



a COVID-19 briefing

Is there a

DOCTOR in the HOUSE?

Averting a post-pandemic staffing crisis in the NHS



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Summary

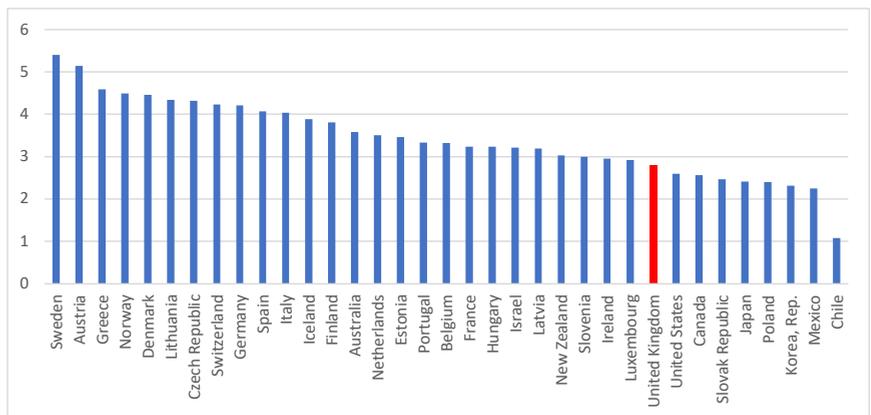
- Shortages of PPE and ventilators have overshadowed shortages of doctors during the Covid-19 pandemic. Yet when normality returns and the NHS is swamped by a backlog of cases, the latter could be thrust to the forefront of public debate.
- The UK ranks 27th out of 36 OECD countries for number of physicians. Around 30 per cent of doctors on the GP and specialist registers are over 55 years old.
- The UK relies more heavily on foreign-trained physicians than comparable countries. Yet within a decade it could become increasingly difficult to meet demand this way: there could be a deficit of 400,000 doctors by 2030 between 32 OECD countries.
- Doctor shortages disproportionately affect a handful of specialist fields. The NHS in England entered the Covid-19 crisis with a 17 per cent shortfall of emergency medicine consultants and a 9 per cent shortfall of respiratory medicine consultants.
- Starving some specialties of personnel could leave the nation's health vulnerable to future crises that disproportionately demand the expertise of consultants from one or two fields of medicine.
- A perfect storm could be forming around the NHS, as the fallout from the pandemic threatens to increase the demand for health services at the same time as reducing the resources available to fund it. Efficiency savings are arguably more urgent than ever.
- This paper suggests that a cost-effective solution to doctor shortages could be to scrap laws that prevent suitably trained non-medics from filling workforce gaps.

The roots of the doctor shortage problem

The key statistics

The UK ranks 27th out of 36 OECD countries for number of physicians.¹ According to World Health Organization (WHO) data, the UK had 2.8 physicians per 1,000 of the population in 2016 (see Figure 1).

Figure 1: Physicians per 1,000 people, OECD countries, 2016



Source: World Health Organization's Global Health Workforce Statistics.

¹ Turkey is excluded due to an absence of physicians per 1,000 people data for 2016. The most recent estimate was 1.8 in 2014, putting it somewhere between Mexico and Chile.

By comparison, Germany had 50 per cent more doctors (4.2 per 1,000) than the UK, Australia had 28 per cent more (3.6 per 1,000) and France had 14 per cent more (3.2 per 1,000). Canada and the USA, on the other hand, both had 8 per cent fewer doctors per 1,000 than the UK – 2.6 per 1,000 in both nations.

Direct comparisons between nations' levels of staffing per 1,000 cannot on their own be used to predict differences in service levels. Most obviously, doctors in the USA work longer hours than in EU nations, where the Working Time Directive has established a cap on average weekly working hours.² In addition, countries with fewer doctors per 1,000 may compensate by having extra nurses and allied health professionals.

Demand for doctors in the UK has been driven in recent decades by population growth and ageing, alongside advances in medicine and technology, which have increased the number of diagnostic techniques and treatments available (Rolewicz and Palmer 2019). In the last quarter of 2018/19, there were over 9,000 full-time equivalent vacancies for doctors in England (NHS Improvement 2019: 2.5). Around 90 per cent of these vacancies are being filled by agency or bank staff, depriving patients of continuity of care while costing the health service above the odds (Rolewicz and Palmer 2019).

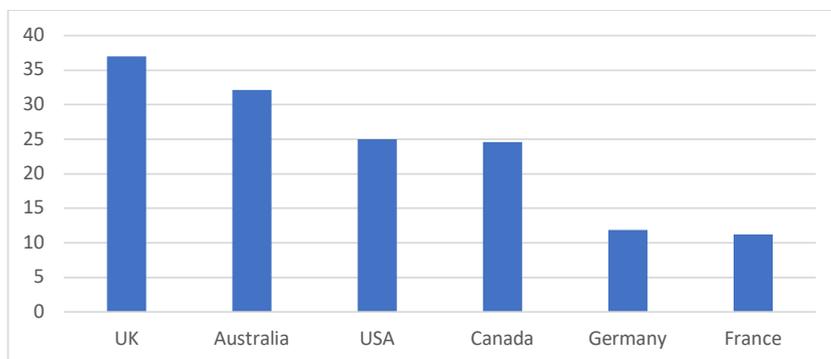
Demographic factors also affect the supply side of the equation. Around 30 per cent of doctors on the GP and specialist registers are over 55 years old.³ Meanwhile, the majority (57 per cent) of doctors in training are women, which could lead to a drop in average hours worked. An analysis of 10,866 UK doctors' working patterns found 42 per cent of women worked less than full time, compared with 7 per cent of men (Lachish et al. 2016).

The UK relies more heavily on foreign-trained physicians than comparable countries. Over one-third (37 per cent) of doctors in the UK qualified abroad (see Figure 2). This is nothing new: over the last twelve years – as far back as General Medical Council (GMC) data record – the proportion of foreign-trained doctors has remained stable.

2 'How many hours are in the average physician workweek?', American Medical Association, 6 January 2015 (<https://www.ama-assn.org/practice-management/physician-health/how-many-hours-are-average-physician-workweek>).

3 GMC Data Explorer (<https://www.gmc-uk.org/about/what-we-do-and-why/data-and-research/gmc-data-explorer>).

Figure 2: Percentage of foreign-trained doctors in the UK, Australia, USA, Canada, Germany and France



Source: UK data taken from GMC register;⁴ data for other five countries from the OECD's 'Health at a Glance' (2019: 187).

Meanwhile, in Australia 32 per cent of physicians are foreign trained, compared with 25 per cent in Canada and the USA. At the bottom of the pack are Germany (12 per cent) and France (11 per cent).

Migration of doctors predominately occurs from low-income countries to high-income countries. In 2018, the UK received 8,170 foreign-trained doctors, of whom the biggest group came from India (1,131), followed by Pakistan (1,008), Nigeria (852), Egypt (738) and Sudan (305).⁵

4 The OECD's 'Health at a Glance' (2019) report says the proportion of foreign-trained doctors in the UK is only 29 per cent. However, according to the GMC's register the proportion is 37 per cent. The cause of this discrepancy is unclear.

5 OECD: Health Workforce Migration data (https://stats.oecd.org/Index.aspx?DataSetCode=HEALTH_WFMI).

Fierce international competition for doctors forecast by 2030

Poor salaries, few career prospects and unsatisfactory working conditions push doctors in developing countries to migrate. Physicians who migrate from poor to rich countries also have the opportunity to help raise their families out of poverty through remittances. Indians working abroad generated £60 billion in remittances in 2018, accounting for roughly 3 per cent of their nation's GDP.⁶

While importing growing numbers of doctors from abroad will be essential in the short term, within a decade it could become increasingly difficult to meet demand this way. The UK is not the only nation with an ageing population and a dependency on imported doctors. According to Scheffler and Arnold (2018), there will be a deficit of 400,000 doctors by 2030, with that undersupply spread across 32 OECD countries. That suggests the international market for doctors could become fiercely competitive.

At the same time, rapid economic development in Asia is likely to reduce the 'push factors' that have made dependence on foreign-trained doctors possible. For example, in 2019 there were 14 Indian universities in the Shanghai Academic Ranking's top 1,000,⁷ compared with only one the year before; Indians soon will have access to world-class training in their own country. At the same time, India's burgeoning private healthcare sector is providing more high-quality jobs than ever,⁸ and in 2018 the government announced the rollout of a universal healthcare scheme that would cover the poorest 40 per cent of Indians (around 500 million people).⁹

As middle-income countries tighten their grips on domestically trained medics, an increasing proportion of doctors imported from abroad may come from the world's poorer states, such as war-torn Sudan. The number of Sudanese doctors working in the UK grew from 564 in 2012 to 936 in

6 'India to retain top spot in remittances with \$80 bn in 2018: World Bank', Mint, 8 December 2018 (<https://www.livemint.com/Industry/kwSiOsjV6sVvU5ekrp8LPM/India-to-retain-top-spot-in-remittances-with-80-bn-World-B.html>).

7 'Academic Ranking of World Universities 2019', Shanghai Ranking Consultancy (<http://www.shanghairanking.com/World-University-Rankings-2019/India.html>).

8 'Indian doctors ditching Britain in droves', *Hindustan Times*, 24 April 2014 (<https://www.hindustantimes.com/world/indian-doctors-ditching-britain-in-droves/story-AjZXy0BEsFrtE9d6Maeq0L.html>).

9 'Modicare': India's PM promises free health care for poorest citizens', *Guardian*, 24 September 2018 (<https://www.theguardian.com/world/2018/sep/24/modicare-indias-pm-promises-free-health-care-for-half-a-billion-people>).

2018.¹⁰ However, the NHS has an ‘ethical recruitment policy’, which prohibits it from actively head-hunting doctors from over 100 developing countries.¹¹ While this does not stop physicians from applying for positions under their own steam, relying on humanitarian crises to fill gaps in hospital staffing rotas is not a credible workforce plan.

Brexit and the end of free movement will impose a barrier to entry for EU doctors, who will be required to pay for a work visa.¹² However, the overall impact of Brexit is ambiguous, as the new points-based immigration system may encourage more non-EU doctors to come to the UK, as they react to the shorter waiting times promised. The government claims ‘the process will be streamlined to reduce the time it takes to bring a migrant into the UK by up to eight weeks’.

The loss of doctors to Australia, Canada, the USA and New Zealand

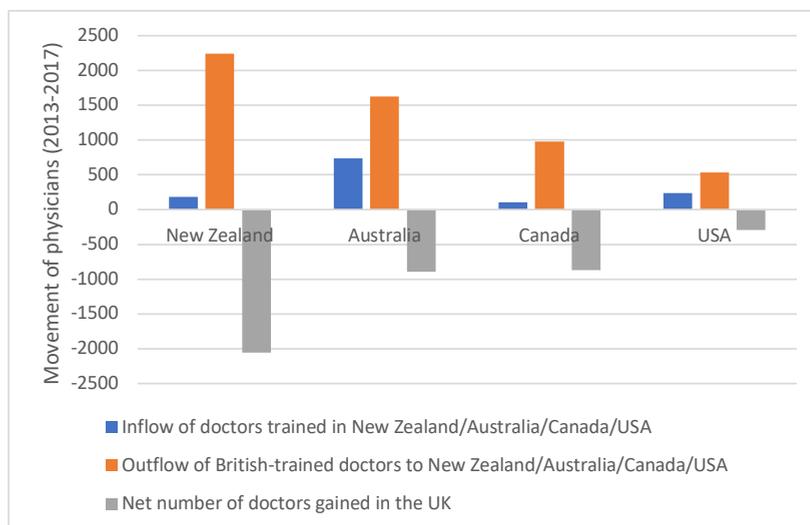
From 2013 to 2017, the UK lost on net 4,144 doctors to Australia, Canada, the USA and New Zealand. That is, for comparison, greater than the number of emergency medicine doctors currently registered with the GMC (2,842), or roughly equivalent to the number of registered pathologists (3,744).

10 OECD: Health Workforce Migration data (https://stats.oecd.org/Index.aspx?DataSetCode=HEALTH_WFMI).

11 ‘Developing countries - recruitment’, NHS Employers, 17 July 2020 (<https://www.nhsemployers.org/your-workforce/recruit/employer-led-recruitment/international-recruitment/uk-code-of-practice-for-international-recruitment/list-of-developing-countries>).

12 ‘The UK’s points-based immigration system: policy statement’, Home Office, 19 February 2020 (<https://www.gov.uk/government/publications/the-uks-points-based-immigration-system-policy-statement/the-uks-points-based-immigration-system-policy-statement>).

Figure 3: Gross and net flows of doctors to and from New Zealand, Australia, Canada and the USA



Source: OECD, foreign-trained doctors, annual flow. Flow data for Australia were not available, so an estimate was made by subtracting stock data for 2013 from stock data for 2017.

Figure 3 shows that 185 doctors from New Zealand emigrated to the UK between 2013 and 2017; meanwhile, 2,239 British-trained physicians left for New Zealand, leaving the UK with a net outflow of 2,054. The UK's net loss of doctors over the same time period to Australia, Canada and the USA was 890, 873 and 297, respectively.

Many British-trained doctors leave for sunnier climes with the intention of returning within a year or two. Still, the net negative movement means that at any given point the stock of medics in the UK is reduced, as those that return are replaced by new absentees.

How the pandemic will affect the supply and demand for health resources

The government announced around £90 billion worth of spending on schemes to support individuals and businesses during the initial coronavirus lockdown (Harari et al. 2020). Moreover, in its central scenario the Office for Budget Responsibility (OBR) forecast a 12.4 per cent fall in real GDP

in 2020, and an increase in the unemployment rate to 11.9 per cent.¹³ Lower GDP, higher borrowing and the accounting consequences of the Bank of England's policy measures will drive public sector net debt to 104 per cent of GDP by the end of the 2020/21 financial year, according to the OBR's forecast (compared with 77 per cent in the pre-lockdown Budget forecast).

In the medium to long term, the increased public debt burden and economic contraction may reduce the resources available to the health service. At the same time, demand on the health service is forecast to rise. The Institute for Fiscal Studies (IFS) concludes that recessions 'have been shown to have large and persistent negative effects on health and mortality at the population level' (Banks et al. 2020).

A 1 per cent fall in employment leads to a 2 per cent increase in the prevalence of chronic illness, according to the findings of a quantitative analysis of the 2008 financial crisis in Britain (Janke et al. 2020). The IFS extrapolates from Janke et al. to find that, if employment falls by the same amount as it fell in the 12 months following the 2008 crisis, around 900,000 additional people of working age could develop chronic health conditions.

Of course, unlike the 2008 financial crisis, the present crisis has the added health dimension of being a pandemic. The availability of healthcare has been interrupted, most obviously through the cancellation of non-urgent elective surgeries. There are also indications that people have been reluctant to visit their GPs with routine health complaints during the Covid-19 crisis, meaning the chance to detect cancers and other serious illnesses early has been missed – with knock-on effects for future health demand. In the month to 12 April, cancer referrals under the two-week wait system fell by up to 70 per cent.

A perfect storm is forming around the health service, as the fallout from the pandemic threatens to increase the demand for health services at the same time as reducing the resources available to fund it. Efficiency savings are arguably more urgent than ever.

13 'Coronavirus analysis', Office for Budget Responsibility (<https://obr.uk/coronavirus-reference-scenario/>).

Shortages of specialists

The coronavirus pandemic gave a glimpse of the danger that shortages of specialists concentrated in a handful of areas could pose to the nation's health. As the novel coronavirus arrived on the UK's shores, the NHS in England had a 17 per cent shortfall of emergency medicine consultants (340 whole time equivalents) and a 9 per cent shortfall of respiratory medicine consultants (104 whole time equivalents) (Health Education England 2018b: 13).

A well-balanced medical workforce could enable the NHS to confidently absorb 'demand shocks' that disproportionately draw on the skills of doctors in one or two specialised fields. So, why do some medical specialties have shortages?

After finishing five years of undergraduate study and two years of foundation training, junior doctors can apply for training posts in a specialist field. It is at this point where chasms open between hospitals' staffing demands and the supply of junior doctors.

An average of 750 out of 7,700 first-year specialty training posts advertised went unfilled each year between 2015 to 2017 (ibid.: 6). As shown in Table 1, the lowest fill rates in 2017 were for core psychiatry (68 per cent), histology (71 per cent) and cardiothoracic surgery (75 per cent).

Table 1: Fill rates for first-year specialist training posts¹⁴

First-year specialty training course	Fill rate 2015 (%)	Fill rate 2016 (%)	Fill rate 2017 (%)
Broad-based training	81	N/A	N/A
Core psychiatry	86	73	68
Core anaesthesiology	98	97	97
Core medicine	98	95	90
Core surgery	98	100	100
General practitioner	85	87	85
Emergency medicine	99	98	91
Histology	103	99	71
Cardiothoracic surgery	100	100	75
Oral and maxillofacial surgery	100	100	100
Neurosurgery	100	100	100
Obstetrics and gynaecology	100	99	100
Clinical radiology	100	100	100
Paediatrics	96	93	88
Ophthalmology	100	100	100
Public health	100	100	99
Community sexual and reproductive health specialty	100	100	100
Overall	92	91	88

Source: Health Education England (2018a: 17).

14 After graduating from their undergraduate degrees and completing two years of foundation training, junior doctors apply for places on three year 'core training' specialty courses. After their three years of core training are finished, they apply for 'specialty registrar' posts, which can last up to eight years. The statistics in Table 1 refer to fill rates for the first year of core training, as well as the first year of specialty registrar training.

In 2018, the government increased medical school places in England by 25 per cent, from 6,000 to 7,500 a year. Health Secretary Jeremy Hunt said the move would lead to the NHS being 'self-sufficient' in doctors by 2025.¹⁵ But are 1,500 additional doctors a year enough?

By 2025, Health Education England (HEE) predicts the 1,500 extra medical school places added in 2018 will start to show up in higher fill rates for training courses in unpopular specialist medical fields.

However, a rising per centage of medics have postponed specialty training in recent years for a variety of reasons (see Table 2). In 2016, 53 per cent of doctors did not immediately start specialty training after finishing foundation training, up from 32 per cent in 2012 (Health Education England 2018a: 16).

Table 2: Junior doctors not in training after second foundation year

Base year	Junior doctors in system at year before specialty training begins (Foundation Year 2)	Not in training one year later (%)	Not in training two years later (%)	Not in training three years later (%)
2012	6,280	32	19	21
2013	6,257	38	21	21
2014	6,229	41	21	24
2015	6,406	48	25	
2016	6,331	53		

Source: Health Education England (2018b: 16)

Survey data of junior doctors published in 2019 showed 11 per cent were rejected from all their specialist training choices. Another 14 per cent received offers, but turned them down – probably because they were second or third choices (UK Foundation Programme 2017: 15). These two groups together made up one-quarter of junior doctors at the foundation-to-specialty training junction.

¹⁵ 'Medical School Places Increase by 25%', The Medic Portal, October 2016 (<https://www.themedicportal.com/blog/medical-school-places-increase-by-25/>).

It is likely that an increased proportion of medics will hit this same impasse from 2025 onwards, as competition for desirable specialty courses rockets. After seven years of study, these medics will find that their dreams of being a neurosurgeon, a public health expert, a radiologist, etc. are not viable. How will they react? Of the surveyed medics that were rejected from their chosen courses in 2017, 41 per cent took a non-specialist role in the NHS, 21 per cent were in search of work, 14 per cent took a career break and 7 per cent enrolled into academic study (UK Foundation Programme 2017: 15).

These data illustrate that some specialty training courses are failing to attract applicants, while others are oversubscribed. For example, in 2017 neurosurgery received 5.24 applications for every post available, while core psychiatry received 1.26 per post (Health Education England 2017a: 1). After ineligible candidates were weeded out and the best candidates selected, neurosurgery had completely filled; meanwhile, core psychiatry had a 68 per cent fill rate.

Medical workforce planners in the NHS are handicapped by a politically motivated reluctance to use large pay incentives and differentials to re-direct doctors from oversubscribed specialties to those where shortages have been identified. Instead, doctors in training of all specialties are put on nearly identical salary progression scales, with some extra benefits for those with a high degree of on-call intensity or unsociable hours (Oliver 2019).

Since 2017, bonuses have been added to the pay packets of doctors who opt for 'hard-to-fill' training posts. For example, in 2019 this was equal to £3,503 a year for 'core trainees' in psychiatry and £8,617 a year for those doing GP registrar training (NHS Employers 2020: 6).

Bonuses could be made still more generous for specialty training roles which do not fill, with the cost to the public purse neutralised by freezing or cutting wages paid for posts that are consistently and substantially oversubscribed.

Concerns that opening large pay differentials will 'set specialties against one another' and undermine a 'sense of solidarity and commitment to a national service' may be outweighed by the objective of remedying gaps in the quality of care given to patients between specialties (Oliver 2019).

Hard-to-fill training posts could also be made more attractive by providing non-monetary benefits – such as more flexible working, opportunities to attend conferences and increased holiday allowance. Surveys of junior doctors could be conducted to find out how to reform remuneration in a way that would persuade the greatest numbers of medics to apply to shortage specialties.

‘Doctor deserts’

This paper has so far taken a nationwide perspective when discussing the shortages of doctors in particular specialties. Our suggestion has been that larger pay differentials be opened between specialties to encourage the necessary numbers of junior doctors to enrol in training courses that are chronically undersubscribed. This would be a more intelligent form of central planning.

However, we must now examine the ‘doctor deserts’ that have been caused by central pay scales in the NHS. ‘Doctor deserts’ are regions of the country that are disproportionately affected by shortages of specialists.

Table 3 shows the shortfall of consultant doctors in five specialties, broken down into four regions: North, Midlands and East, London, and South. The data show the folly of setting wages centrally, when the local conditions of supply and demand vary substantially. For example, in London there is a 2 per cent shortfall of respiratory medicine consultants, compared with a 14 per cent shortfall in the South.

Table 3: Provider expressed shortfall from establishment of consultants, September 2017

Specialty	Establishment WTE	Shortfall WTE	England	North	Midlands & East	London	South
Emergency Medicine	2045	340	17%	12%	20%	21%	15%
Psychiatry - General and Adult	1455	301	11%	14%	12%	11%	7%
Histopathology	1398	174	12%	16%	12%	11%	10%
Respiratory Medicine	1104	104	9%	10%	9%	2%	14%
Intensive Care Medicine	608	52	9%	16%	3%	10%	4%

Source: Health Education England (2018b: 13); WTE = whole time equivalent.

This calls into question the whole principle of pay scales negotiated centrally. Why should the question of pay be determined at the level of ‘the NHS’? For example, McDonald’s – a similarly gigantic organisation – does not set a single worldwide or countrywide level of remuneration for store managers, burger flippers or cleaners.

‘Doctor deserts’ could be solved by treating every NHS Trust as an employer in its own right. This would mean NHS Trusts would negotiate with their employees (or their representatives) to determine payment packets that balance the local conditions of supply and demand – instead of being forced to operate under a one-size-fits-all pay scale negotiated by distant health bureaucrats.

How professional protectionism can harm patients

Rigid job-role boundaries prevent rapid responses to doctor shortages

For over eight decades, successive governments have raced to increase or cut medical school places in response to committee forecasts of impending shortages or gluts of doctors (Maynard and Walker 1993: 1). Medical workforce planning has been erratic, with knee-jerk reactions causing training places to jump and fall in line with the latest shock predictions.

Training times of up to 16 years for some specialist consultants mean their supply is inelastic, and policymakers must decide how many medical-school places to fund based on dubious forecasts of what service levels will be desired in the next decade, and how technological and institutional factors might disturb existing input-output relationships.

Such workforce planning problems have seemed entirely theoretical to governments of rich nations in past decades, because legions of foreign-trained physicians from the developing world have stood ready to fill gaps. Within a decade, importing doctors could become more difficult, as developing countries' labour standards improve, leaving the ageing OECD populations to compete over shrinking migratory flows.

Proposals to chop a year or two off doctor training times will not solve the problem.¹⁶ Instead, other clinicians – nurses, medical associates and allied

¹⁶ 'BMA warns against Brexit proposal to shorten training for doctors', British Medical Association, 6 August 2018 (<https://www.bma.org.uk/news/media-centre/press-releases/2018/august/bma-warns-against-brexit-proposal-to-shorten-training-for-doctors>).

health professionals – should be empowered with training pathways to take on parts of doctors' roles.

The process of extending nursing, pharmacist and allied health professional roles began in 1992, when community nurses were given the right to prescribe from a formulary. The successful rolling out of independent prescribing powers to nurses, pharmacists and various allied health professions illustrates that our prior understanding of what work required a doctor was based largely on historical workforce hierarchies, not rational or evidence-based criteria.

Of the nearly 706,000 registered nurses and midwives in the UK, fewer than 10 per cent have independent prescriber status. A similarly small percentage of pharmacists (around 7 per cent) can prescribe independently (Cope et al. 2016). This gives leeway to workforce planners to rapidly increase the number of independent prescribers in these groups should doctor shortages require it. Essential tasks neglected by upskilled nurses and pharmacists can then be delegated to newly recruited healthcare assistants/nursing associates and pharmacy assistants.

A redistribution of tasks down the skill gradient, with the addition of support staff at the bottom of the chain, bolsters workforce output faster than training new doctors. And it is possible only if there is overlap between job roles.

The extension of prescribing rights

In 1986, a report reviewing the care given to patients in their homes found community nurses were wasting many hours waiting for prescriptions to be written or signed by GPs, including for items as basic as wound dressings. An analysis by Touche Ross, an accountancy firm, put the value of lost time at £27 million a year in today's prices, representing 2.84 million carer, nurse and GP hours (House of Commons 1992; LayFlurrie 2002). Meanwhile, patients were regularly left 'suffering needlessly' until prescription backlogs were cleared (House of Commons 1992).

In response, legislation was passed in 1992 that allowed community nurses to prescribe from a limited formulary of drugs, dressings and appliances – though these could only be given in the context of a care plan approved by a doctor (Cope et al. 2016). By 1998, after eight pilot sites returned positive results, community nurses were given the status of 'independent

prescribers', meaning they were entrusted with diagnosing patients and deciding on treatment plans, with the scope of this practice limited to conditions manageable with items from the Nurse Prescribers' Formulary (LayFlurrie 2002).

Studies published in the following years found nurse prescribing led to increased patient satisfaction and quicker access to treatments (ibid.). By 2001, independent prescribing rights were extended to include all registered nurses with three years' qualified experience, and in 2005 it was announced the limited formulary would be scrapped, and nurses would be able to prescribe all licensed medicines for any medical condition, and some controlled drugs for a limited number of medical conditions (Cope et al. 2016).

The successful extension of prescribing rights to nurses demolished the assumption that only doctors could be trusted with a prescription pad. Independent prescribing rights were further extended to pharmacists in 2006, optometrists in 2007, physiotherapists and podiatrists in 2013, therapeutic radiographers in 2016 and paramedics in 2018.¹⁷ Dietitians were given 'supplementary' prescribing rights in 2013, allowing them to prescribe within the context of a care plan agreed with an independent prescriber.¹⁸

Training courses for independent prescribers are typically three to six months, and students can self-fund or apply for funding from HEE if they meet the criteria, which include working for the NHS and having access to an appropriate supervisor. After qualifying, they must register with their professional regulator, ensure they have indemnity arrangements and periodically study for and pass refresher courses.¹⁹

17 'Who can prescribe what?', Pharmaceutical Services Negotiating Committee (<https://psnc.org.uk/dispensing-supply/receiving-a-prescription/who-can-prescribe-what/>).

18 'Supplementary prescribing by Dietitians', NHS England (<https://www.england.nhs.uk/ahp/med-project/dietitians/>).

19 'Medical associate professions', NHS Employers (<https://www.nhsemployers.org/your-workforce/plan/medical-associate-professions>).

New career roles: meet the Medical Associate Professionals (MAPs)

As well as blurring the lines between existing professions, in recent years entirely new clinical roles have emerged in the NHS, partly to make up for a shortage of doctors.²⁰ ‘Medical associate professions’ (MAPs) is an umbrella term that includes four new clinical roles, working at the level of junior doctors: physician associates (PAs), anaesthesia associates (AAs), advanced critical care practitioners, and surgical care practitioners.

Unlike junior doctors, individuals working as MAPs are not climbing the career ladder towards a consultant position, meaning they stay on the same wards for years. MAPs ease the medical workload and provide the continuity of care to patients that junior doctors cannot due to training commitments.

An overview of the differences and similarities between the four MAPs is presented in Table 4. Most importantly, PA and AA training courses – two-year postgraduate programmes – are open to all graduates with degrees in life sciences. That means a new entry route into the health service, with the potential to expand the size of the workforce.

By contrast, many extended-nursing roles – including the advanced critical care practitioner and surgical care practitioner roles – are open exclusively to healthcare professionals. For this reason, these roles could be criticised for merely moving resources around, taking nurses off the frontline and producing a net neutral effect on the workforce.

Following a government consultation published in February 2019 on the regulation of the MAPs, it was decided PAs and AAs would be regulated by the GMC, protecting their title and giving them the right to order x-rays and CT scans (Department of Health and Social Care 2019a). Prior to that decision, PAs and AAs who entered their roles from a non-healthcare background had no regulator, while those who entered from nursing or an allied health profession continued to be regulated by the Nursing and Midwifery Council (NMC) or the Health and Care Professions Council (HCPC).

20 ‘New clinical roles in the NHS’, British Medical Association (<https://www.bma.org.uk/collective-voice/policy-and-research/education-training-and-workforce/new-clinical-roles>).

Because the advanced critical care practitioner and surgical care practitioner roles do not have direct-entry routes, the government judged it would be 'disproportionate' to regulate the professions, as they are already subject to statutory regulation by either the NMC or the HCPC.

The government has said it will consult on extending independent prescriber status to PAs and AAs in the future (House of Commons 2020).

Table 4: Overview of the MAPs – compared and contrasted

	Physician associate	Anaesthesia associate	Advanced critical care practitioner	Surgical care practitioner
Description	Generalists, trained to diagnose and treat illnesses	Anaesthetise patients and provide preoperative and postoperative support	Work in intensive care units	Assist with surgical interventions and provide preoperative and postoperative support
Training requirements	Two-year postgraduate study	Two-year postgraduate study	Two-year postgraduate study	Two-year postgraduate study
Entry requirements	Either a degree in a life sciences subject or experience as a certified healthcare practitioner (nurse, operating department practitioner, etc.)	Either a degree in a life sciences subject or experience as a certified healthcare practitioner	Only registered healthcare practitioners accepted	Only registered healthcare practitioners accepted
Role history	Developed in the 1970s in the US and spread to the UK in 2003	Dates back to 2004	Dates back to 2010	Dates back to 2000 approximately

How many practising?	~1700	~200	~300	~700
Who are they regulated by?	Pending GMC	Pending GMC	Original professional body – e.g., if they were nurses before entering, then the NMC	Original professional body
Do they have independent prescriber status?	No right to independently prescribe, although the government said it plans to consult on this at an undisclosed date	No right to independently prescribe, although the government said it plans to consult on this at an undisclosed date	Can independently prescribe, although must register their independent prescriber status with their original professional body	Can independently prescribe, although must register their independent prescriber status with their original professional body

Source: Health Education England.²¹

Professional protectionism: the opponents of blurred job-role boundaries

Prescribing rights

The medical profession has been resistant to ceding its monopoly over prescribing rights to nurses, pharmacists and allied health professionals. According to an article in the *British Medical Journal*, 'in consultations, the [medical] profession has voted solidly for the slowest possible progress, given that no progress at all was not an option' (Hawkes 2010).

In 2005, when the Department of Health announced the limited nurse formulary would be scrapped and nurses and pharmacists would be able to prescribe all licensed medicines for any medical conditions and even some controlled drugs, the British Medical Association (BMA)'s chairman called for an 'urgent meeting' with the health secretary to discuss the proposals (Day 2005). The BMA said in a statement: 'It is difficult to see

²¹ 'Medical Associate Professions', Health Education England (<https://www.hee.nhs.uk/our-work/medical-associate-professions>).

how healthcare professionals who are not trained to diagnose disease can safely prescribe appropriate treatment’.

One doctor writing anonymously expressed himself more frankly in an article for the *Daily Mail* in 2006, calling advanced practitioner nurses ‘pretend doctors’, arguing they should either leave nursing and go to medical school or focus on maintaining cleanliness of wards and emptying bedpans.²²

However, one study showed doctors commonly trusted the nurses they worked with to prescribe safely. Their reservations were about nurses in general having prescribing rights, rather than about specific nurses they knew (Hawkes 2010).

Evidence about non-medical prescribing has consistently shown improved patient access to medicines and better patient care and experiences. Importantly, this has come at no cost to patient safety (Cope et al. 2016). In addition, a report in 2015 found nurse prescribers alone save the NHS in England £777 million a year (i5 Health 2015).

New clinical job roles

The MAPs have not received any affection from tabloids, with snipes such as ‘cut price doctors’, ‘mock-tors’ and ‘unlicensed doctors’ appearing in headlines.^{23,24,25} Because the new clinical roles outlined in Table 4 exist somewhere on the skill-mix spectrum between doctor and nurse, they have had to endure the resistance of protectionists from both professions. In addition, as their numbers are tiny, they do not have the same ability to counter attacks and shape public opinion as did nurses and allied health professionals when they were labelled unfit to be independent prescribers.

22 ‘Are nurses angels? I don’t think so’, *Daily Mail*, 18 July 2006 (<https://www.dailymail.co.uk/health/article-396258/Are-nurses-angels-I-dont-think-so.html>).

23 ‘Unlicensed doctors to ease NHS workload’, *Daily Mail*, 22 August 2014 (<https://www.dailymail.co.uk/news/article-2731402/Unlicensed-doctors-ease-NHS-workload-Graduates-just-two-years-training-soon-treating-patients-GP-surgeries-casualty.html>).

24 ‘Cut price doctor will see you now’, *Daily Mail*, 13 June 2017 (<https://www.dailymail.co.uk/news/article-4601346/3-000-cut-price-physicians-work-GPs-hospitals.html>).

25 ‘An army of doctors on the cheap’, *Daily Mail*, 28 December 2014 (<https://www.dailymail.co.uk/news/article-2889408/An-army-doctors-cheap-Desperate-NHS-tackle-shortages-GPs-training-physician-associates.html>).

Interestingly, the BMA is not explicitly opposed to extending independent prescribing rights to PAs and AAs, even submitting to a government consultation in 2019 that it agreed the expansion of ‘prescribing responsibilities to any or all of the four MAP roles should now be considered’ (British Medical Association 2019: 2). However, the BMA said it had ‘significant concerns about the impact of MAPs, and in particular the role of physician associates, on junior doctors’ training’ (ibid.). The government has responded by commissioning an impact analysis, with the results yet to be released (ibid.).

It is true that PAs in training compete with medical students for clinical placements. However, hospitals are paid ten times as much by HEE if they take a medical student over a PA in training (Department of Health and Social Care 2019b: 12). In addition, as practitioners trained to the medical model and stationed on a single ward for years, PAs and other MAPs have the potential to support junior doctors’ development.

The evidence shows PAs have a lot to offer patients. Uniquely, PAs must do a re-certification exam every six years, testing their general medical knowledge, regardless of their current specialty.²⁶ As a result, they afford the health service extra wiggle room, as their core generalist education means they can be quickly re-directed to ease medical shortages wherever they appear. A US study found the same applied to their PA workforce, and suggested using incentives, such as education grants, to draw more into primary care medicine to plug workforce gaps (Hooker et al. 2010). Likewise, the UK government has said it wants to increase PA numbers in primary care roles as part of a plan to support the core work of GPs.²⁷

In addition, each consultation handled by a PA instead of a GP cost £6.22 less, according to a 2015 study in the *British Journal of General Practice* (Drennan et al. 2015). A study in the *Scottish Medical Journal* found PAs saved £43,000 a year in take-home wages, assuming the time they spent practising would have otherwise required the attention of a doctor (Farmer et al. 2011).

26 ‘Physician Associate National Certification and Recertification Exam Information’, Royal College of Physicians (<https://www.fparcp.co.uk/examinations>).

27 ‘The physician associate will see you now – new role to assist patients in primary care’, NHS England (<https://www.england.nhs.uk/gp/case-studies/the-physician-associate-will-see-you-now-new-role-to-assist-patients-in-primary-care/>).

Four options to blur job-role boundaries and tackle pressing shortages

This section identifies areas where professional protectionism is blocking non-medics from upskilling and lightening doctors' workloads in key shortage areas.

A Nuffield Trust report from 2016, commissioned by NHS Employers, was widely derided for arguing that upskilled nurses could plug doctor shortages.²⁸ Critics rightly pointed out that staff shortages in nursing are greater than those in medicine.

This paper avoids falling into the same trap by ensuring its suggestions do not make any extra demands on already overstretched nursing staff. Instead, it suggests that more extended-nursing posts could be opened up for direct entry to graduates with degrees in biological science subjects, expanding the career horizons of thousands of young adults and providing the health service with an injection of new people.

We also suggest providing accessible, fast-track training pathways to PAs, clinical psychologists and biomedical scientists so they can take on tasks traditionally considered to be within the physician's protected sphere.

28 'Plan to train NHS nurses to cover for doctors sparks alarm', *Guardian*, 17 May 2016 (<https://www.theguardian.com/society/2016/may/17/plan-to-train-nhs-nurses-to-cover-for-doctors-sparks-alarm>).

Extending independent prescriber status to PAs

Currently, PAs and AAs cannot prescribe independently. This limits the usefulness of the PA role in particular. In primary care, the ‘closed door’ environment means PAs often find themselves working without a doctor on hand, leading to wasted time tracking one down each time they need a prescription signed (DHSC 2019: 19).

PAs have been a crucial part of government plans to patch up medical workforce shortages in primary care since 2017, with around 1,000 PAs working in GP practices.²⁹ GP shortages in England are set to triple to 7,000 by 2023/24, according to a projection published in a joint report by the Nuffield Trust, the Health Foundation and King’s Fund (Beech et al. 2019: 56). Analysts have claimed the shortfall is so serious, and the training time for doctors so long, that it would be impossible to plug the gap in the short term.³⁰ This suggests PAs must be quickly upskilled to help lighten the workload and improve patients’ access to primary care.

The role of PA was created in the USA, where over 120,000 are currently practising, with legal rights to prescribe drugs in all 50 states (Farmer et al. 2011: 130). One study showed American PAs produce fewer medical malpractice cases than doctors, suggesting claims they could jeopardise patient safety are ill-founded (ibid.:130). Interestingly, from 2006 to 2008 the Scottish government ran a pilot, in which they imported 15 PAs from the USA. The American PAs confirmed they could not carry out their roles as effectively without independent prescribing rights (ibid.:131).

To make PAs independent prescribers would require an amendment to Part 12 of the 2012 Human Medicines Regulations. In 2018, the Medicines and Healthcare products Regulatory Agency, an executive agency of the Department of Health and Social Care, laid before parliament a regulatory instrument designed to add registered paramedics to the list of professionals who can practise independent and supplementary prescribing under the Human Medicines Regulations (MHRA 2018). Due to an ‘administrative oversight’ by the Department of Health, it took three years from the government consultation on paramedic prescribing for the amendments to be laid before Parliament (ibid.:1).

29 ‘The physician associate will see you now – new role to assist patients in primary care’, NHS England, 20 July 2017 (<https://www.england.nhs.uk/publication/the-physician-associate-will-see-you-now-new-role-to-assist-patients-in-primary-care/>).

30 ‘NHS “no chance of training enough staff”’, BBC News, 21 March 2019 (<https://www.bbc.co.uk/news/health-47616491>).

The government has said it will consult on the question of prescribing rights for MAPs, although no date has been confirmed (House of Commons 2020). The process could be sped up, with lessons from the paramedic debacle learned. Given the long list of professions currently on the list of independent prescribers, there is little sense in delaying the addition of MAPs. Already, the consultation on the regulation of MAPs in February 2019 found that 84 per cent of 3,063 respondents agreed ‘the expansion of medicines supply, administration mechanisms and/or prescribing responsibilities’ should be considered for ‘any or all of the four MAP roles’ (DHSC 2019: 33).

Creating direct-entry routes into nurse practitioner positions

Currently, life sciences graduates can enter PA and AA postgraduate courses, eventually working at levels comparable with registrars or nurse practitioners.

The evidence suggests many life sciences graduates currently have to settle for employment that does not make use of their studies. In 2016/17 alone, 65,850 people completed degrees in biological science subjects in the UK (Higher Education Statistics Agency 2018: 3), of whom 19.4 per cent (12,775) were working in retail, catering and bar jobs six months after graduation, while six per cent (3,951) were unemployed (Higher Education Careers Service Unit 2018: 50).

Providing a direct-entry route into nurse practitioner roles would encourage gifted graduates to enter healthcare, supporting overstretched medics and nurses. A similar model of recruitment has already been used to parachute recent graduates into high-ranking police jobs – for example, police forces have recently launched a National Detective Programme and a National Graduate Leadership Programme.³¹

Specifically, training for the roles of advanced critical care practitioner and surgical care practitioner could be made accessible to non-healthcare workers. Currently, every extra one of these MAPs trained means a reduction in the nursing or allied health practitioner workforce. If opened to academically exceptional life sciences graduates, these MAP roles would function not only as career progression avenues for healthcare workers, but also as direct-entry routes into clinical roles for graduates.

31 ‘National Detective Programme’, Police Now (<https://www.policenow.org.uk/national-detective-programme/#>).

Those working as advanced critical care practitioners and surgical care practitioners are currently regulated by either the NMC or the HCPC – depending on the healthcare profession in which they started. Accepting life sciences graduates without healthcare backgrounds might mean setting up a regulator with responsibility for all practitioners, regardless of their background.

The Faculty of Intensive Care Medicine said the government’s decision following consultation in February 2019 not to set up a single regulator for advanced critical care practitioners and surgical care practitioners would ‘limit access and expansion of this novel workforce’.³²

Empower clinical psychologists with training pathways to prescribe

Across the UK, 9.3 per cent of consultant psychiatrist positions were unfilled in 2019, up from 7 per cent in 2015 (Royal College of Psychiatrists 2019: 5). This shortage has been produced partly by unprecedented demand for mental health services, coupled with a ‘retirement bulge’ resulting from a psychiatrist recruitment scheme that ran from 1976 to 1995 and offered doctors the incentive of taking their pensions at 50, provided they had done at least 20 years of service (Health Education England 2017b: 12).

Meanwhile, plans to expand the number of consultant psychiatrists have been thwarted by insufficient numbers of junior doctors choosing the specialty, with only 68 per cent of first-year psychiatry training posts in England filled in 2017 (see Table 1 above). Fill rates for psychiatry training posts vary greatly between regions, with 78 per cent filled in London and the South East, compared with 38 per cent in the North (ibid.: 13).

Currently, there are 10,000 clinical psychologists registered with the HCPC (ibid.: 14). Clinical psychologists are not medical doctors, although their route to qualifying is arduous: they normally start with a three-year undergraduate degree in psychology, after which they work in clinical roles for at least one year before applying to do a three-year doctorate, with applicant-to-place ratios as high as 28 to 1 (Scior et al. 2014). While junior doctors are reluctant to train as psychiatrists, many non-medics compete fiercely to enrol in oversubscribed clinical psychology doctorate programmes.

32 ‘FICM comments on Medical Associate Professionals Consultation’, Faculty of Intensive Care Medicine, 12 October 2017 (<https://www.ficm.ac.uk/news-events-education/news/ficm-comments-medical-associate-professionals-consultation>).

For now, clinical psychologists cannot prescribe medications, limiting the extent to which they can substitute for psychiatrists. In 2016, NHS England asked the British Psychological Society to put together a position statement on the extension of prescribing and medicines supply mechanisms to include clinical psychologists.³³ A discussion paper laying out the issues and asking for opinions from members of the profession was published in October 2019 by the British Psychological Society.³⁴

Psychologists have been prescribing for almost 30 years in the USA. In 1991, a pilot run by the US Department of Defense successfully trained up ten psychologist prescribers. Since then, four states have granted appropriately trained psychologists the right to prescribe psychotropic medications: New Mexico (2002), Louisiana (2004), Illinois (2014) and Iowa (2016).³⁵ A recent US study of prescribing psychologists found they were 'overwhelmingly perceived positively by their medical colleagues across various domains' (Linda and McGrath 2017).

A training course for psychologists, focused on anatomy and psychopharmacology, could be designed and assessed using the competency framework created by the Royal Pharmaceutical Society (British Psychological Society 2019: 7). The 2012 Human Medicines Regulations would have to be amended to include clinical psychologists on the list of independent prescribers. This would continue a decade-long trend of extending the roles of clinical psychologists.

Investing in biomedical scientists to become independent histopathological reporters

Histopathologists are doctors who diagnose diseases through the analysis of tissue and/or cell samples – for example, they provide multi-disciplinary oncology teams with information about the stage and grade of tumours.

33 'A role for psychologists on prescription?', *The Psychologist*, March 2019 (<https://thepsychologist.bps.org.uk/volume-32/march-2019/role-psychologists-prescription>).

34 'Should some psychologists have the option to prescribe medication?', British Psychological Society, 2 October 2019 (<https://www.bps.org.uk/news-and-policy/should-some-psychologists-have-option-prescribe-medication>).

35 'About Prescribing Psychologists', American Psychological Association (<https://www.apaservices.org/practice/advocacy/authority/prescribing-psychologists>).

The fill rate for histology specialty courses in 2017 was 71 per cent, making it the second least popular programme for junior doctors behind psychiatry (see Table 1 above). At the same time, a retirement crisis looms, as a quarter of consultant histopathologists are aged 55 or over.³⁶

Biomedical scientists are non-medics who work alongside histopathologists, helping to dissect tissue samples pre-analysis. The non-medical dissection role originated in 1999, at which point the idea that somebody without a medical degree could 'trim' and prepare tissue samples for inspection was controversial (Duthie et al. 2004).

In most histopathology departments, all samples have to be checked and signed off by a consultant doctor. Due to current workforce pressures, this has produced 'large backlogs of reporting work, accompanied by frustrated biomedical scientists unable to help' (Royal College of Pathologists 2015). Still, the Royal College of Pathologists notes that 'many consultant histopathologists feel strongly that only medically qualified consultants can report histopathology' (ibid.).

In 2017, the first cohort of five biomedical scientists graduated from the pilot 'Advanced Specialist Diploma in Histopathology Reporting' – qualifying them to dissect, independently report and present patient cases at multidisciplinary team meetings in the place of medics.³⁷ The pilot was considered a success, and the course – made up of on-the-job portfolio work plus two exams over a minimum of four years – is open to annual intakes of biomedical scientists.

With histopathological reporting for non-medics still in its infancy, the only specialties currently available are gastrointestinal tract pathology, gynaecological pathology and dermatopathology.³⁸

Further development of and investment in training pathways for histopathological reporting would lead to more blurring of job-role boundaries between biomedical scientists and histopathologists, while helping to head off emerging medical workforce shortages in this field.

36 'College report finds UK wide histopathology staff shortages', Royal College of Pathologists, 16 September 2018 (<https://www.rcpath.org/discover-pathology/news/college-report-finds-severe-staff-shortages-across-services-vital-to-cancer-diagnosis.html>).

37 'The progress of histopathology reporting', *The Biomedical Scientist*, 25 June 2018 (<https://thebiomedicalscientist.net/resources/progress-histopathology-reporting>).

38 'Histopathology Reporting', Institute of Biomedical Science (<https://www.ibms.org/education/advanced-qualifications/histopathology-reporting/>).

Conclusion

Every year, thousands of junior doctors finish their foundation training and enter into competition for places on specialty training courses. It is at this point where gaps between supply and demand open up, with around one-quarter of junior doctors failing to get onto a training programme they would accept.

In 2018, the government added 1,500 extra medical school places in England, which means in 2025 these additional students will emerge at the foundation-to-specialty-training junction. It is assumed by workforce planners that these extra people will solve shortages by accepting the posts that junior doctors are presently rejecting.

This paper has suggested that large pay differentials could be opened up to re-direct junior doctors from massively oversubscribed specialties (such as neurosurgery and ophthalmology) to those that consistently fail to fill (such as emergency medicine and psychiatry). The pandemic has taught us the importance of having a well-balanced medical workforce, capable of responding to 'demand shocks' that disproportionately call on the expertise of doctors from one or two specialist fields.

At the same time, there is a case for an open-minded attitude towards the tasks that could be safely performed by non-medical clinicians. This approach could empower ambitious and experienced healthcare professionals to quickly extend their scope of practice, improving patient access to care in the short term.

For example, legislative barriers prevent appropriately trained clinical psychologists and physician associates from prescribing drugs and lightening doctors' mounting workloads. Yet there is clear evidence from the USA that clinicians from these disciplines are capable of taking on such tasks.

The past two decades have seen prescribing rights extended to nurses, pharmacists, optometrists, physiotherapists, podiatrists, therapeutic radiographers and paramedics. There is evidence that extending these clinicians' responsibilities into territory once held exclusively by doctors has benefited patients' access to care while lowering costs to the health service.

Cost-saving innovations may be particularly desirable at a time when the NHS looks set to be engulfed by a perfect storm of fewer resources and more demand, as the nation's wealth and health are shaken by the pandemic.

The medical associate professions (MAPs) – new clinical roles, existing somewhere between nurse practitioners and registrars – provide a host of novel advantages. They are much more than just substitutes for doctors.

For example, because MAPs do not have to constantly rotate between wards like junior doctors, they can accumulate tacit knowledge and provide patients with continuity of care. Also, physician associates – one of the four MAPs, and distinctive due to their generalist training – provide the health service with immense flexibility by being able to move quickly between specialties according to demand. Doctors, on the other hand, rarely move between specialties.

Importantly, it is not suggested that all non-medical clinicians be upskilled to work at the level of doctors. Currently, fewer than 10 per cent of nurses and midwives have independent prescriber status. Traditional job-role boundaries are maintained for the majority, with extended roles made available for the exceptional minority. Upskilling non-medics comes at a cost, which must be justified on economic grounds.

Inflexible ideas about what work requires a doctor may become increasingly untenable as the proportion of medics willing to migrate from the developing world to the UK reduces. For decades, Britain's former colonies have provided a large and welcome supply of doctors, ready to fill rota gaps. They have been the metaphorical 'magic medic tree', allowing the system to maintain job-role boundaries that lock out people who have not travelled the approved path to accreditation.

Life-saving clinical skills can be learned through a variety of training pathways. If there is demand for it in the system, a capable and motivated person who entered an allied health or medical associate profession could be equipped with the tools to learn skills that others learn by going to

medical school. Equally, the brightest biology, biochemistry and biomedical graduates could be fast-tracked into advanced clinical roles. Before any of those things can happen, however, some of the legislative barriers that guard the physician's protected sphere would have to be removed.

References

Banks, J., Karjalainen, H. and Propper, C. (2020) Recessions and health: the long-term health consequences of responses to the coronavirus. Briefing note. London: Institute for Fiscal Studies (<https://www.ifs.org.uk/publications/14799>).

Beech, J., Bottery, S., Charlesworth, A., Evans, H., Gershlick, B., Hemmings, N., Imison, C., Kahtan, P., McKenna, H., Murray, R., Palmer, B. (2019) Closing the gap: Key areas for action on the health and care workforce. The Health Foundation, The King's Fund and Nuffield Trust (<https://www.kingsfund.org.uk/sites/default/files/2019-03/closing-the-gap-health-care-workforce-full-report.pdf>).

British Medical Association (2019) Medical Associate Professions consultation response (<https://www.bma.org.uk/collective-voice/influence/uk-governments/westminster/uk-consultations-and-inquiries>).

Cope, L. C., Abuzour, A. S. and Tully, M. P. (2016) Non-medical prescribing: where are we now? *Therapeutic Advances in Drug Safety* 7(4): 165–172.

Day, M. (2005) UK doctors protest at extension to nurses' prescribing powers. *BMJ* 331: 1159 (<https://www.bmj.com/content/331/7526/1159.1.full>).

Department of Health and Social Care (2019a) The Regulation of Medical Associate Professions in the UK, Consultation Response. London: DHSC (https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/777130/maps-consultation-report.pdf).

Department of Health and Social Care (2019b). Education and Training Tariffs. London: DHSC (https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/791560/education-and-training-tariffs-2019-to-2020.pdf).

Drennan, V. M., Halter, M., Joly, L., Gage, H., Grant, R. L., Gabe, J., Brearley, S., Carneiro, W. and de Lusignan, S. (2015) Physician associates and GPs in primary care: a comparison. *British Journal of General Practice* 65(634) (<https://bjgp.org/content/65/634/e344>).

Duthie, F. R., Nairn, E. R. and Topping, D. (2004) The impact of involvement of biomedical scientists in specimen dissection and selection of blocks for histopathology: a study of time benefits and specimen handling quality in Ayrshire and Arran area laboratory. *Journal of Clinical Pathology* 57(1): 27-32 (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1770182/>).

Farmer, J., Currie, M., Hyman, J., West, C. and Arnott, N. (2011) Evaluation of physician assistants in National Health Service Scotland. *Scottish Medical Journal* 56: 130-134 (https://capa-acam.ca/wp-content/uploads/2012/06/2011_Evaluation-of-physician-assistants-in-National-Health.pdf).

Harari, D., Keep, M. and Brien, P. (2020) Coronavirus: Economic impact. Briefing Paper 8866. London: House of Commons (<https://researchbriefings.files.parliament.uk/documents/CBP-8866/CBP-8866.pdf>).

Hawkes, N. (2010) Handing over the prescription pad. *BMJ* 340 (<https://www.bmj.com/bmj/section-pdf/186442?path=/bmj/340/7737/Feature.full.pdf>).

Health Education England (2017a) CT1/ST1 Competition Ratios. Leeds: HEE (<https://specialtytraining.hee.nhs.uk/portals/1/Content/Resource%20Bank/Competition%20Ratio%27s/Competition%20Ratios%202017%20ST1.pdf>).

Health Education England (2017b) Stepping forward to 2020/21: The mental health workforce plan for England, July 2017. Leeds: HEE (<https://www.hee.nhs.uk/sites/default/files/documents/Stepping%20forward%20to%20202021%20-%20The%20mental%20health%20workforce%20plan%20for%20england.pdf>).

Health Education England (2018a) Post Graduate Medical Education Commissioning 2018 for 2019 Recruitment. Leeds: HEE (<https://www.hee.nhs.uk/sites/default/files/documents/180522MedPlanningGuidance201819V1.1.pdf>).

Health Education England (2018b) Doctors' and Dentists' Review Body, Health Education England's written evidence for 2019/20. Leeds: HEE (<https://www.hee.nhs.uk/sites/default/files/documents/Written%20evidence%20to%20Doctors%20and%20Dentists%20Review%20Body%20-%20201920.pdf>).

Higher Education Careers Service Unit (2018) What do graduates do? Insights and Analysis from the UK's Largest Higher Education Survey. Bristol: HECSU.

Higher Education Statistics Agency (2018) Higher Education Student Statistics: UK, 2016/17 - Qualifications achieved. Statistical First Release SFR247. Cheltenham: HESA.

Hooker, R. S., Cawley, J. F. and Leinweber, W. (2010) Career flexibility of physician assistants and the potential for more primary care. *Health Affairs* 29(5): 880-886 (<https://www.ncbi.nlm.nih.gov/pubmed/20439875/>).

House of Commons (1992) HC Deb, 28 February, columns 533-534. London (<https://api.parliament.uk/historic-hansard/lords/1992/feb/28/medicinal-products-prescription-by>).

House of Commons (2020) 8 January, c1393W. London (<https://qnadailyreport.blob.core.windows.net/qnadailyreportxml/Written-Questions-Answers-Statements-Daily-Report-Commons-2020-01-13.pdf>).

i5 Health (2015) Non-Medical Prescribing: An Economic Evaluation. London (<http://www.i5health.com/NMP/NMPEconomicEvaluation.pdf>).

Janke, K., Lee, K., Propper, C., Shields, K. and Shields, M. (2020) Macroeconomic conditions and health in Britain: aggregation, dynamics and local area heterogeneity. Discussion paper. London: Centre for Economic Policy Research.

Lachish, S., Svirko, E., Goldacre, M. J. and Lambert, T. (2016) Factors associated with less-than-full-time working in medical practice: results of surveys of five cohorts of UK doctors, 10 years after graduation. *Human Resources for Health* (<https://core.ac.uk/download/pdf/81913013.pdf>).

LayFlurrie, K. (2002) The impact of prescribing in wound care on nurses and patients. *Nursing Times*, 1 July (<https://www.nursingtimes.net/clinical-archive/tissue-viability/the-impact-of-prescribing-in-wound-care-on-nurses-and-patients-01-07-2002/>).

Linda, W. and McGrath, R. (2017) The current status of prescribing psychologists: Practice patterns and medical professional evaluations. *Professional Psychology: Research and Practice* 48(1): 38-45 (<https://psycnet.apa.org/record/2017-04419-005>).

Maynard, A. and Walker, A. (1993) *Planning the Medical Workforce, Struggling Out of the Time Warp*. Health Economics Consortium, University of York (<https://www.york.ac.uk/che/pdf/DP105.pdf>).

Medicines and Healthcare Products Regulatory Agency (2018) Explanatory memorandum to the Human Medicines (Amendment) Regulations, no.199 (http://www.legislation.gov.uk/ukxi/2018/199/pdfs/ukxiem_20180199_en.pdf).

NHS Employers (2020) Pay and Condition Circular. Leeds (<https://www.nhsemployers.org/-/media/Employers/Documents/Pay-and-reward/Pay-and-Conditions-Circular-MD-22019.pdf>).

NHS Improvement (2019) Performance of the NHS provider sector for the year ended 31 March 2019. London (https://improvement.nhs.uk/documents/5404/Performance_of_the_NHS_provider_sector_for_the_quarter_4_1819.pdf).

Oliver, D. (2019) Should we use pay incentives for shortage specialties? *British Medical Journal* (<https://www.bmj.com/content/364/bmj.l1398>).

Rolewicz, L. and Palmer, B. (2019) *The NHS workforce in numbers*. London: Nuffield Trust (<https://www.nuffieldtrust.org.uk/resource/the-nhs-workforce-in-numbers>).

Royal College of Pathologists (2015) Breaking new ground in histopathology: report from the pilot of BMS histopathology reporting. Bulletin 169. London (<https://www.rcpath.org/profession/publications/college-bulletin/january-2015/breaking-new-ground-in-histopathology-report-from-the-pilot-of-bms-histopathology-reporting.html>).

Royal College of Psychiatrists (2019) Census, Workforce figures for consultant psychiatrists, specialty doctor psychiatrists and Physician Associates in Mental Health. London (<https://www.rcpsych.ac.uk/docs/default-source/improving-care/workforce/census-2019-finalupdate-finaledit5f904f1dfee0408283dfb2eb333546b9.pdf>).

Scheffler, R. M. and Arnold, D. R. (2018) Projecting shortages and surpluses of doctors and nurses in the OECD: what looms ahead. Cambridge University Press (<https://www.ncbi.nlm.nih.gov/pubmed/29357954>).

Scior, K., Bradley, C. E. and Williams, C. (2014) What predicts performance during clinical psychology training? *British Journal of Clinical Psychology* 53(2): 194-212 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4153958/#__fn_sectitle).

UK Foundation Programme (2017) Career Destinations Report. Birmingham (https://www.foundationprogramme.nhs.uk/wp-content/uploads/sites/2/2019/11/2017-F2-Career-Destinations-Report_0.pdf).

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