $t$:

$$wshare_{hst} = \alpha_0 + \alpha_1\Gamma_h + \alpha_2\Delta_s + \alpha_3\Lambda_t + \epsilon_{hst}$$

where $wshare_{hst}$ is the number of women as a share of all senior doctors at the hospital group $h$ and specialty $s$ in month $t$ and $\Gamma_h$, $\Delta_s$ and $\Lambda_t$ are sets of fixed effects.

The 'main' regression for this approach, for a rotation of junior doctor $i$ at hospital group $h$ in specialty $s$ and month $t$ is

$$\begin{aligned} Y_{hsi} =& \beta_0 + \Sigma_{q=1}^{3}\beta_q f(\widehat{wshare}_{hs}) + \Sigma_{r=4}^{6}\beta_r g(wshare_{hs} - \widehat{wshare}_{hs}) \\ &+ \beta_7\mathbf{X}_i + \beta_8\mathbf{Z}_{hsi} + \epsilon_{hsi} \end{aligned}$$

where $f(\cdot)$ is the same set of splines used in the main specification, but based on predicted rather than actual shares of senior women (i.e. with knots at 20% and 40%), and $g(\cdot)$ is a spline in the deviation from the predicted share, with knots at -5% and +5%, to "small" versus "large" deviations. The average absolute deviation from the predicted share of senior women in the secondary analysis sample (used to analyse sector choice in section 4) is 0.11. $\mathbf{X}_{hs}$ is a vector of placement characteristics (number of senior doctors, duration, parity, starting month, and contract type), and $\mathbf{X}_i$ are junior doctor characteristics (age, UK nationality, cohort, regional Foundation School). These include the conditioners from the baseline specification (cf notes for Table 4). $\beta_1$ to $\beta_3$ capture the impact of a rotation *where we would expect more senior women.* This includes any job amenities that differ between locations and specialties that are differentially valued by (junior and senior) women and men. By contrast, the main effects of interest, $\beta_4$ to $\beta_6$ is the impact of a rotation *where a junior doctor was 'unexpectedly' exposed to more senior women.*

'Unexpected' exposure to substantially below-average shares of senior women is associated with a deterrance effect on junior women (Table 14), in line with our main results. On the other hand, there is also a deterrance effect from exposure to a share of senior women that is substantially *above* what we would expect in a given specialty and hospital, suggesting that junior women have a preference for gender-balanced department, not necessarily for contact with as many senior women as possible. In this specification, we also find that exposure to more senior women beyond the average is associated with fewer junior men going on to train in the placement specialty, in line with tentative although largely insignificant findings from the main specification and heterogeneity analyses.

[Table 14 about here.]

**Alternative functional forms** Tables 15 and 16 show alternative specifications as discussed in section 5, including additional fixed effects, moving the knots for the splines, and using a quadratic specification.

[Table 15 about here.]

[Table 16 about here.]

### A.8 Hospital-level evidence from the NHS staff survey

The annual NHS staff survey can provide supplementary evidence on the impact of more senior women doctors on aspects of workplace culture. Data is available at the level of all junior doctors working for a hospital, annually between 2016 and 2020. To characterise the workplace culture of hospitals with a higher share of senior women, we condition on year fixed effects, trust type, doctor headcount, the share of White British or Irish doctors (which is positively correlated with the share of women doctors), and the share of doctors working in each of fourteen specialty groups.

More specifically, we estimate the following model via OLS

$$Y_{ht}^{jun} = \beta_0 + \beta_1 W_{ht}^{sen} + \beta_2 \mathbf{X}_{ht} + \epsilon_{ht}$$

where $Y_{ht}^{jun}$ is the share of junior doctors in hospital trust $h$ who in year $t$'s staff survey agreed with a statement. $W_{ht}^{sen}$ is the share of senior women in the trust in year $t$ (the staff survey collects responses in the autumn of each year), and $\mathbf{X}_{ht}$ are conditioners as discussed above, including the specialty composition of the hospital trust.

Table 17 shows that there is little evidence at this level that, conditionally on the share of women junior doctors, a higher share of women senior doctors is associated with higher job satisfaction for junior doctors on average across genders: They are not significantly more or less likely to report that they look forward to going to work, or that they would recommend their organisation as a place to work, or that time passes quickly when they are working, and are in fact *less* likely to report being enthusiastic about their job or that they are able to do their job "to a standard they are personally pleased with".

On the theme of a collaborative, supportive and egalitarian environment, there is also no association with reported discrimination, harassment, bullying or abuse at work from managers or from other colleagues, or with reported support from immediate managers or other colleagues, or with the perceived fairness of career progression independently of personal characteristics including gender, or with junior doctors reporting that they receive recognition for good work. The one result suggestive of better management quality is an association between the share of women senior doctors and junior doctors reporting they are involved in deciding on changes introduced that affect their work area, team, or department. By contrast, they are less likely to report that the team they work in has shared objectives.

[Table 17 about here.]

### A.9 Further heterogeneity analysis

In addition to the analysis presented in section 6, we allow our effect of interest to vary by additional placement, specialty and junior doctor characteristics and outline the results in the present section. Full results are available upon request.

As discussed in the body of the paper, surgical specialties are particulatly stereotyped as male. However, the effects of exposure to senior women where the share is below 20% are very similar in surgical and non-surgical specialties, and similarly precisely estimated. This is consistent with our discussion in sections 3 and 5 which characterised marginal choices.

**Growing versus shrinking departments** The staff growth trajectory of the department might influence a junior doctor's specialty choice, for example by signalling strong labour demand in a specialty, or by more generally creating a sense of dynamism or a more positive experience for trainees in general. We define a growing department as one that, in the year around the placement, increased the number of senior doctors on its staff by at least one, and analogously, a shrinking department as one that reduced its staff by at least one senior doctor.[49] Just over half of placements in our analysis sample take place in growing departments, and just over one in ten in shrinking departments. Department growth is modestly positively correlated with share of senior women ($\rho = 0.08$) and negatively correlated with average senior doctor age ($\rho = -0.11$). A placement in a growing department could differ in a range of ways that are relevant for specialty choice. We find no evidence of a direct effect, i.e. neither junior men nor junior women are more likely to choose a specialty if their placement was completed in a growing department.[50]

[49] Counting consultants only, and using headcounts which are likely to be more salient than changes in working hours.

[50] In another setting, we might expect this effect to be positive, if workplace growth contains information about job amenities. There are a number of reasons why this does not apply here: Senior doctors joining or leaving choose between hospitals within a specialty, whereas junior doctors choose a specialty. Department growth may also be driven by labour demand and not reflect doctor preferences at all.

We find some evidence that effects on junior women's specialty choice are largest at low shares of senior women, in departments that are growing. There also appears to be something of a "deterrance" effects on junior men in growing departments with a high share of senior women. However, the effects in departments on different growth trajectories are not significantly different from each other in either the case of junior women or junior men.

**Young senior doctors** We saw in Section 6 that the impact on junior women's specialty choice is *less* strong in departments where senior women receive performance-related pay. This may reflect opportunities for interaction with senior women: It is plausible that Foundation doctors have more access to senior women who are not undertaking the activities needed to achieve clinical excellence awards. Another explanation consistent with this pattern would be that these older, very successful women are less relatable – in fact, not a "senior doctor like me" at all. To shed additional light on such a possible pattern, we look at senior doctors' age and split departments into those where male and female doctors, respectively, are younger or older than 48, the overall average senior doctor age in our analysis sample. Heterogeneity by the age of senior men would be consistent with a number of different mechanisms including multiple demographic match effects (by age and by gender) reinforcing each other.

The presence of senior women in male-dominated department affects specialty choice only in departments where senior women are younger. The effect in departments where both senior men and women are younger is statistically significantly different from the effect in departments where senior men are younger but women are older ($p = 0.029$).

Looking at the results for the same specification for junior men, there appears to be a large "deterrance" effect in gender-balanced or female-dominated departments where senior men are younger but senior women are not. However, we note that this is a very small subgroup, accounting for just 1.2% of junior men's placements in this analysis.

As discussed above, age is strongly correlated with receipt of performance-related pay. The specification looking at heterogeneity by senior women's receipt of performance-related pay conditioned on senior doctor age (as do all our specification). The present specification, however, does not condition on receipt of performance-related pay, since unlike age, it is not predetermined. However, if we do additionally condition on indicators for the presence of a male or female senior doctor receiving performance-related pay, the results are qualitatively unchanged and the two coefficients of interest (on the share of female senior doctors if that share is below 20% in settings where senior women are younger) are virtually unchanged.

The gender match effect is strongest when senior female doctors are more relatable or closer to Foundation doctors in characteristics (younger, not in receipt of clinical excellence awards). This is consistent with changing perceived returns to the abilities of women, or the ability they have to have a successful career in a particular specialty, where a successful career is defined as reaching senior doctor level rather than receiving a clinical excellence awards. The pattern of results is however also consistent with an important role for access and interaction between Foundation doctors and senior women. While the gender match effects are if anything slightly stronger for part-time working senior women, this may be because there are characteristics of part-time workers which mean that they are more likely to interact with Foundation doctors for a given number of hours worked. By comparison, a very senior senior doctor may be employed full-time but have many other commitments. What is clear is that older and very successful senior women, who may in many respects be regarded as role models, are not those who have the greatest influence on the specialty choice of early-career doctors in our setting.

**Junior doctor age** We find no evidence that main effect of interest differs between junior women who are younger or older. Variation in junior doctor age at the start of Foundation training is modest but not nonexistent: The median age 25.6 years in the estimation sample, while 20% of placements correspond to junior doctors aged at least 27.1 at the start of

training, and 10% to those aged at least 28.7. To the extent that there is a "deterrance" effect on junior men in gender-balanced or female-majority departments (less precisely estimates than the effect on junior women), this appears concentrated among junior men who enter Foundation Training at slightly older ages. However, the effect is still only significant at the 10% level for this subgroup.

**Competition for training places** Another specialty-level dimension of heterogeneity we consider is competition for training places. Annually published numbers of applications[51] and training places inform junior doctors' perceptions of the difficulty of entry to training in different specialties. Of course, the number of applications is itself the outcome of a strategic choice. This means that the number of applications may *understate* the underlying demand for places if some junior doctors are discouraged from applying because their perceived chance of success is too low.

Heterogeneous effects by competitiveness can provide indirect evidence on two issues: One, while we do not have direct measures of performance of doctors once they enter specialty training, they provide some indication of the quality of additional junior women who enter training in male-dominated specialties when exposed to senior women. If exposure to senior women induced more junior women to apply for specialty training, but these doctors were unsuited to or poorly prepared for specialty training, we would expect to see a diminished effect in highly competitive specialties as more of their applications would be unsuccessful.

The share of women in a specialty is negatively correlated with competitive entry, but *only* for applications to the first stage of training, and when excluding psychiatric and community specialties, many of which are highly competitive to enter. Therefore, while competitive entry is correlated with the share of men in a specialty within the sample we analyse, women do not overall appear to be deterred by competitive entry to specialties, or they would not enter psychiatric and community specialties in such high numbers. Notably, there are more

[51] A junior doctor can submit more than one application.

applications than places in every programme. In placements with low shares of women, the effect is very similar in more competitive specialties (including core surgery training, single-stage or 'run-through' surgical programmes, ophtalmology and radiology) as in less competitive specialties (including obstetrics and gynaecology, paediatrics, anaesthetics, and emergency medicine). This suggests that the effect is on women who are at least as successful at the specialty training application stage as the marginal junior man.

**Placement peer group** The impact of exposure to senior women could also be mediated by the peer group - the group of other Foundation trainees in the same specialty and hospital at the same time. We examine potential heterogeneity of our effect by either the size of the peer group relative to the number of senior doctors present, or by the gender composition of the peer group. We find limited evidence of significant heterogeneity, but it tends to point towards stronger effects on junior women in placements with the smallest groups of junior doctors relative to senior doctors, and with the highest shares of female peers.

Foundation training peer groups are typically quite small: The median placement in our analysis has a group of eight junior doctors in Foundation training. Group size varies substantially across specialties: The median placements in obstetrics and gynaecology as well as cardiology are in groups of four, while the median placements in surgery and in geriatric medicine are in groups of 12. This partly reflects the overall size of a department (hospital-specialty combination), but there remains variation in the ratio of junior to senior doctors. This could affect effective contact time, and hence the transmission of information, potentially an important channel for our effect of interest (cf section 3). When we allow effects to vary for placements in the top quartile of the senior-to-junior doctor ratio (just over 2.5 FTE senior doctors[52] per junior doctor), the main effect of interest (the share of senior women where that share is below 20%) is larger in settings where there are more senior doctors relative to the number of junior doctors in Foundation training (full results

[52]The results are very similar using headcounts

available on request). However, the two coefficients are not significantly different from each other ($p = 0.12$). In addition, the large difference in point estimate is specific to *very* high ratios of seniors to juniors: When we split at the median ratio or at a 1:1 ratio, the two coefficients are close together. Overall, this provides at best tentative evidence of a role for contact time *mediated by the relative number of junior and senior doctors*.

In Table 18, we allow the effect to vary across placements with more versus fewer women peers (fellow Foundation doctors). Some previous work in higher-education settings [Griffith and Main, 2021, Butcher et al., 2023] has argued that exposure to female teaching staff and peers are or at least could be complementary in influencing women's choices.[53] We split the sample by placements where the share of women junior doctors in Foundation training is in the top quartile for their cohort, versus all other placements.[54] While the point estimate of the main effect of interest (the impact of an increase in senior women for share below 20% on junior women's specialty choices) is somewhat larger in placements with more women peers, the difference is relatively small and far from statistically significant ($p = 0.32$).

[Table 18 about here.]

If, instead of characterising the top quartile of placements as those with a "high" share of women peers, we cut the sample at the median share, the two estimated coefficients are even closer together. In summary, we find little evidence that the effect of exposure to senior women is amplified in settings with more women peers.

**Senior women's share relative to a junior doctor's other placements** Our analysis is at the placement level; however, they could be interactions between the shares of senior women in different placements in terms of shaping a junior doctor's beliefs. In Table 19,

[53] On the other hand, Brenøe and Zölitz [2020] find that exposure to female peers in secondary school *reduces* the likelihood of girls choosing STEM careers.

[54] The cutoff is between 67% and 70% for all cohorts.

we allow the estimated effects for the lower two splines to vary depending on whether the placement is the most male-dominated one the junior doctor completes (in our sample) or not.[55] 56% of placements with a share of senior women below 20%, and 7% of placements with a share of senior women in the 20% to 40% range, are a junior doctor's most male-dominated placement in our analysis sample. The most common specialties for placements with a share of senior women below 20% are general surgery and trauma and orthopaedic surgery – and this is true both in the sample of placements that are the most male-dominated for an individual junior doctor, and other placements. Put another way, almost exactly half (50.5%) of surgical placements are the most male-dominated within-junior doctor.

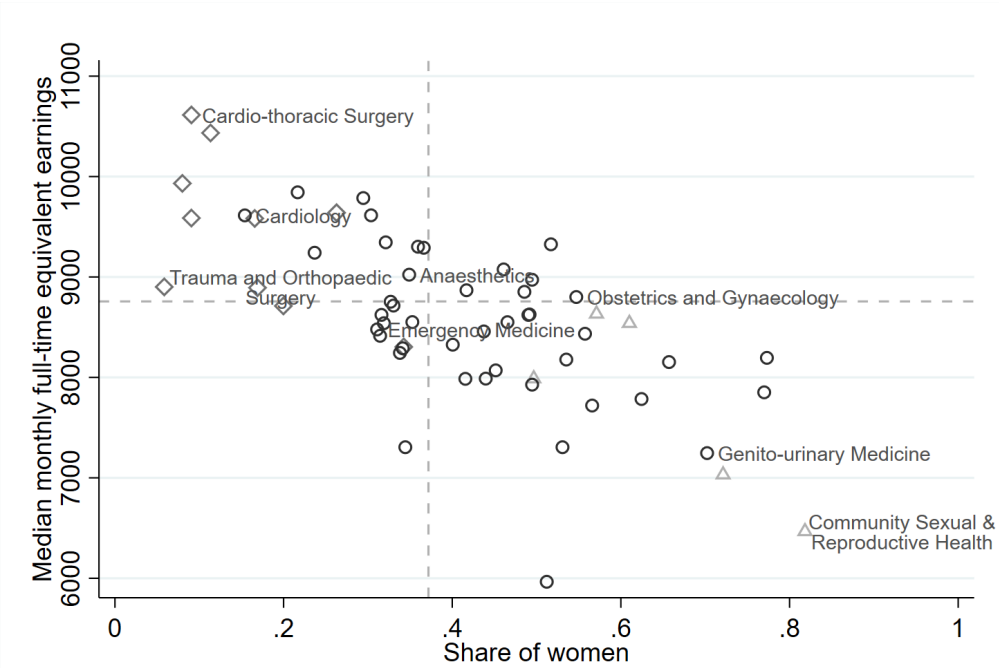
[Table 19 about here.]

We find that effects are strongest in placements that are *not* the most male-dominated that a doctor completes. The difference between the two coefficients is significant ($p = 0.015$), and the estimated effect for the most male-dominated placements within-junior doctor is small, insignificant and essentially the same for junior men and women. This fits with the results in section 6 showing that the results are stronger in specialties that are not the most male-dominated overall. This is consistent with exposure to a few senior women in the *most* male-dominated placements and specialties being insufficient to shift beliefs enough to make a meaningful difference to junior women's specialty choices – in other words, this would be an infra-marginal choice.

[55]Recall that we use just under four placements per junior doctor on average, after dropping placements outside the hospital sector as described in section 4 and above. Placements we drop based on specialty are in general practice, community and mental health specialties, which have above-average shares of senior women in aggregate, although we cannot be precise about individual exposure during a placement.

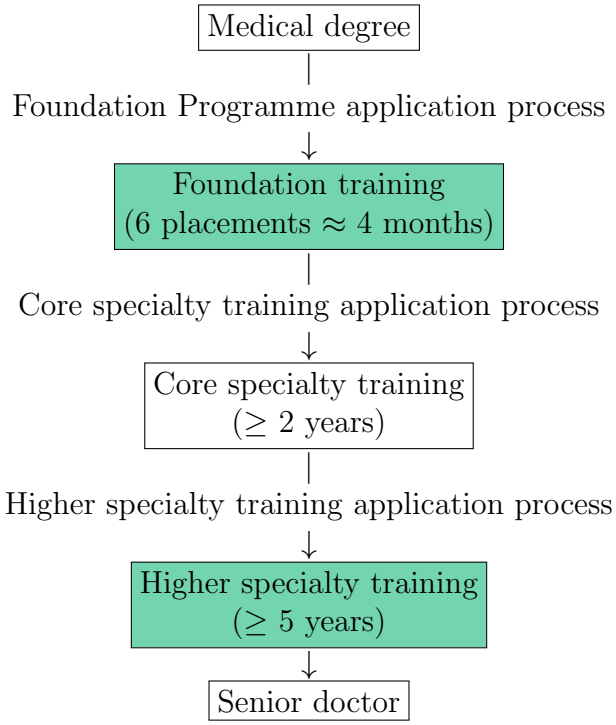
# Figures

Figure 1: Share of women and average full-time equivalent earnings by medical specialty




Note: Senior doctors' (consultants and staff grade specialists') monthly earnings 2012-2021, linearly scaled for contracted hours. Diamonds are surgical specialties, triangles are community specialties, dashed lines are overall averages.

Figure 2: Stages of medical training and our research design




← **Measure variation: exposure to senior women**

← **Measure outcome: settled specialty choice conditionally on choosing hospital sector**

## Tables

Table 1: Specialty choice after a placement, by specialty group of the placement and junior doctor's gender

| | Number of placements | Share of placements | | | |
|---|---|---|---|---|---|
| | | During placement | | Later choose placement specialty | |
| | | Junior women | Senior women | Junior women | Junior men |
| Surgery | 9555 | 0.50 | 0.11 | 0.06 | 0.10 |
| Paediatrics | 1437 | 0.67 | 0.49 | 0.48 | 0.31 |
| Emergency/Intensive | 4105 | 0.53 | 0.31 | 0.13 | 0.12 |
| Pathology | 73 | 0.59 | 0.47 | 0.16 | 0.20 |
| Oncology/Radiology | 393 | 0.54 | 0.49 | 0.16 | 0.13 |
| Anaesthetics | 845 | 0.48 | 0.31 | 0.41 | 0.46 |
| Obstetrics/Gynaecology | 1041 | 0.71 | 0.48 | 0.36 | 0.17 |
| Cardiology | 1031 | 0.46 | 0.10 | 0.06 | 0.15 |
| Geriatric medicine | 2439 | 0.55 | 0.37 | 0.09 | 0.04 |
| Gastroenterology | 1134 | 0.54 | 0.18 | 0.05 | 0.08 |
| Respiratory | 1265 | 0.54 | 0.28 | 0.05 | 0.06 |
| Other | 2320 | 0.54 | 0.33 | 0.09 | 0.09 |
| All | 25,638 | 0.53 | 0.25 | 0.13 | 0.12 |

Average outcomes over observations included in our baseline specifications (Table 4). Share of junior women is the share of placements filled by a woman, whereas the share of senior women is the share of senior doctors present during placements that were women, averaged across placements. For a list of specialties in each group see the appendix, section A.3.

Table 2: Test for sorting on observable junior doctor characteristics

| | Woman | Age | UK national |
|---|---|---|---|
| Share female senior doctors | | | |
| Share, if <20% | -0.028 | -0.056 | -0.011 |
| | (0.037) | (0.208) | (0.022) |
| Share, if 20% - 40% | 0.004 | 0.058 | -0.008 |
| | (0.039) | (0.220) | (0.022) |
| Share, if ≥40% | 0.044 | -0.165 | -0.009 |
| | (0.028) | (0.174) | (0.016) |
| Observations | 64,660 | 64,660 | 64,660 |

Standard errors in parentheses. Observations are at the Foundation placement level, including all the whole initial placement sample. The dependent variable is an indicator for whether the junior doctor is a woman in column 1, age of the junior doctor in column 2, and an indicator for the junior doctor is a UK national in column 3. Each regression conditions on all covariates in the baseline specification except the outcome and the number of years observed in the late stage, including the fixed effects. Excludes placements in psychiatry, community health, general practice and dentistry. Does not condition on persistence in the acute sector. Nationality dummy defined as ever recorded as a UK national.

Table 3: The probability that junior doctors remain in the acute sector for higher specialty training

| | Women | | Men | |
|---|---|---|---|---|
| Share female senior doctors | | | | |
| Share, if <20% | 0.015 | (0.047) | 0.025 | (0.053) |
| Share, if 20% - 40% | -0.060 | (0.049) | -0.012 | (0.058) |
| Share, if ≥40% | 0.033 | (0.036) | -0.064 | (0.046) |
| $R^2$ | 0.046 | | 0.061 | |
| Observations | 36,596 | | 28,064 | |

Standard errors in parentheses, $^{+}$ $p < 0.1$, $^{*}$ $p < 0.05$, $^{**}$ $p < 0.01$, $^{***}$ $p < 0.001$. Observations are at the Foundation placement level. The dependent variable is an indicator for whether a junior doctor remains in the acute sector for specialty training. The specification is the same as baseline model (Table 4) except for the dummy for a stage of training in the acute sector overlapping with the pandemic (which would implicitly condition on the outcome).

Table 4: The probability that junior doctors pursue higher specialty training in the Foundation placement specialty

| | Women | | Men | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Share female senior doctors | | | | |
| Share, if <20% | 0.181*** | 0.163*** | -0.064 | 0.072 |
| | (0.045) | (0.049) | (0.051) | (0.057) |
| Share, if 20% - 40% | 0.567*** | -0.024 | 0.173** | -0.018 |
| | (0.053) | (0.062) | (0.056) | (0.064) |
| Share, if ≥40% | 0.049 | -0.045 | -0.126** | -0.081$^{+}$ |
| | (0.043) | (0.048) | (0.044) | (0.049) |
| Characteristics | Yes | Yes | Yes | Yes |
| Hospital fixed effects | No | Yes | No | Yes |
| Specialty fixed effects | No | Yes | No | Yes |
| $R^2$ | 0.070 | 0.168 | 0.031 | 0.107 |
| Observations | 13,701 | 13,701 | 11,937 | 11,937 |

Standard errors in parentheses, $^{+}$ $p < 0.1$, $^{*}$ $p < 0.05$, $^{**}$ $p < 0.01$, $^{***}$ $p < 0.001$. Observations are junior doctor-Foundation placement pairs. The dependent variable is an indicator for whether a junior doctor pursues advanced specialty training in the placement specialty. Characteristics are junior doctor age, cohort, and UK nationality, years observed in the outcome stage, senior doctor age, senior doctors under 45, number of senior doctors, placement duration, parity, and starting month, and overlap of training with the COVID-19 pandemic. For definitions and functional forms, see Section 4. Excludes placements in General Internal Medicine and Acute Internal Medicine.

Table 5: Heterogeneous effects by average share of senior women across placements in the specialty

| | Women | | Men | |
|---|---|---|---|---|
| Share female senior doctors × specialty average share <20% | | | | |
| Share, if <20% and low on av. | 0.092 | (0.057) | 0.138 | (0.071) |
| Share, if 20% - 40% and low on av. | 0.145 | (0.125) | -0.225 | (0.129) |
| Share, if ≥ 40% and low on av. | -0.148 | (0.147) | 0.128 | (0.253) |
| Share female senior doctors × specialty average share ≥ 20% | | | | |
| Share, if <20% and higher on av. | 0.250** | (0.085) | -0.002 | (0.091) |
| Share, if 20% - 40% and higher on av. | -0.083 | (0.076) | 0.050 | (0.076) |
| Share, if ≥ 40% and higher on av. | -0.035 | (0.050) | -0.100* | (0.051) |
| Observations | 13,701 | | 11,937 | |

Standard errors in parentheses clustered at the junior doctor level, $^{*}$ $p < 0.05$, $^{**}$ $p < 0.01$, $^{***}$ $p < 0.001$. Also conditions on junior doctor and placement characteristics and trust and specialty fixed effects as in Table 4, column 3.

Table 6: Presence of female senior doctors receiving performance-related pay (PRP)

| | Women | | Men | |
|---|---|---|---|---|
| No senior women | 0.011 | (0.014) | -0.043* | (0.017) |
| Share female senior doctors × no senior woman with performance-related pay | | | | |
| Share if <20%, no PRP | 0.265** | (0.092) | -0.184 | (0.103) |
| Share if 20%-40%, no PRP | -0.108 | (0.087) | 0.002 | (0.083) |
| Share if ≥ 40%, no PRP | 0.022 | (0.071) | -0.042 | (0.064) |
| Share female senior doctors × ≥ 1 senior woman with performance-related pay | | | | |
| Share if <20%, some PRP | 0.147 | (0.085) | -0.031 | (0.099) |
| Share if 20%-40%, some PRP | 0.055 | (0.079) | -0.031 | (0.088) |
| Share if ≥ 40%, some PRP | -0.075 | (0.058) | -0.137* | (0.064) |
| Observations | 13,701 | | 11,937 | |

Standard errors in parentheses clustered at the junior doctor level, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. 'High' performance-related pay above median (£754) pro rata. Also conditions on junior doctor and placement characteristics and trust and specialty fixed effects as in Table 4, column 3.

Table 7: Part-time working female senior doctors

| | Women | | Men | |
|---|---|---|---|---|
| No senior women | 0.004 | (0.014) | -0.038* | (0.017) |
| Share female senior doctors × no part-time working senior woman | | | | |
| Share, if <20% and no PT | 0.171* | (0.083) | -0.136 | (0.097) |
| Share, if 20% - 40% and no PT | -0.026 | (0.074) | 0.083 | (0.078) |
| Share, if ≥ 40% and no PT | -0.032 | (0.063) | -0.136** | (0.053) |
| Share female senior doctors × at least one part-time working senior woman | | | | |
| Share, if <20% and PT | 0.269* | (0.113) | 0.059 | (0.121) |
| Share, if 20% - 40% and PT | -0.082 | (0.113) | -0.170 | (0.113) |
| Share, if ≥ 40% and PT | -0.058 | (0.065) | -0.032 | (0.079) |
| Observations | 13,701 | | 11,937 | |

Standard errors in parentheses clustered at the junior doctor level, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Part-time working senior women defined as aged 55 or younger with contracted hours of 80% of full-time or less. Also conditions on junior doctor and placement characteristics and trust and specialty fixed effects as in Table 4, column 3.

Table 8: Heterogeneity by specialty characteristics

| | Women | | Men | |
|---|---|---|---|---|
| Panel A: Specialties with high versus low prevalence of on-call duties | | | | |
| Share female senior doctors × low prevalence of on-call duties | | | | |
| Share, if low and <20% | 0.223*** | (0.055) | 0.074 | (0.065) |
| Share, if low and 20% - 40% | -0.067 | (0.067) | -0.100 | (0.067) |
| Share, if low and ≥ 40% | -0.067 | (0.051) | -0.080 | (0.051) |
| Share female senior doctors × high prevalence of on-call duties | | | | |
| Share, if high and <20% | -0.018 | (0.101) | 0.053 | (0.108) |
| Share, if high and 20% - 40% | 0.124 | (0.153) | 0.283 | (0.162) |
| Share, if high and ≥ 40% | 0.048 | (0.122) | -0.051 | (0.123) |
| Panel B: Geographic concentration of specialties | | | | |
| Share female senior doctors × geographically dispersed specialty | | | | |
| Share, if dispersed and <20% | 0.187*** | (0.050) | 0.071 | (0.060) |
| Share, if dispersed and 20% - 40% | -0.059 | (0.064) | -0.035 | (0.067) |
| Share, if dispersed and ≥ 40% | -0.037 | (0.054) | -0.104 | (0.054) |
| Share female senior doctors × geographically concentrated specialty | | | | |
| Share, if concentrated and <20% | -0.147 | (0.172) | 0.006 | (0.190) |
| Share, if concentrated and 20% - 40% | 0.468* | (0.238) | 0.301 | (0.223) |
| Share, if concentrated and ≥ 40% | -0.111 | (0.093) | -0.008 | (0.105) |
| Panel C: Typical age when starting to work as a senior doctor | | | | |
| Share female senior doctors × typically become senior before age 40 | | | | |
| Share, if early and <20% | 0.189** | (0.062) | 0.092 | (0.072) |
| Share, if early and 20% - 40% | -0.055 | (0.070) | -0.009 | (0.073) |
| Share, if early and ≥ 40% | -0.081 | (0.051) | -0.072 | (0.052) |
| Share female senior doctors × typically become senior after age 40 | | | | |
| Share, if late and <20% | 0.119 | (0.077) | 0.039 | (0.086) |
| Share, if late and 20% - 40% | 0.101 | (0.139) | -0.083 | (0.137) |
| Share, if late and ≥ 40% | 0.016 | (0.099) | -0.102 | (0.109) |
| Observations | 13,701 | | 11,937 | |

Standard errors in parentheses clustered at the junior doctor level, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Also conditions on junior doctor and placement characteristics and trust and specialty fixed effects as in Table 4, column 3. On-call duties are *highly prevalent* if at least 81% of consultants receive on-call allowances or on-call allowances make up at least 4.3% of basic earning on average. A specialty is *geographically dispersed* if one or more consultants work at at least half the 174 relevant hospitals (trusts) in the Electronic Staff Record.

Table 9: Sample restrictions

| | N | Per cent of initial observations |
|---|---|---|
| Initial observations | 87,726 | 100% |
| Drop: | | |
| Community, psychiatric and placements | 4,940 | 5.6% |
| Generalist placements | 12,604 | 14.4% |
| Qualified abroad | 4,266 | 4.9% |
| Placements over a year | 178 | 0.2% |
| Less than one senior doctor present throughout or missing senior doctor information | 1,078 | 1.2% |
| Secondary analysis sample (outcome: staying in acute sector) | 64,660 | 73.7% |
| Not in acute sector for early specialty training | 27,027 | 30.8% |
| Not in acute sector for late specialty training | 13,021 | 14.8% |
| Main analysis sample (outcome: specialty choice) | 25,638 | 29.2 % |

Notes: Of those who are not in the acute sector during (early) specialty training, slightly over half are in general practice training. Other 'exits' include those training in psychiatric or community specialties, or not pursuing specialty training at all.

Table 10: Summary Statistics: Foundation Placements

| | All placements | | Stayers | |
|---|---|---|---|---|
| | Women | Men | Women | Men |
| Age | 26.22 | 26.54 | 25.98 | 26.22 |
| | (2.78) | (3.06) | (2.27) | (2.47) |
| British national | 0.91 | 0.91 | 0.92 | 0.92 |
| | (0.29) | (0.29) | (0.28) | (0.27) |
| Months in placement | 4.53 | 4.54 | 4.50 | 4.54 |
| | (1.10) | (1.11) | (1.05) | (1.10) |
| Parity: 1st | 0.19 | 0.19 | 0.19 | 0.19 |
| 2nd | 0.19 | 0.19 | 0.19 | 0.19 |
| 3rd | 0.19 | 0.19 | 0.19 | 0.19 |
| 4th | 0.16 | 0.16 | 0.16 | 0.16 |
| 5th | 0.14 | 0.15 | 0.15 | 0.15 |
| 6th or subsequent | 0.12 | 0.12 | 0.12 | 0.12 |
| Senior doctor composition | | | | |
| Female senior doctors | 4.41 | 3.94 | 4.61 | 4.07 |
| | (5.85) | (5.52) | (6.09) | (5.59) |
| Male senior doctors | 11.88 | 12.44 | 12.14 | 12.69 |
| | (9.82) | (10.29) | (10.20) | (10.61) |
| Female senior doctors (share) | 0.26 | 0.23 | 0.26 | 0.23 |
| Share of placements with female senior doctor share | | | | |
| $< 20\%$ | 0.46 | 0.51 | 0.45 | 0.51 |
| 20% - 40% | 0.29 | 0.29 | 0.29 | 0.30 |
| $\geq 40\%$ | 0.26 | 0.20 | 0.26 | 0.20 |
| Mean senior doctor age | 4.82 | 4.82 | 4.82 | 4.81 |
| | (0.32) | (0.32) | (0.32) | (0.32) |
| Senior doctors under 45 | 0.39 | 0.39 | 0.39 | 0.39 |
| Specialty distribution (shares) | | | | |
| Surgery | 0.40 | 0.45 | 0.39 | 0.44 |
| Paediatric | 0.08 | 0.05 | 0.08 | 0.04 |
| Emergency/Intensive/Acute | 0.17 | 0.17 | 0.18 | 0.18 |
| Anaesthetics | 0.03 | 0.04 | 0.03 | 0.04 |
| Obstetrics/Gynaecology | 0.06 | 0.03 | 0.06 | 0.03 |
| Cardiology | 0.04 | 0.05 | 0.04 | 0.05 |
| Geriatric medicine | 0.12 | 0.11 | 0.11 | 0.10 |
| Gastroenterology | 0.05 | 0.05 | 0.05 | 0.05 |
| Respiratory | 0.06 | 0.06 | 0.06 | 0.06 |
| Observations | 36,596 | 28,064 | 13,701 | 11,937 |

"Stayers" are junior doctors who subsequently stay in the hospital sector. Standard deviations in parentheses.

Table 11: Placement-level summary statistics, by share of senior women

| | <20% | | 20% - 40% | | ≥ 40% | |
|---|---|---|---|---|---|---|
| Woman | 0.54 | (0.50) | 0.56 | (0.50) | 0.63 | (0.48) |
| Age | 26.25 | (2.92) | 26.39 | (2.94) | 26.54 | (2.86) |
| British national | 0.90 | (0.29) | 0.91 | (0.28) | 0.92 | (0.27) |
| Months in placement | 4.56 | (1.15) | 4.53 | (1.12) | 4.47 | (0.98) |
| Parity: 1st | 0.23 | (0.42) | 0.18 | (0.38) | 0.14 | (0.35) |
| 2nd | 0.22 | (0.42) | 0.18 | (0.39) | 0.14 | (0.35) |
| 3rd | 0.20 | (0.40) | 0.20 | (0.40) | 0.18 | (0.38) |
| 4th | 0.13 | (0.34) | 0.17 | (0.38) | 0.20 | (0.40) |
| 5th | 0.12 | (0.32) | 0.16 | (0.36) | 0.19 | (0.39) |
| 6th or subsequent | 0.10 | (0.30) | 0.12 | (0.32) | 0.15 | (0.36) |
| Senior doctor composition | | | | | | |
| Female senior doctors (count) | 1.43 | (1.53) | 5.01 | (5.36) | 8.96 | (7.81) |
| Male senior doctors (count) | 14.14 | (9.12) | 11.85 | (11.49) | 8.27 | (8.61) |
| Female senior doctors (share) | 0.08 | (0.07) | 0.29 | (0.06) | 0.54 | (0.13) |
| Mean senior doctor age (in 10s) | 4.90 | (0.31) | 4.77 | (0.31) | 4.70 | (0.32) |
| Senior doctors under 45 | 0.34 | (0.17) | 0.42 | (0.18) | 0.45 | (0.19) |
| Observations | 30,999 | | 18,700 | | 14,961 | |

Standard errors in parentheses. 2012-13 to 2014-15 cohorts. Excludes placements in psychiatry, community health, general practice and dentistry. Does not condition on persistence in the acute sector. Nationality dummy defined as ever recorded as a UK national.

Table 12: Differences in placement parity and duration by share of senior women

| | Duration (months) | First year | 4th placement | Later placement |
|---|---|---|---|---|
| Share female senior doctors | | | | |
| Share, if <20% | 0.068 | -0.137*** | 0.049 | 0.089** |
| | (0.082) | (0.034) | (0.028) | (0.031) |
| Share, if 20% - 40% | 0.030 | 0.050 | -0.006 | -0.044 |
| | (0.088) | (0.038) | (0.032) | (0.036) |
| Share, if ≥40% | -0.023 | -0.194*** | 0.054* | 0.140*** |
| | (0.058) | (0.029) | (0.025) | (0.028) |
| Observations | 64,660 | 64,660 | 64,660 | 64,660 |

Standard errors in parentheses. 2012-13 to 2014-15 cohorts. Each regression conditions on all covariates in the baseline specification except the outcome and the number of years observed in the late stage, including the fixed effects. Excludes placements in psychiatry, community health, general practice and dentistry. Does not condition on persistence in the acute sector. Nationality dummy defined as ever recorded as a UK national.

Table 13: Impacts on those progressing to specialty training in the same hospital

| | Women | | Men | |
|---|---|---|---|---|
| Specialty training in same hospital as Foundation placement | -0.005 | (0.017) | -0.031 | (0.021) |
| Share female senior doctors *times* trained in different hospital | | | | |
| Share, if <20%, trained in different hospital | 0.162** | (0.050) | 0.059 | (0.059) |
| Share, if 20% - 40%, trained in different hospital | -0.065 | (0.063) | -0.017 | (0.066) |
| Share, if $\geq$ 40%, trained in different hospital | -0.023 | (0.050) | -0.092 | (0.050) |
| Share female senior doctors *times* trained in same hospital | | | | |
| Share, if <20%, trained in same hospital | 0.222 | (0.155) | 0.239 | (0.175) |
| Share, if 20% - 40%, trained in same hospital | 0.328 | (0.182) | -0.044 | (0.184) |
| Share, if $\geq$ 40%, trained in same hospital | -0.250* | (0.119) | 0.050 | (0.176) |
| Observations | 13,701 | | 11,937 | |

Standard errors in parentheses clustered at the junior doctor level, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Also conditions on junior doctor and placement characteristics and trust and specialty fixed effects as in Table 4, column 3.

Table 14: Alternative specification decomposing predicted and residual variation in female senior doctors

| | Women | | Men | |
|---|---|---|---|---|
| Predicted female senior doctors | | | | |
| if <20% | 0.30*** | (0.06) | -0.05 | (0.07) |
| if 20% - 40% | 0.48*** | (0.06) | 0.08 | (0.06) |
| if $\geq$ 40% | 0.96*** | (0.09) | 0.24** | (0.09) |
| Residual female senior doctors | | | | |
| if <-5% | 0.18** | (0.06) | 0.08 | (0.05) |
| if -5% to 5% | 0.03 | (0.09) | 0.13 | (0.09) |
| if > 5% | -0.13** | (0.04) | -0.19*** | (0.05) |
| Observations | 13,701 | | 11,937 | |

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Conditions on junior doctor and placement characteristics as in baseline specification (Table 4, column 3). Additionally conditions on Foundation School.

Table 15: The probability that junior doctors pursue higher specialty training in the Foundation placement specialty, with additional fixed effects

| | Women | | Men | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Share female senior doctors | | | | |
| Share, if <20% | 0.168*** | 0.173 | 0.057 | 0.092 |
| | (0.051) | (0.109) | (0.059) | (0.145) |
| Share, if 20% - 40% | -0.030 | -0.091 | -0.028 | 0.105 |
| | (0.063) | (0.146) | (0.066) | (0.136) |
| Share, if ≥40% | -0.047 | -0.115 | -0.092$^{+}$ | -0.175 |
| | (0.049) | (0.124) | (0.051) | (0.118) |
| Senior doctor characteristics | | | | |
| Average senior age | 0.002 | -0.059 | 0.020 | 0.033 |
| | (0.017) | (0.037) | (0.017) | (0.038) |
| Share under 45 | 0.039 | 0.008 | 0.013 | -0.021 |
| | (0.029) | (0.051) | (0.029) | (0.056) |
| Number of senior doctors | | | | |
| One senior doctor | 0.020 | 0.034 | -0.043 | -0.156$^{+}$ |
| | (0.039) | (0.061) | (0.033) | (0.084) |
| Size, if 2-5 | 0.003 | -0.008 | -0.007 | -0.015 |
| | (0.006) | (0.014) | (0.007) | (0.015) |
| Size, if 5-10 | -0.002 | 0.004 | 0.000 | -0.001 |
| | (0.002) | (0.007) | (0.003) | (0.007) |
| Size, if ≥10 | -0.000 | -0.005* | -0.000 | -0.004$^{+}$ |
| | (0.000) | (0.002) | (0.001) | (0.002) |
| Junior doctor characteristics | | | | |
| Age | -0.000 | 0.000 | -0.001 | -0.000 |
| | (0.001) | (0.001) | (0.001) | (0.001) |
| UK national | 0.010 | 0.014 | 0.019* | 0.016 |
| | (0.008) | (0.009) | (0.009) | (0.010) |
| Constant | 0.361** | 1.090** | 0.565*** | 0.723* |
| | (0.132) | (0.398) | (0.133) | (0.325) |
| Hospital-specialty fixed effects | No | Yes | No | Yes |
| Specialty-cohort fixed effects | Yes | No | Yes | No |
| Hospital-cohort fixed effects | Yes | No | Yes | No |
| $R^2$ | 0.186 | 0.297 | 0.133 | 0.257 |
| Observations | 13,701 | 13,701 | 11,937 | 11,937 |

Standard errors in parentheses clustered at the junior doctor level, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Also conditions on junior doctor and placement characteristics and trust and specialty fixed effects as in Table 4, column 3.

Table 16: Alternative functional forms for the share of senior women

| | Equal-sized bins | | Knots at 30% & 60% | | Quadratic specification | |
|---|---|---|---|---|---|---|
| First spline | 0.170** | 0.136 | 0.117*** | 0.062 | | |
| | (0.062) | (0.073) | (0.035) | (0.039) | | |
| Second spline | 0.032 | -0.031 | -0.043 | -0.115* | | |
| | (0.060) | (0.063) | (0.051) | (0.052) | | |
| Third spline | -0.054 | -0.074 | -0.107 | 0.029 | | |
| | (0.042) | (0.043) | (0.083) | (0.087) | | |
| Share | | | | | 0.153*** | 0.078 |
| | | | | | (0.044) | (0.048) |
| Share squared | | | | | -0.188** | -0.135* |
| | | | | | (0.059) | (0.064) |
| Observations | 13,701 | 11,937 | 13,701 | 11,937 | 13,701 | 11,937 |

Standard errors in parentheses clustered at the junior doctor level, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Also conditions on junior doctor and placement characteristics and trust and specialty fixed effects as in Table 4, column 3.

Table 17: Staff survey evidence on share of women senior doctors and junior doctors' perception of workplace culture (selected)

| Question | % senior women doctors | | N |
|---|---|---|---|
| I am enthusiastic about my job. | -0.168* | (0.081) | 635 |
| Discrimination at work | -0.0415 | (0.035) | 636 |
| Harassment, bullying or abuse at work | | | |
| – from managers? | 0.0672 | (0.055) | 637 |
| – from other colleagues? | -0.0623 | (0.062) | 633 |
| Team shared objectives | -0.207** | (0.068) | 634 |
| Involved in deciding on changes | 0.209* | (0.087) | 637 |
| Able to do job to standard I am pleased with | -0.117* | (0.058) | 637 |

Standard errors in parentheses, clustered at the trust level. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 18: Gender composition of Foundation training peer group

| | Women | | Men | |
|---|---|---|---|---|
| Share female senior doctors × fewer women peers | | | | |
| Share, if <20%, fewer women peers | 0.139** | (0.052) | 0.085 | (0.058) |
| Share, if 20% - 40%, fewer women peers | -0.010 | (0.073) | -0.009 | (0.068) |
| Share, if ≥ 40%, fewer women peers | -0.078 | (0.070) | -0.098 | (0.050) |
| Share female senior doctors × more women peers | | | | |
| Share, if <20%, more women peers | 0.202** | (0.066) | -0.040 | (0.102) |
| Share, if 20% - 40%, more women peers | -0.047 | (0.090) | -0.026 | (0.151) |
| Share, if ≥ 40%, more women peers | -0.026 | (0.060) | 0.014 | (0.147) |
| Observations | 13,753 | | 11,877 | |

Standard errors in parentheses clustered at the junior doctor level, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Also conditions on junior doctor and placement characteristics and trust and specialty fixed effects as in Table 4, column 3.

Table 19: Share relative to a junior doctor's other placements

| | Women | | Men | |
|---|---|---|---|---|
| Share female senior doctors × lowest for this junior doctor | | | | |
| Share if <20%, lowest for this doctor | 0.034 | (0.071) | 0.032 | (0.086) |
| Share if 20%-40%, lowest for this doctor | -0.026 | (0.221) | -0.231 | (0.216) |
| Share female senior doctors × not lowest for this junior doctor | | | | |
| Share if <20%, not lowest for this doctor | 0.184*** | (0.050) | 0.079 | (0.058) |
| Share if 20%-40%, not lowest for this doctor | -0.051 | (0.064) | -0.024 | (0.066) |
| Share, if ≥ 40% | -0.043 | (0.048) | -0.083$^{+}$ | (0.049) |
| Observations | 13,701 | | 11,937 | |

Standard errors in parentheses clustered at the junior doctor level, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Also conditions on junior doctor and placement characteristics and trust and specialty fixed effects as in Table 4, column 3.