REAL Supply

TOPIC 1:
The consequences of non-marginal changes in recruitment into healthcare training

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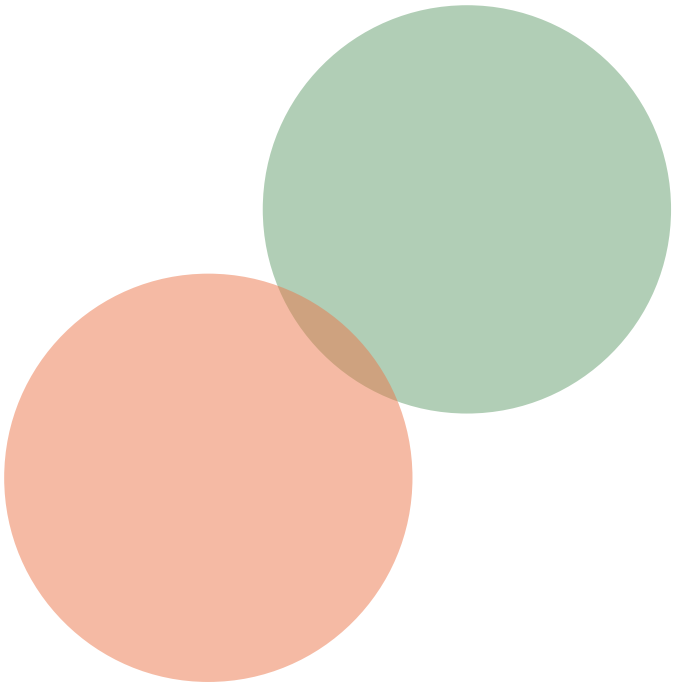

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Plain English summary

The health and care sector needs to train more young people to provide care for an aging population. But the number of young people in the UK is going to shrink in the next decades because of historically low birth rates. This means that the sector may need to train some young people that are less keen to do so or who would normally not have been considered suitable. We do not know how these large increases in recruitment might change the workforce over time.

In this pathfinder, we explore two issues: Will these 'additional' workers be different to those that would be trained anyway? If yes, how will this change the way they work and provide care? This Pathfinder aims to explore these unknowns and understand the potential impacts on health care delivery over the next decades.

There are many characteristics of workers that might change when the NHS begins to train more. In this pathfinder, we focus on two characteristics that are widely believed to be important: a worker's ability and their altruistic motivation (i.e. how much they care about their patients). We find a small and very recent literature that measures altruism in health care workers in the US, Germany and Denmark. These studies show that a worker's altruism affects their clinical choices. However, there are large gaps in evidence around the effect of motivation on how much an individual works, e.g. whether they work part-time, retire early, or delay completion of their training. The literature on ability shows that academic achievement (e.g. GCSE or A-level results) is a good but imperfect predictor of training outcomes.

The UK lacks large cohort studies that measure ability and motivation and link it to career outcomes and care delivery. We make some suggestions for how the data could be improved. Conducting further research into this topic is crucial because it will help us plan the future workforce better and more realistically.

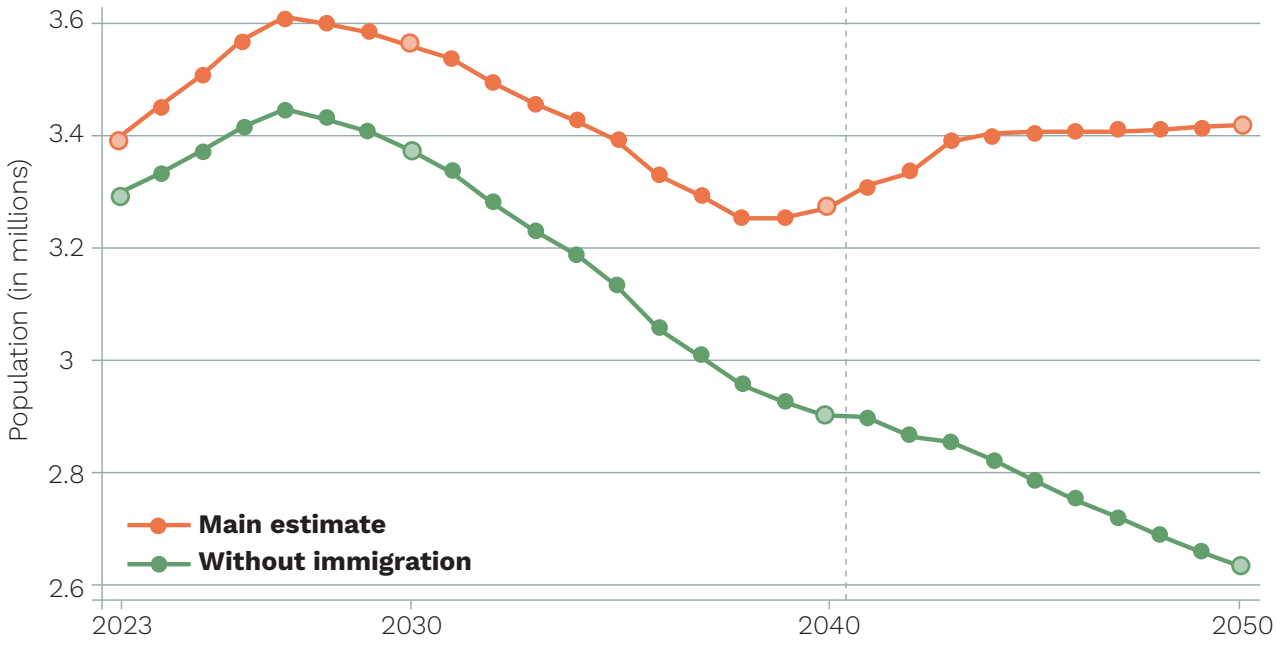
Outline of the problem

The demographic challenge and future training needs for health and care workers

The provision of health and social care services is widely recognised to be labour intense. Despite efforts to automate functions of service delivery (e.g. the use of artificial intelligence for clinical documentation; see '**Automation**' pathfinder), a key challenge for many health and care systems in the next decades will be to train and recruit a sufficient number of new workers to compensate for those leaving the workforce (e.g. due to retirement, ill health, or emigration) and to expand service provision in line with future needs.

In common with many developed countries, England's population is predicted to age considerably over the next decades with profound implications for the demand for, and supply of, labour: Firstly, demand for care is expected to increase due to a larger share of elderly people with, on average, more and more complex health and social care needs (Watt et al. 2023). Secondly, the number of young people who are available to enter training and subsequently take up work in health and care roles is forecast to drop in coming decades despite a temporary increase in the next few years (see Figure 1). This reflects falling fertility rates in the UK population over the last decade following a period of increased fertility during the early 2000s.[1] Reductions in international migration, as demanded by most major political parties in the UK, would further aggravate this problem (see '**International migration**' pathfinder). A smaller pool of potential trainees to draw from may lead to intensified competition

Figure 1: Estimated population aged 15-19 in England, 2023 to 2050

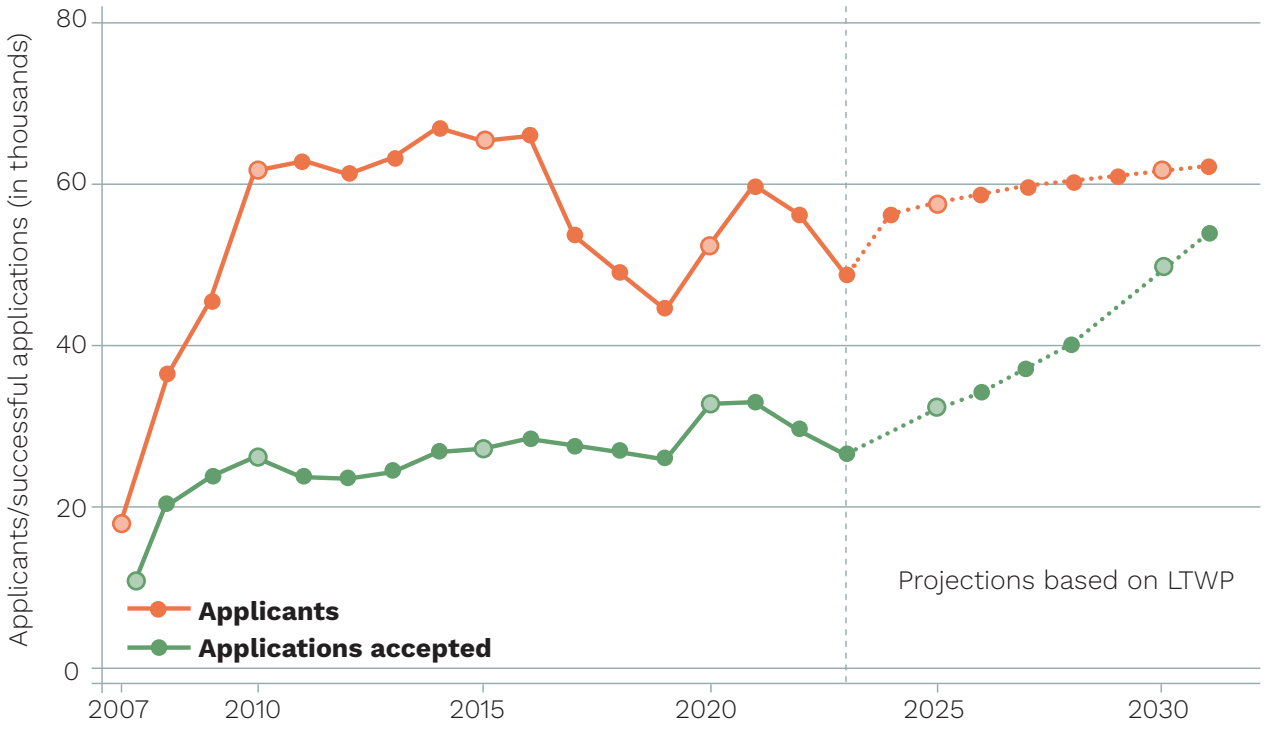


1 According to the Office for National Statistics (2024), the total fertility rate in England has decreased from 1.94 in 2010 to 1.44 in 2023; the lowest level since the start of recording in 1938.

across industries for increasingly scarce human resources. This is likely to make it more challenging to recruit comparable numbers of new workers into training as currently done, let alone increase the number of people entering training above current levels.

The NHS long-term workforce plan (LTWP) published in 2023 sets out future staffing needs of the health system and how these are intended to be met (NHS England 2023). Over the next 15 years, NHS England predicts that the service will require an additional 204,000 to 230,000 health care workers to maintain adequate levels of quality and access to care. To meet this target entails a large expansion of the number of training places and a corresponding increase in recruitment into training. For example, the training intake for nurses, midwifes and health visitors is planned to grow from approximately 40,000 in 2022 to 72,000 in 2031; a nearly 80% increase. Figure 2 projects both this planned intake as well as the expected number of applicants based on the assumption that a constant share of the population in each age group applies for a nursing program.[2] While currently around 56% of applicants to nursing programs are successful, this number is predicted to rise precipitously, with the required training intake nearly equal to the number of applicants.[3] The overall picture is less stark but qualitatively similar in other clinical staff groups.

Figure 2: Projected applicants and training intake or nurses in England



Source: Own calculations

Note: Historical data are given by solid lines and projections by dashed lines. The future number of applicants were projected based on the assumption that the share of people in each age group applying for nursing degrees remains the same as the average share from 2021 to 2024. We project the training intake based on the NHS long-term workforce plan's projected training intake for nurses with linear interpolations for years where no projection is given.

2 Note that to be consistent with the UCAS data, we exclude midwifery, health visitors, district nurses, and registered school nurses from the projections for this exercise.

3 Note that Figure 2 only predicts nursing applications for the period covered by the LTWP. Much of the fall in fertility rates will play out after 2032.

By necessity, any increase in trainees will have to be drawn from a pool of people who may not have trained in this profession otherwise. Large, non-marginal increases in recruitment as outlined in the LTWP have the potential to change the composition of the workforce, especially if these are sustained year-on-year. These additional trainees may have different characteristics, preferences, and practice styles than those that would have trained in the counterfactual world where the NHS did not expand its workforce. The implications of significantly expanded training for the overall characteristics of the healthcare workforce and any associated effects on service provision (e.g. due to changed productivity or quality of care) are unknown but should – ideally – be reflected in long-term workforce planning.

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This pathfinder poses three questions: how do the characteristics of the current health and social care workforce differ from the wider trainable pool? How might the distribution of characteristics of the workforce change as it is expanded through increased training? And what are the likely consequences of changes in the distribution of these characteristics for labour supply (e.g. hours worked), productivity, and quality of care? Importantly, this pathfinder does *not* interrogate strategies to increase recruitment itself, i.e. we look at the likely consequences of increased recruitment, not the mechanism to achieve it.

The current health and social care workforce chose to work in this profession when other career paths may have been available, and they were successful in training and then applying for their current roles. We assume that the characteristics that drive choice might also determine professionals' behaviours (e.g. in terms of the effectiveness of their care, or their labour supply decisions) in their chosen careers, i.e. selection has consequences for care delivery. There are several candidate characteristics that could be studied. For example, in light of the ongoing feminisation of medicine, there has been considerable interest in gender differences in specialty choice (e.g. Rodriguez Santana and Chalkley 2017), quality of care (e.g. Miyawaki et al. 2024; Tsugawa et al. 2018), productivity (Bloor, Freemantle, and Maynard 2008), and labour supply decisions such as the number of hours (e.g. Núñez-Elvira 2023) or the propensity to own and operate a primary care practice (Jefferson et al. 2022). In this pathfinder we focus on two characteristics that are less readily observed and thus not as widely studied: the motivation of health care professionals – in particular the degree to which they value the well-being of patients and the public (altruism) – and their cognitive ability.

Economic frameworks for understanding the consequences of changes in recruitment into training

In economic theory, workers select into occupations based on their preferences over characteristics of those jobs and their individual sets of characteristics (Keane and Wolpin 1997). A young person deciding which career to pursue will consider a range of factors such as their likely lifetime earnings, the intrinsic value they place on this work, the working conditions associated with this occupation, as well as their likelihood of being able to successfully apply for and complete the required training. These considerations of individuals' comparative advantages drive *sorting*, the process whereby people with different characteristics and preferences choose to pursue different careers.

Any policy change which affects the incentives for choosing a particular career is likely to affect the sorting process, thereby changing the distribution of characteristics of workers in particular occupations. The degree to which the new sorting results in a less favourable distribution of characteristics is *a priori* unknown. It depends both on the (dis-)similarity of current and potential workers, the degree to which the characteristics of workers change as one moves further down the rank order of potential applicants as well as the stringency of current selection and sorting processes, i.e. the degree to which the characteristic of interest is predictive of uptake of training. The latter point is likely to be substantive: The sorting of people into occupations is subject to frictions such as imperfect information, myopia, access costs, or discrimination. As a result, it is possible that there are people out there that have favourable characteristics and would be willing to train as health care workers but who currently do not select into (or are not selected for) training. For example, Kugler (2022) studies the wage beliefs of 14 to 15-year-old German pupils and finds that those who underestimate nurse wages are less likely to subsequently choose to become nurses, suggesting that information frictions prohibit uptake of training.

Economists have noted the possibility of job characteristics, in particular wages, to interact with personal characteristics, thereby affecting the type of people selecting into the health and care sector. Heyes (2005) develops a theoretical model of selection into nursing, suggesting that heterogeneity in the extent of nursing "vocation" i.e., devotion and care for the job, may explain differential uptake of the profession in the population.[4] People with a high vocation for nursing have a higher preference for work as a nurse at any given wage compared to those with low vocation. When nursing wages are relatively low, only those with a high vocation for nursing are likely to sort into working as a nurse; however, raising nurses' wages increases the number of nurses but decreases the share of nurses who have a high vocation for nursing, because some people with low vocation for nursing will nevertheless think it worth applying for a higher wage. This model extends readily to other professions in the health and social care sector.

What is currently known?

We have surveyed the academic literature which investigates the key empirical questions in relation to motivation and ability. These questions relate to how individuals' characteristics i) determine who selects into health and care careers and ii) how much labour they supply and of what quality.

Altruism

Economists as early as Adam Smith have been concerned with the role of economic agents' motivation and how this affects their behaviour in the market (see McCloskey 2016). Altruism, which is broadly understood to incorporate a form of interpersonal utility dependence in which one's utility depends on that of another person, is one form of motivation that is widely seen to be of particular relevance for the supply of care services (Elliott 2024; Galizzi et al. 2023; Pellegrino 1987). In his seminal work that shaped the discipline of health economics, Arrow (1963) argued that because of asymmetric information between the provider and the patient, some degree of altruism on the part of the provider is needed for the patient to be willing to purchase the service. A subsequent literature emphasised

4 For a more general discussion, see e.g. Delfgaauw and Dur (2007).

the importance of provider altruism in the context of designing remuneration systems that encourage the optimal provision of services (Ellis and McGuire 1986; Jack 2005). However, despite this long history of theoretical literature discussing the role of altruism, the empirical literature measuring and describing the effect of provider altruism is significantly more recent.

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A key challenge in the empirical economic literature has been the measurement of motivation, which is not directly observable. Recent years have seen methodological advancements in two areas that are promising and provide inspiration for this pathfinder. One strand of the literature, rooted in neoclassical economics, employs stylized laboratory experiments to measure altruism using a modified dictator game: the respondent is presented with a problem of allocating resources between themselves and another person. Often, the question is framed as one of deciding how much "costly care" to provide from their allocated budget, with the money the respondent forgoes being donated to a health charity to more closely mimic the kind of altruism which a health and care worker might be expected to exhibit (Godager and Wiesen 2013).[5] The proportion of potential earnings that a participant is willing to forgo to benefit another person is then interpreted as altruism. A second strand of the literature, led by researchers at the University of Odense, Denmark, builds on survey instruments developed in public administration research to measure workers' motivations using online or paper-based or online questionnaires (Yordanov et al. 2023). Responses to a range of questionnaire items – typically measured on Likert scales – are scored to calculate a numeric representation of respondents' motivational profiles across a series of dimensions: extrinsic motivation, intrinsic motivation, user-orientation (most akin to the concept of altruism), and public service-orientation. The survey approach provides a richer set of estimates of motivation than the experimental approach but focuses on 'stated' rather than 'revealed' aspects of motivation.[6]

Level and stability over time of altruistic motivation

Altruistic motivation is typically assumed to be high amongst health and care workers. Yordanov et al. (2023) measure the distribution of motivations across Danish GPs using the aforementioned survey approach. They conduct latent class analysis to define five different motivation "types". The two largest types, representing over three quarters of the sample, are either motivated by all sources of motivation (i.e. intrinsic and extrinsic motivation, public service and user orientation) or by everything except extrinsic motivation. The type which is (mostly) motivated by extrinsic motivation (e.g., financial reward) constitutes only around 3.5% of the sample. These results suggest that, at least amongst Danish GPs, there is evidence of significant motivation by non-financial considerations including altruism towards the patient.

5 There is also a relevant literature that shows that people working in 'caring jobs' (e.g. nursing, social care, teaching) suffer a wage penalty on average (Barron and West 2013). This speaks to the hypothesis of an altruistic motivation.

6 For a related discussion of the concordance of stated vs revealed preferences see e.g. Loomis (2011) and Quaife et al. (2018).

Several papers have compared the degree of altruism amongst healthcare professionals with that of the general population. This gives some insight into the selection mechanism[7], although cross-sectional studies cannot rule out the possibility that the occupation choice shapes motivation, and not all members of the general population may be interested in training. The results of these comparative studies vary based on setting, which is suggestive that different policy environments entice different types of people into training. Li et al. (2022) study samples of US physicians, medical students, and representative samples of the US population. Measuring altruism using a modified dictator game, they find that while physicians are more altruistic than the general population, medical students are less altruistic than the general population. On the other hand, Zhang et al. (2023) conduct a similar study of medical students in Beijing and derive a measure of altruism of 0.84 (from a possible 1), which they interpret to suggest that medical students score highly for altruism compared to the (unmeasured) general population. They also find that measured altruism is correlated with preferences for working in medical jobs which have non-pecuniary benefits related to workload, environment, and career progression. There is some evidence of differences in motivation across medical disciplines. Crossley and Mubarik (2002) survey dental and medical students at the University of Manchester and find that medical students are more likely than dental students to be motivated by factors such as patient care and use of interpersonal skills.

One concern is whether motivation is a stable trait within individuals over time: if individual motivation is not consistent over time, especially if it is shaped by the occupation after selecting into it (e.g. through training and socialisation amongst other health and care professionals), then the concern that widening the recruitment pool might change the average motivation of staff would appear to be less salient. Several recent studies speak to this possibility. Attema et al. (2023) document a U-shaped curve in altruism over the course of training: measuring altruism using an experimental game amongst German medical students they show that altruism first declines, then increases, over the course of their training. Li et al. (2022) show that in the US population, physicians are more altruistic than the average person, whereas medical students are less altruistic than the average person, which is consistent with medical practitioners becoming more altruistic as they start practising. Wang et al. (2020) compare patient-regarding preferences (a form of altruism) amongst Chinese medical students, Chinese medical doctors, and German medical students. They observe similar preferences for patient benefit vs. own benefit amongst doctors and students, suggesting stability of preferences after graduation and into practice.[8] Other researchers have found it possible to manipulate measured altruism in the short term by changing the financial incentives of the game (Byambadalai, Ma, and Wiesen 2023) or by priming respondents by having them recite the Hippocratic oath (Kesternich, Schumacher, and Winter 2015). Whether such interventions induce transitive or lasting changes in motivation is unclear. On the other hand, Abbiati and Cerutti (2023) find evidence of rank-order stability of personality traits amongst medical students; this finding suggests that, although personality traits including motivation can change over time, individual characteristics might still be important predictors of these traits.

7 Motivation is likely to correlate with other aspects on which prospective trainees are selected. McManus, Livingston, and Katona (2006) investigate how the motivations of prospective medical students depend on personality traits. They administer a survey to British students attending a conference about how to apply for medical school, asking questions about their reasons for wanting to work in the medical field. They summarise these motivations as four "factors": a desire to help others, feeling indispensable, wanting to be respected, and interest in science. These factors are linked to personality scores and academic performance: those ranking being indispensable as important score lower for agreeableness, higher for extraversion, lower for neuroticism, and lower on measures of empathy. Those motivated by a need for respect tend to have better historical academic performance, including higher grades at GCSE. Those motivated by interest in science have higher average openness to experience, higher neuroticism, and lower agreeableness.

8 Wang et al. (2020) also find that German students behave like Chinese students, suggesting a degree of transferability of findings across cultural contexts.

Labour supply decisions

Provider altruism may affect their labour supply decisions. Theoretically, less extrinsically motivated providers may be more likely to supply labour beyond the point where they have achieved the desired level of income; additional public service or user-oriented motivation might cause medical staff to work longer hours than purely extrinsically motivated workers. These considerations have led some to worry about apparent declines in altruism amongst young doctors in the context of workforce planning (Jones 2002). While intuitive, to our knowledge, these theoretical predictions have not been tested empirically. However, Győrffy, Birkás, and Sándor (2016) and Dyrbye et al. (2010) find evidence that altruism is correlated with lower rates of burnout amongst medical students. This result may be driven by these students finding more intrinsic rewards in their work or by internalising future altruistic benefits if they complete training and start practice, both of which could arguably counteract the stress of training to be a doctor. Since burnout is likely to delay students or even lead them to terminate their training altogether, this research suggests that altruistic motivation may indeed affect the lifetime supply of labour.

Specialty and location choice

Measured altruism is an important explanatory factor in physicians' choices of how and where to practise. Amongst US medical students, those who score lower on measured altruism are more likely to express a preference for specialties with above median average income, such as surgery, radiology and cardiology (Li 2018). This suggests that preferences for own vs others' consumption in economic experiments extends to real-world decision making. Attema et al. (2023) replicate this result amongst German medical students. Additionally, nursing and medical students who score lower on measured altruism are less likely to express plans to practise in underserved areas (Dyrbye et al. 2010; Li 2018; Serneels et al. 2007). It is important to state that these studies correlate altruism in students with stated preferences for specialties or location choice, which may differ from actual choices (revealed preferences). A noteworthy exception is Lagarde and Blaauw (2014), who document that South African nurses with higher levels of altruism are more likely to work in rural locations. Nevertheless, these studies suggest that changes in motivation arising from changes in training intake may need to be considered when planning the future distribution of the workforce.

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Delivery of care

Altruism is possibly linked to care decisions made by professionals as agents of their patients. Casalino et al. (2024) link estimates of physician altruism elicited through experimental investigations (using the original data from Li et al. (2022)) to claims data from the US Medicare programme to investigate the impact of altruistic motivation on spending decisions and quality of care. Their study found that patients registered with more altruistic physicians were less likely to experience ambulatory-care sensitive emergency department visits or hospital admissions and had lower annual expenditure on health care. Huang, Li, and Basu (2025) find that these less altruistic physicians also receive more gifts from pharmaceutical companies (+2,184 USD per annum, or +254%) than the more altruistic physicians, and that less altruistic physicians respond to this inducement by prescribing more branded (i.e. costly) pharmaceuticals.

Survey studies which distinguish between user-orientation and public service-orientation find that these different sources of motivation can have different explanatory effects. Theoretically, they can be thought of as altruism towards the patient and altruism towards society, which may conflict. For example, Jensen and Andersen (2015) find that while user-orientation predicts higher numbers of prescriptions of antibiotics, public service-orientation predicts a greater share of antibiotics prescriptions being narrow spectrum. Antibiotic prescriptions have positive effects on patients but impose a negative externality on society by increasing the incidence of microbial antibiotics resistance. On the other hand, searching for narrow spectrum antibiotics is a costly activity which has benefits for wider society but not for the individual patient. Jensen and Vestergaard (2017) explore home visits, which, they argue, is a costly intervention a public service-oriented clinician might believe to be economically wasteful. They find that user-orientation predicts higher numbers of home visits amongst Danish GPs, while public service-orientation predicts lower numbers. An important implication of these studies is that the motivation of the clinicians in a health service can affect the degree to which it maximises patient health versus economic efficiency as suggested by economic theory.

Cognitive ability and academic achievement

Innate ability, including both cognitive and non-cognitive aspects, is a potential determinant of labour supply and productivity because it affects an individual's effort cost of performing a specific task. Ability, like motivation, is not directly observable. University training programmes for doctors and nurses have traditionally relied on measures of academic achievement in school (e.g. A-level results) to proxy for cognitive ability. Our discussion of economic theory suggests that admissions criteria influence sorting into careers by changing the costs of accessing those careers for people with particular characteristics. For example, high academic standards for entry into medical training raise the cost of becoming a doctor for young people who do not have an aptitude for academic work. Academic minimum requirements serve two purposes: They restrict access to limited training capacities based on a measurable and verifiable metric that is, at least partially, reflective of the costly effort exerted by applicants. Furthermore, it is assumed that performing well on these admissions standards is associated with better clinical practice and positive population health effects.

A literature outside of economics investigates the correlations of cognitive ability as measured by academic achievements in school. For the most part, this literature has only been able to follow applicants through the remainder of their medical training. For doctors, researchers have shown predictive power of both high school exam results and performance in aptitude tests for undergraduate exam results (Donnon, Paolucci, and Violato 2007; Ferguson, James, and Madeley 2002; Mwandigha et al. 2018; Tiffin et al. 2016). This suggests that academic criteria may be effective in selecting students who are most capable of completing their training. Outside of undergraduate exam performance, Donnon, Paolucci, and Violato (2007) show that successful candidates with higher medical college admission test (MCAT) scores, a test designed to assess medical knowledge and problem-solving abilities, are also more likely to pass licensing exams. Based on their systematic review of the literature, Ferguson, James, and Madeley (2002) find that high school qualifications predict better scores on placements for trainee doctors.

Given the predictive power of academic qualifications for performance, one might question the utility of other screening techniques (such as situational judgement tests). Kötter et al. (2020) assess this using institutional facts from Germany, where 20% of medical school places are allocated based on pre-university GPA alone, and other students have a more comprehensive assessment.

They find that the latter group are more likely to be rated as suitable by their supervisor at the end of their placement, suggesting that there is utility in considering factors beyond exam results in recruitment. Smith and Tiffin (2018) find a similar result: performance in situational judgement tests predicts performance of medical students in clinical training even when controlling for performance in undergraduate education and prior educational attainment. There is mixed evidence that non-cognitive skills predict performance. On the one hand, conscientiousness tends to be associated with knowledge acquisition (Patterson et al. 2016). On the other hand, Finn et al. (2018) study non-cognitive elements of the UK clinical aptitude test (UKCAT) and find that non-cognitive characteristics do not predict undergraduate exam results.

Very little research has been able to follow applicants over the course of their careers beyond their initial training, leading to a lack of evidence about how academic admissions criteria predict on-the-job performance (Patterson et al. 2016). One exception to this is McManus et al. (2003), who conduct a prospective 20-year cohort study of UK medical students. They study how performance on intelligence tests and A-levels predict career trajectory. While better A-levels predict the speed of passing professional accreditation exams and increase the probability of being registered at the end of the period, their measures of intelligence do not have predictive power when controlling for A-levels.

Turning to nurses, a smaller literature has investigated the correlates of selection criteria and academic and clinical success. GPA and other measures of high school academic achievement are generally correlated with a higher probability of program completion and performance in clinical placements (Crawford et al. 2021). In the UK, Donaldson, McCallum, and Lafferty (2010) find that subject knowledge, content of written work, and academic references are good predictors of completing a nursing program, conditional on being accepted, but cannot measure performance in clinical practice.

Following the Francis (2013) report, which recommended a shift towards *values-based recruitment* of nurses, much of the UK-based literature has evaluated criteria which might select on **non-academic ability** characteristics. Multiple-Mini Interviews (MMI) are intended to assess values and competencies, such as empathy and emotional intelligence,[9] in "role play" scenarios. The evidence is mixed, with some finding a positive correlation between MMI performance and subsequent academic performance (Gale et al. 2016), and some finding no correlation (Traynor et al. 2017). The most promising results for MMI come from a cohort study (Callwood et al. 2018; Callwood et al. 2020), where MMI performance was shown to predict performance in clinical placements, including clinical placements three-years after the MMI assessment. Variation in findings about MMIs could result from differential implementation of MMIs.

Overall, our review has identified evidence that both cognitive and non-cognitive ability determine the outcome of the training process. If additional recruitment is achieved by lowering admission standards, this might affect training outcomes on average.

9 Other values and competencies typically tested during MMIs include honesty and integrity, commitment to chosen field of nursing, decision making and problem-solving skills, empathy and non–judgemental approach, potential for leadership and management, personal responsibility/self-awareness, and communication skills.

What we do not know

The literature outlined above is still sparse and leaves many important questions unanswered. We focus here on four aspects that are important for workforce planning to achieve a sustainable supply of health and care labour:

Firstly, the existing literature on physician motivation tends to correlate physician values with medical *inputs*, such as home visits and prescribing decisions, rather than measures of clinical outcomes or productivity. One noteworthy exception is the study by Casalino et al. (2024) discussed before. Additionally, there is sparse evidence on the effect of motivation and academic achievement on labour supply beyond hard outcomes such as burn-out, e.g. willingness to take on additional shifts, lifetime supply of work, probability to work part-time, etc. Such evidence is important in itself but may also be relevant to better understand the role of working conditions on labour supply (see **'Working conditions'** pathfinder).

Secondly, while there is research on the recruitment of doctors and nurses in a UK context, for the most part studies of the impact of differential physician characteristics and their correlates have been carried out in different settings such as the United States and Denmark. While aspects of these settings are likely to be similar – for example, Danish GPs operate in a similar way to English GPs – there are reasons to be sceptical of translating these results into the local context. For example, given higher levels of income inequality and higher pay for doctors in the US than the UK, motivation for doctors to pursue specialist training in the US is likely to be different. In addition, different financial incentives (e.g. a mix of fee-for-service and diagnosis-related group (DRG) payment systems) and career incentives (e.g. access to specialist training places, career progression goals) may affect decision-making. To be confident of extrapolating these results to NHS policy would require replicating these results in an English context.

Thirdly, much of the existing research focuses on doctors. To our knowledge, there is little economic research which indicates the importance of (cognitive) ability of nurses, carers, or healthcare assistants, or assesses the correlates of the motivation of these professionals. One likely reason for this is the difficulty in measuring clinical performance amongst these professions: since nurses, carers and healthcare assistants typically work in teams and and/or have limited scope for independent decision-making, it is difficult to attribute clinical outcomes to their behaviour. Arguably the clearest measurement of nurse quality comes from their assessments while on clinical placement during training; relying on these measures, however, precludes assessing whether the factors which affect nurse quality during training also predict the quality of their performance later in their career. By contrast, physician diagnosis and decisions about appropriate treatment provide clearer cases to assess performance.

Fourthly, in our survey we found little evidence on the characteristics or labour market outcomes of workers who may have been willing to train in health and care but either did not express their willingness or were not selected. Several studies have estimated differences in altruistic motivation amongst doctors and the general public, but not all members of the general public would be 'in scope' for training. Hence, the existing evidence is insufficient to predict how changes in training intake affect the distribution of desirable characteristics. It would be particularly useful to understand whether there are groups within the population who might be high-quality, productive health and care workers but who are currently systematically underrepresented. Research on selection processes to encourage participation from non-traditional backgrounds, e.g. gateway medicine or widening access programmes (Curtis et al. 2014; Dueñas, Tiffin, and Finn 2021), may offer useful insights in this respect.

What is the opportunity for the research unit?

Based on our survey of the literature, review of existing data sources and extensive discussions with (non-)academic stakeholders in the UK and abroad we have identified several opportunities for the REAL Supply Research Unit to conduct meaningful, high-impact economic research.

An important opportunity for research arises from recent advancements in methodologies to measure altruism and related 'pro-social' motivations. These methods rely on primary data collection, which, to our knowledge, has not been carried out for samples of existing English health and care workers or potential future workers (e.g. pupils aged 15-18). Work by Li et al. (2022) and Yordanov et al. (2023) suggests that low-cost online data collection is feasible, which implies that motivation could be measured at scale by either including additional tasks/questions into existing cross-sectional data collections (e.g. as part of the Commonwealth Survey co-funded by THF or the GP survey managed by the University of Manchester) or by conducting de-novo data collection (e.g. as part of discrete choice experiments to measure preferences for (non-)monetary job characteristics – see **'Working conditions'** pathfinder). It would be particularly interesting to collect data on young people at the stage of selecting careers, i.e. at GCSE or A-level, and then track their actual applications and career outcomes over time by linking elicited motivation data to UCAS and UKMED data. It would also be informative to study the relationship between motivation and labour supply decisions, e.g. to work part-time or retire early, and how these are modified by working conditions. The REAL Supply unit has developed networks with experts in the application of the experimental (Prof. Daniel Wiesen, University of Cologne) and survey approach (Prof. Anne Sophie Oxholm, Southern Denmark University); both of whom have signalled their interest in collaborating on research that applies these methodologies in the UK context and expands it to the non-medical workforce.

A second opportunity arises from the implementation of the LTWP in England from Autumn 2025 onwards. This policy is expected to create year-on-year increases in the number of applicants selected into training through investment in training capacity. This may arguably induce variation in minimum academic requirements to fill the new training capacities, which can be exploited to estimate the causal effect of selection criteria on (early) career outcomes. The REAL Supply unit is well placed to evaluate these changes, thereby uncovering meaningful relationships between proxy measures of applicants' abilities and their career outcomes.

Thirdly, to convincingly demonstrate an effect of individual characteristics on labour market outcomes (e.g. hours supplied, career pathways) and population health, researchers require prospective cohort studies that follow health and care professionals over their careers and link these data to clinical activity and outcome data. The UK Medical Careers Research Group (UKMCRG) longitudinal cohort study has recruited medical students at the start of postgraduate training since 1974. However, it does not measure individual characteristics such as motivation and does not link to clinical activity data such as HES or CPRD that would permit measurement of practice style and clinical effectiveness. Furthermore, data collection stopped in 2018 and, to our knowledge, will not resume. The UK Medical Education Database (UKMED) follows clinicians from application to university through training and into practice. But, again, it cannot currently be linked to clinical activity data and does not measure motivation. Longitudinal cohort studies are lacking for clinical staff other than doctors. In January

2025, the REAL Supply research unit hosted Prof Tony Scott (Monash University), who previously ran the MABEL survey of doctors in Australia, to discuss opportunities for establishing a new cohort study in England to study career outcomes and clinical practice patterns of doctors and nurses from undergraduate enrolment onwards. The REAL Supply research unit offers a unique opportunity to establish and fund the first years of data collection, with follow-on funding needing to be obtained from other sources.

Finally, it would be instructive to revisit past expansion of training capacities in the UK and assess whether these led to changes in (geographic) intake, location decisions, career outcomes and practice patterns. The government has over time increased the number of institutions who can offer medical and dental training in the UK, with five medical schools having opened their doors in the academic year 2021/22 alone. If it is possible to identify a group of students who would have been unlikely to be selected into training without the expansion in capacity, they might be studied to learn more about the career outcomes and practice styles of 'marginal' candidates.

What stage of development is the pathfinder at?

We have identified a relevant policy challenge that is likely to intensify over time: the recruitment of sufficient trainees into university courses that lead to a professional registration from a shrinking pool of potential trainees. Our review of the literature, in particular that relating to altruistic motivation, has progressed well, and we have had useful conversations with academic and non-academic stakeholders to inform our review and confirm the importance of the topic. We have identified a family of research questions which are key to understanding the changing nature of the NHS workforce and its impact, but which the existing literature is relatively silent on. These questions form the basis for an ambitious research agenda.

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