The Health Foundation

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Technical annexes A–G: NHS workforce projections 2022

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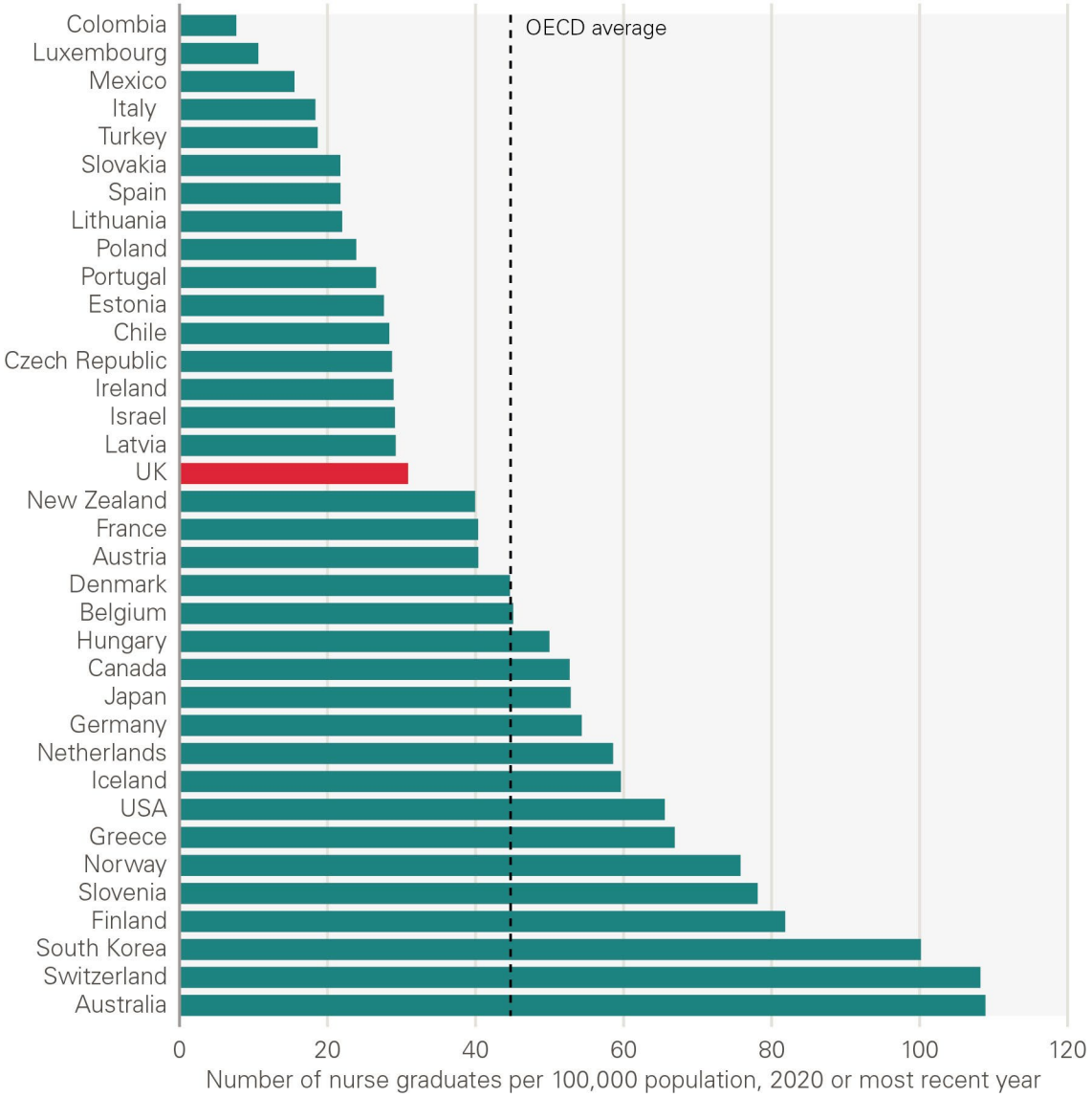
The Health Foundation

Annex A: Insights into how the UK's supply of nurses compares with other OECD countries

Data from the OECD on the number of nurse graduates per 100,000 population suggest that the UK is at the lower end of a range of OECD countries (Figure A1). The UK has around 31 nurse graduates per year per 100,000 population, well below the OECD average of around 45, only half the level of the US and less than a third the level of Australia.

Figure A1: Number of nurse graduates per 100,000 population, OECD countries, 2020 or most recent year



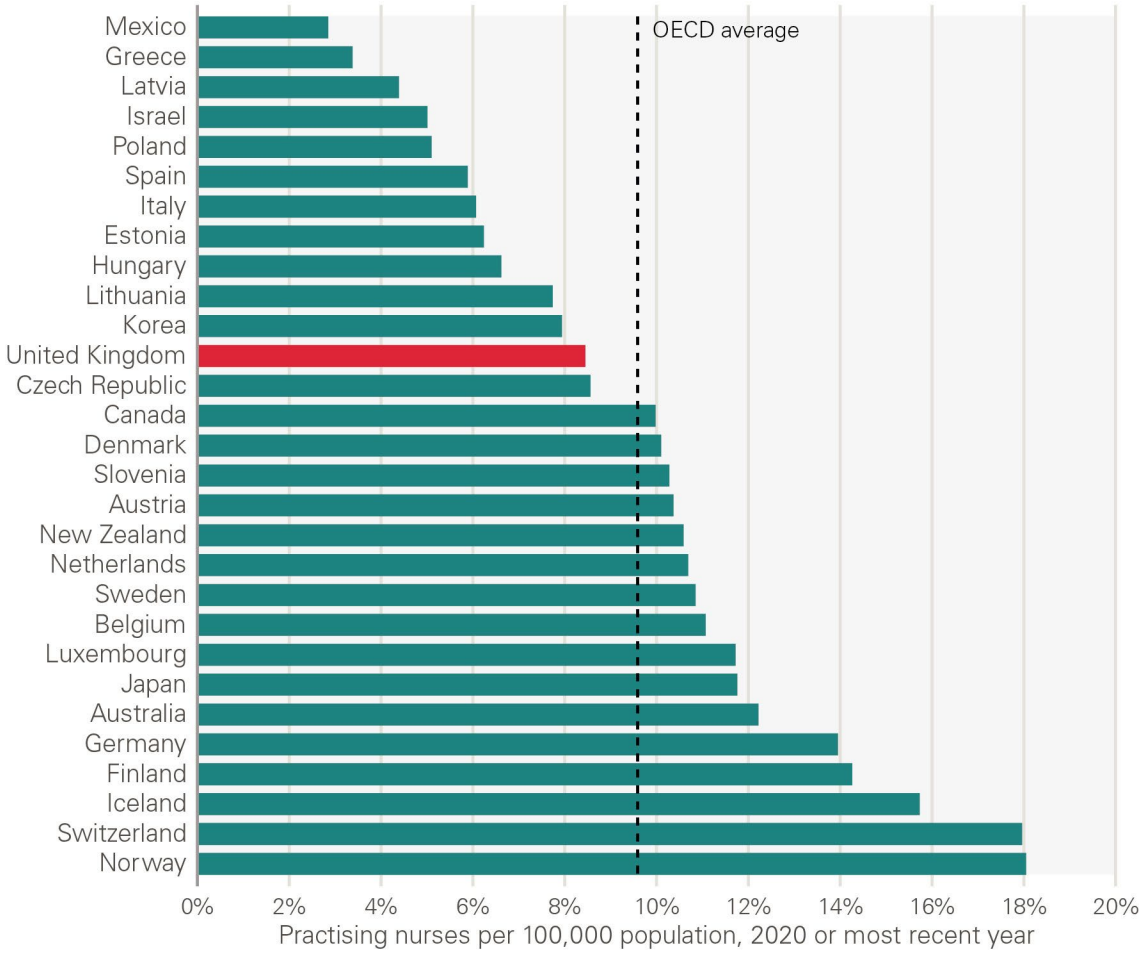
Source: OECD. Nursing graduates (indicator); 2021 (doi: 10.1787/c54611e3-en).

Note: The OECD average is based on 36 OECD member countries for which relevant data were available.

International comparisons based on OECD data suggest that the UK is also below the OECD average when we consider the number of practising nurses per 1,000 population. The UK has approximately eight practising nurses per 1,000 population, well below

commonly cited comparable countries such as Australia and Germany, where the ratio tends to be 12 or more nurses per 1,000 population (Figure A2).

Figure A2: Number of practising nurses per 1,000 population, OECD countries, 2020 or most recent year

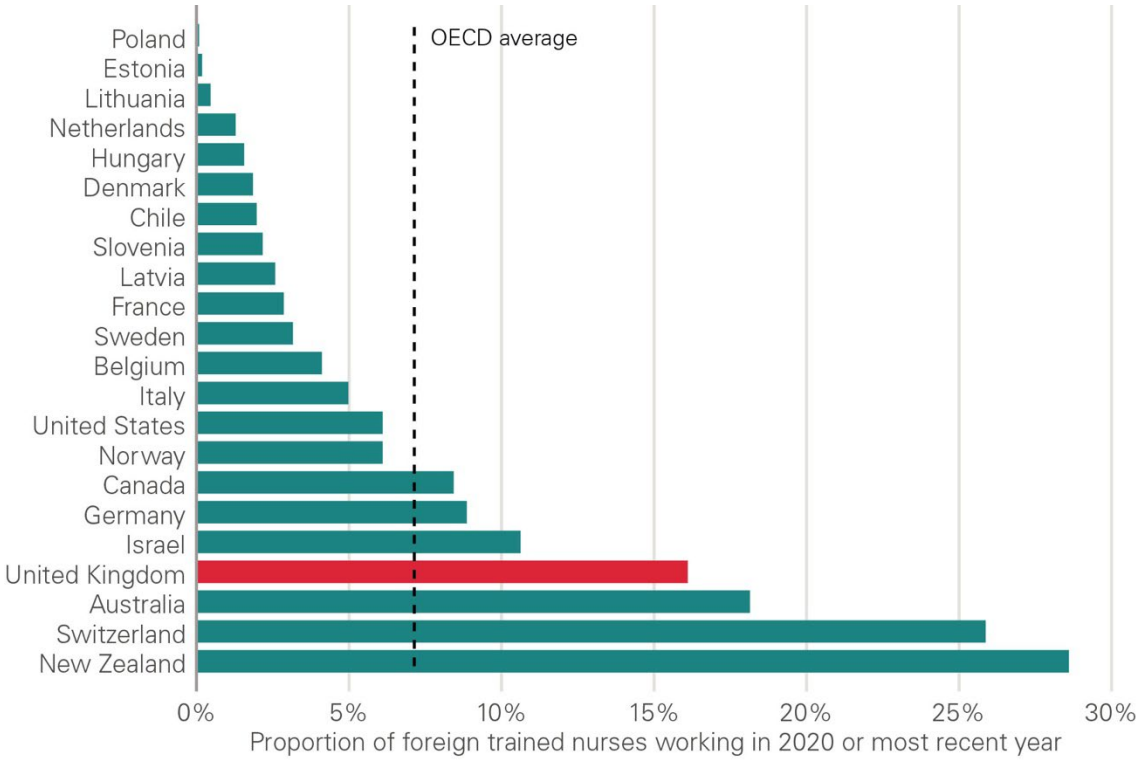


Source: OECD Health Statistics 2021 – Health Care Resources, stats.oecd.org.
Note: The OECD average is based on 29 OECD member countries for which relevant data were available.

Active international recruitment has a long-term history as a periodic policy response in the NHS and other health sector employers, leading to an ebb and flow in the numbers of international nurses coming onto the UK register across the decades. There has been rapid overall growth in international nurse registrants on the UK register since 2017/18, although in the immediate aftermath of the COVID-19 pandemic, in early 2020, most international travel was blocked and there was a temporary drop in international registrants. But the government's 'fast-track' policies to prioritise international nurse recruitment have enabled the international flow of nurses to the UK to bounce back. Most recently, the number of new Nursing & Midwifery Council (NMC) nurse registrants trained outside the UK increased to around 22,700 in 2021/22, accounting for nearly half of all new registrations in 2021/22 – a two-decade high.

Another indicator of the UK's reliance on international recruitment as a nurse supply channel comes from OECD data showing the proportion of nurses trained outside each OECD member country. The proportion of registered nurses in the UK who were trained in other countries is around16%, more than double the OECD average of around 7% (Figure A3).

Figure A3: Proportion of nurses who were trained in other countries, 2020 or more recent year (%, OECD countries)



Source: OECD Health Statistics 2021 – Health Workforce Migration, stats.oecd.org.
Note: The OECD average is based on 22 OECD member countries for which relevant data were available.

Annex B: Illustrative impact of changes in nurse leaver rates on future nurse supply

Improved retention contributes to staff stability and reduces turnover and the need to train or recruit replacements. Data on reasons for leaving, which the NHS collects, can provide insight into workforce departure trends, although almost 10% of workforce leavers do not provide a reason for leaving.

Retirement age can vary for different cohorts due to different pension schemes having been introduced over the past three decades. Still, staff leaving due to their having reached retirement age is recorded as the single most common reason for leaving. On average this accounted for around 1 in 10 leavers per quarter between 2016 and 2020. In the same period, those leaving through voluntary early retirement (before reaching retirement age) accounted for just 1% to 2%.

What is the potential impact of COVID-19 on retirement rates?

In the short run, COVID-19 may have had the effect of improving retention as some health care workers delayed leaving to stay on to help with pandemic demand surges. Between April 2020 and March 2021, the number of nurses, health visitors, midwives and physiotherapists who took early retirement was 14% lower than the number recorded in the previous year. However, subsequent indicators of pandemic fatigue are concerning. Pandemic-related burnout and increased workload are possible motivators of premature workforce departure among fully qualified health care workers, risking workforce stability, quality of care and health system performance.

Among the younger workforce, burnout and pandemic fatigue could impact leaving rates at an aggregate level, through higher rates of early retirement. This could have an adverse effect on nurse supply in the medium term – the proportion of hospital and community health service (HCHS) nurses aged 55–64 years increased from 11% to 16% between March 2010 and March 2021.

Although the number of nurses who leave before reaching retirement age is relatively small in absolute terms, the earlier a younger nurse leaves, the greater the impact on the potential nurse workforce. If the COVID-19 pandemic leads to a significant increase in leaver rates among pre-retirement-age nurse groups, it could lead to sustained longer term pressures for NHS nurse supply.

We attempt to illustrate the impact of an increased pre-retirement leaver rate among nurses younger than 55 years by using the full-time equivalent (FTE) to headcount ratio and the overall nursing stock. The lower the FTE-to-headcount ratio, the lower the number of FTE nurses in the NHS – this can indicate either an increase in the nurse leaver rate or an increase in the proportion of nurses younger than 55 years working part time.

We attempt to illustrate the impact of an increased retirement leaver rate among nurses younger and older than 55 years on the overall nursing stock. To do so we model two alternative leaving rate scenarios:

1. **Temporary impact**. All nurses who may have otherwise left the workforce in 2020/21 but did not do so due to surges in pandemic demand are assumed to leave in 2021/22. Between 2021 and 2022, the leaver rate is assumed to be 2 percentage points higher than the previous year, to account for those who delayed their leaving,

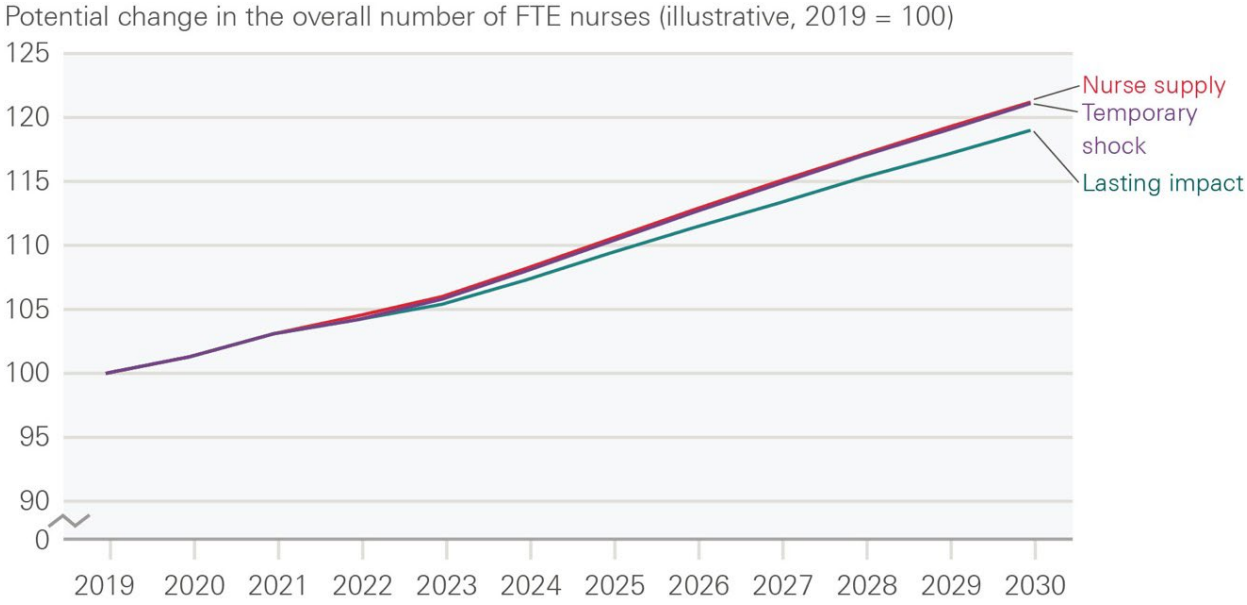
in both age groups. This increase in leaver numbers is the result of delayed departure and is limited to 2022 only, with a return to historic leaver rates in subsequent years.

2. **Lasting impact**. In this case, we assume that the nurse leaver rate for both age groups increases by 2 percentage points in 2021/22 and remains unchanged thereafter. This captures the possibility of a sustained increase in nurse leaver rates from 2021/22 to 2024/25, rooted in the combined impact of pre-pandemic workload pressures, the additional pressures of the pandemic and potentially factors related to the wider economy (for example, the substantial increase in living expenses in 2022).

Figure B1 and Figure B2 show us how our two scenarios lead to different results for the overall stock of nurses, in both age groups. When modelled as a temporary shock, nurses delay their departure from the workforce initially until the next year to cope with demand. This causes a slight fall in the size of the workforce in 2022 but keeps the workforce just under the pre-COVID-19 trend growth line for the rest of the decade to 2030. On the other hand, if the COVID-19 pandemic has a lasting impact on nurses in both age groups, there is a sustained increase in the leaver rate. Among nurses aged 55 years and older, the lasting impact of the pandemic reduces the size of the nurse workforce by 2% by the end of the decade (Figure B1).

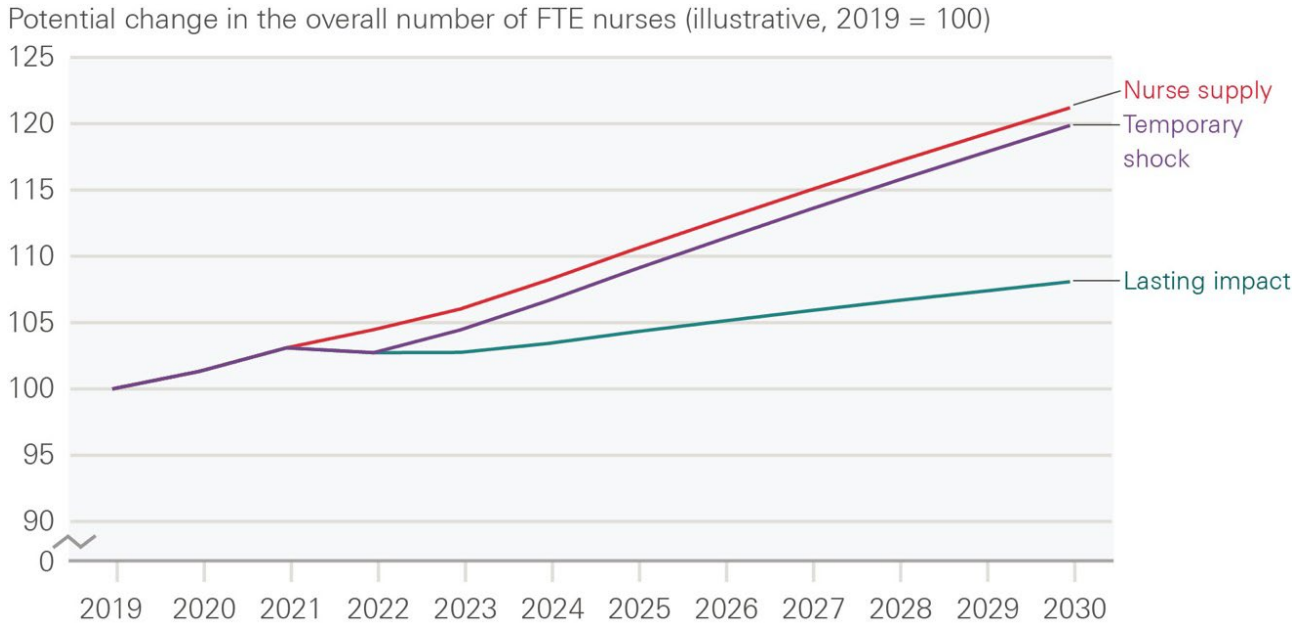
The lasting impact among nurses younger than 55 years leaving the workforce is far higher and acts as a major drag on the stock of nurses (Figure B2). A permanent reduction in the FTE nurse supply results in a level that is 10% to 15% less than what it might otherwise have been in 2030. Given that 77% of nurses and health visitors are in this age bracket, this points to greater workforce pressures, and underlines the need for policy to focus at least as much on nurse retention as on recruiting 'new' nurses to enable sustainable growth in nurse supply.

Figure B1: Illustrative impact of the COVID-19 pandemic on the leaver rate among NHS nurses aged 55 years and older and the overall size of the NHS nurse workforce



Source: REAL Centre nurse supply model (illustrative figures only, based on a range of data sources).

Figure B2: Illustrative impact of the COVID-19 pandemic on the leaver rate among NHS nurses younger than 55 years and the overall size of the NHS nurse workforce



Source: REAL Centre nurse supply model (illustrative figures only, based on a range of data sources).

Annex C: A detailed description of the three nurse supply projection scenarios

This annex provides further detail on the assumptions and reasoning underlying our three nurse supply projection scenarios.

The current policy scenario

The current policy scenario is close to a conventional 'baseline' scenario and assumes that where historic trends have been largely stable in the period running up to 2019/20, this continues to remain stable in the decade to 2030/31. The exception is our assumption on international nurse recruitment, where there have been substantial increases in recent years that are expected to continue in the short term. The government's target of recruiting 50,000 additional FTE NHS nurses by 2023/24 relative to 2018/19 underpins the current policy scenario (see section 6.1.1 of the report for a full discussion of this target). It also accounts for recent shifts in some of the key drivers of nurse supply:

- Following the discussion of the recent increases in undergraduate nursing degree applications and acceptance numbers in section 2.3.2 in the report, it appears reasonable to assume that, notwithstanding the record increase in acceptance numbers in 2020/21 relative to 2019/20, nursing degree acceptances will be relatively stable in the coming years in the current policy scenario. Data from the Universities and Colleges Admissions Service (UCAS) for the 2021/22 cycle support this reasoning, showing a much smaller increase in acceptances (1%) in 2021/22 relative to 2020/21.

- Following the discussion in section 2.3.2, it is unclear whether and how the student nurse attrition rate, relatively stable at an all-England level in the 2017–20 period based on Nursing Standard Freedom of Information data, will have changed due to the COVID-19 pandemic. So, we assume this to be unchanged in this scenario.

- The number of new international nurse and midwife joiners to the NMC's permanent register across the UK has increased steadily since 2014/15. In spite of a sharp decline in April 2020 due to the pandemic, the number recovered to a 30-year high of 22,745 in the year to March 2022. We assume that this strongly increasing trend persists in the short term up to 2024/25 in the current policy scenario, followed by a plateauing in subsequent years. The plateauing reflects uncertainty around whether the existing policy focus on increasing international nurse recruitment will continue beyond the current parliament, particularly if the government's target to recruit an additional 50,000 nurses by 2023/24 is achieved.

- The national leaver rate for nurses and health visitors in the NHS HCHS who are younger than 55 years (as a proportion of the overall nurse headcount), either to move to a job outside HCHS nursing or to leave the labour force entirely, fell from

8.2% in 2019/20 to 7.1% in 2020/21.[1] The corresponding rate for nurses and health visitors aged 55 and older (excluding those who retired) was around 2% in this period. As there is considerable ongoing uncertainty around the possible impacts of the COVID-19 pandemic on nurse leaver rates,[2] we assume that they remain unchanged in this scenario.

- NHS Digital data show that the FTE-to-headcount ratio for HCHS nurses barely changed between December 2016 and December 2021 and was consistently at around 0.90. In the current policy scenario, we assume that this continues to hold.

The optimistic scenario

The optimistic scenario represents a world in which concerted policy action is undertaken beyond the current time-limited focus on the government's target to recruit an extra 50,000 nurses by 2023/24, to achieve sustained increases in nurse supply in England throughout the decade to 2030/31. The following have shaped our assumptions:

- Alongside the significant increase in nursing student acceptance numbers in 2020/21 (see section 2.3.2), the government introduced cost-of-living grants for student nurses from September 2020. This may contribute both to further increases in applications to nursing degrees in the future and reduced student attrition rates. We assume here that policies do more to support investment in increased university capacity for student nurses, and increases in clinical placement numbers, sustaining increases in acceptances and a reduction in student attrition rates by 2023/24. Our modelling assumes an initial increase in the student attrition rate of around 5 percentage points in 2021/22, to account for the results of the analysis of Nursing Standard Freedom of Information data discussed in section 2.3.2, followed by a decline of 10 percentage points in 2023/24 to reflect the effect of the cost-of-living grants introduced in 2020 and wider support to enable more student nurses to complete their training programmes.

- International recruitment has long been a 'get out of jail, free' card for NHS nursing. To boost nurse numbers in the short term, policy action directed at increases in international recruitment beyond the current policy scenario is assumed to be feasible, but with any planned tapering off beyond 2024/25 still resulting in small increases in the number of nurses hired from outside the UK up to 2030/31.

- As noted in Table 7 in the report, the pre-retirement-age NHS nurse leaver rate fell from 8.2% in 2018/19 to 7.1% in 2019/20. A sustained policy focus on improved nurse retention, combined with support for more flexible working and better work–life balance and a responsive and fully funded system of nurse pay determination, could

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[1] These rates are for the 12 months to October in each year (for example, the 12 months to October 2019 for 2019/20). See NHS Digital. Nurse & health visitors turnover data pack, October 17 to 20 AH4395. NHS Digital; 2 February 2021 (https://digital.nhs.uk/supplementary-information/2021/nurse--health-visitors-turnover-data-pack-oct17-to-oct20_ah4395).
[2] Department of Health and Social Care. 50,000 Nurses Programme: delivery update. Department of Health and Social Care; 7 March 2022 (www.gov.uk/government/publications/50000-nurses-programme-delivery-update/50000-nurses-programme-delivery-update).

achieve further reductions in this leaver rate in the coming years. Policy action along these lines is assumed to also achieve a modest reduction in the retirement-age nurse leaver rate.

- NHS Digital data show that the FTE-to-headcount ratio for HCHS nurses barely changed between December 2016 and December 2021 and was consistently at around 0.90. Again, we assume that this continues to hold in this optimistic scenario.

The pessimistic scenario

In the pessimistic scenario, we consider a world in which existing policies aiming to increase nurse supply do not bear fruit due to a combination of poor implementation, inadequate funding and a shift in policy focus in the aftermath of the COVID-19 pandemic leading to pre-existing pressures growing substantially. The following points inform our assumptions for this scenario:

- Key stakeholders have highlighted potential challenges to achieving any further increases in student acceptance numbers, including constraints in terms of university training provision and, up to January 2021, uncertainty surrounding the Health Education England budget (and therefore clinical placement funding) for 2022/23 and future years. So, in this scenario we assume a reduction in student nurse acceptance numbers.

- The data highlighted in section 2.3.2 show evidence of a significant increase in the nursing student attrition rate in 2021/22. While it is unclear if this is a 'one-off', driven by the pandemic having led to a number of student nurses taking up front-line care work (and potentially returning to complete their training in the next 2 years), it is possible that a lasting increase in the attrition rate leads to a major reduction in the stock of 'new' nurses through the rest of this decade (as illustrated in section 2.3.4 of the report). We therefore assume that an initial increase of 5 percentage points in the attrition rate in 2021/22 is mitigated only partly by a 2 percentage-point decline in 2023/24, leaving the attrition rate 3 percentage points above its level in the 2017–19 period.

- In the long term, potential constraints on international recruitment could lead to reductions in the number of nurses from outside the UK newly joining the NMC register. This could occur due to, for example, an increased focus on ethical recruitment, making further increases in international recruitment less feasible, or increased post-pandemic demand for nursing staff in key source countries such as India and the Philippines leading to better pay and conditions for nurses and improved nurse retention in those countries. So, after short-term increases, we assume a reduction in the number of international joiners.

- Stakeholder input and the discussion in section 2.3.3 both suggest that the pandemic has exacerbated NHS staff workload and burnout pressures, with growing concern around the likelihood of an increase in leaver rates in the coming years, driven by several issues (for example, nurses who 'hung on' to help during the pandemic leaving the workforce, better wider labour market conditions, increased burnout leading to more younger staff leaving and upcoming changes to nurses' pension rules).

The evidence so far provides early signs of increases in nurse leaver rates in the coming months being a cause for concern. As discussed in section 2.3.3 of the report, the latest NMC data point to the number of registered leavers having increased in 2021/22 – the first increase in recent years – and more than two-thirds of nurses surveyed by the Royal College of Nursing in 2021 reported feelings of fatigue, exhaustion and excessive pressure at work due to the pandemic, with nearly three in five stating that they were considering leaving their current jobs as they felt undervalued and under pressure. Data published more recently by Health Education England point to leaver rates in mental health nursing having increased from 5.6% to 6.9% between March and December 2021, relative to 6.4% in January 2020. So, we assume increases in the leaver rate for nurses of all ages in this scenario.

- Given these concerns, we also assume that in the pessimistic scenario, it is likely that a higher proportion of nurses will choose to work part time in the coming years. We model this by assuming that the nurse FTE-to-headcount ratio declines by 1 percentage point (0.01) in every year from 2021/22 to 2030/31. While our modelling is at the national level, it is vital to acknowledge that there is likely to be substantial variation around this average across regions and specialties.[3]

These points of distinction between the three scenarios lead to differences in the assumptions that we use for modelling future workforce supply in each scenario, summarised in Table 7 in the report.

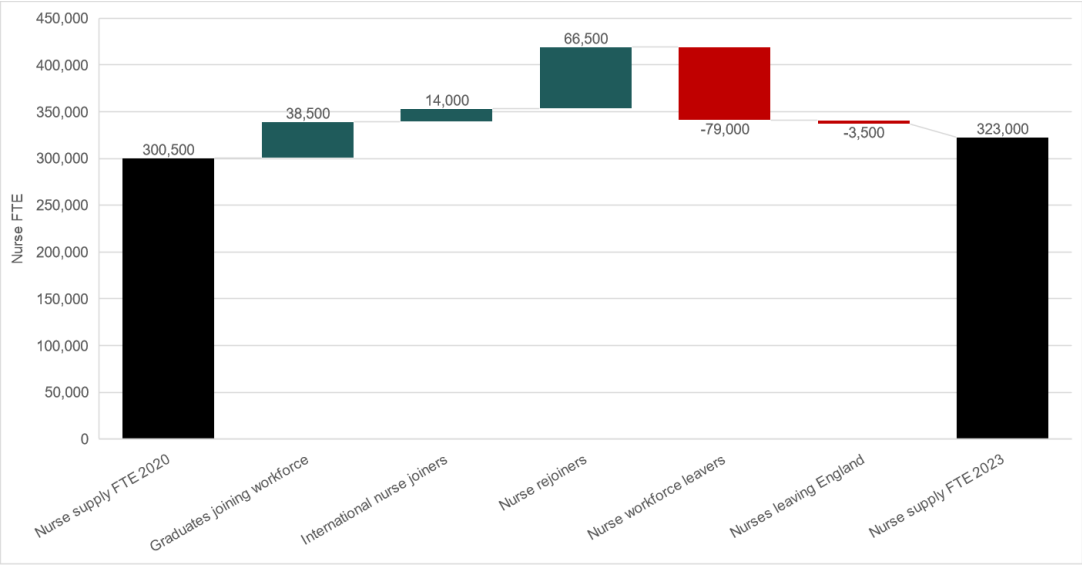
[3] For instance, research undertaken by the Institute for Fiscal Studies has documented that female nurses tend to work part time after maternity leave and that their working hours after maternity leave vary across NHS trusts. See Kelly E and Stockton I. *Maternity and the labour supply of NHS doctors and nurses*. Briefing Note BN340. Institute for Fiscal Studies; 2022 (https://ifs.org.uk/uploads/BN340-Maternity-and-the-labour-supply-of-NHS-doctors-and-nurses.pdf).

Annex D: Additional FTE nurse supply and demand projections for the NHS HCHS in England

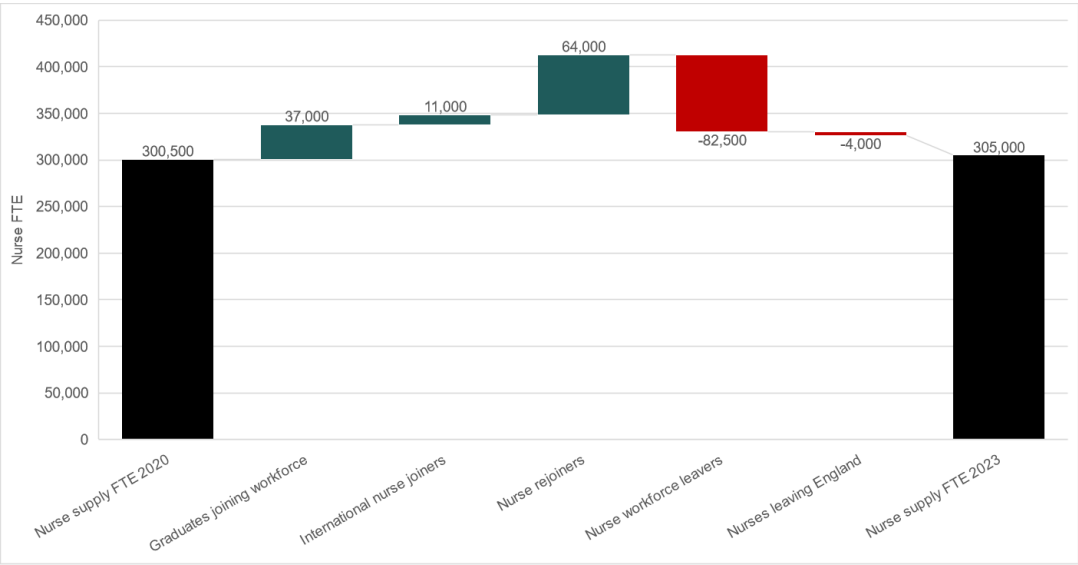
Figure D1 and Figure D2 present waterfall charts for the optimistic and pessimistic scenarios that break down the overall nurse supply projections in those scenarios for 2020/21–2023/24 and 2020/21–2030/31 across the key supply channels (newly qualified nurses joining the workforce, international recruitment and nurse retention and turnover), over the relevant time period.

Figure D1: FTE nurse supply projections (numbers) in the NHS HCHS in England in the optimistic and pessimistic scenarios, from 2020/21 to 2023/24, waterfall charts

Optimistic scenario



Pessimistic scenario

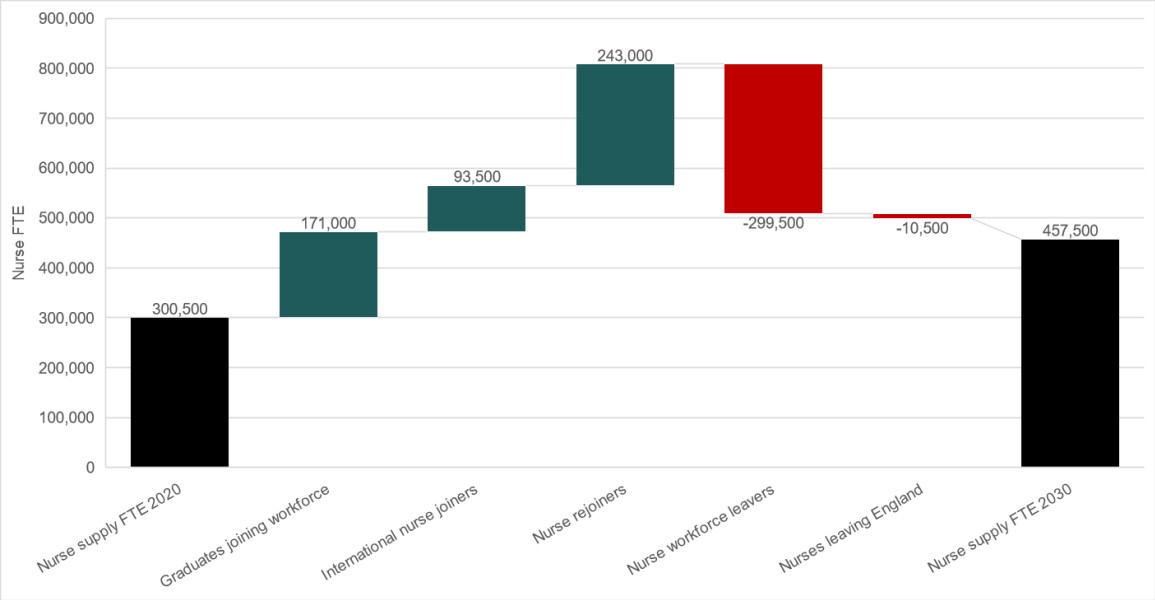


Source: REAL Centre analysis using the nurse supply model, based on a range of data sources.

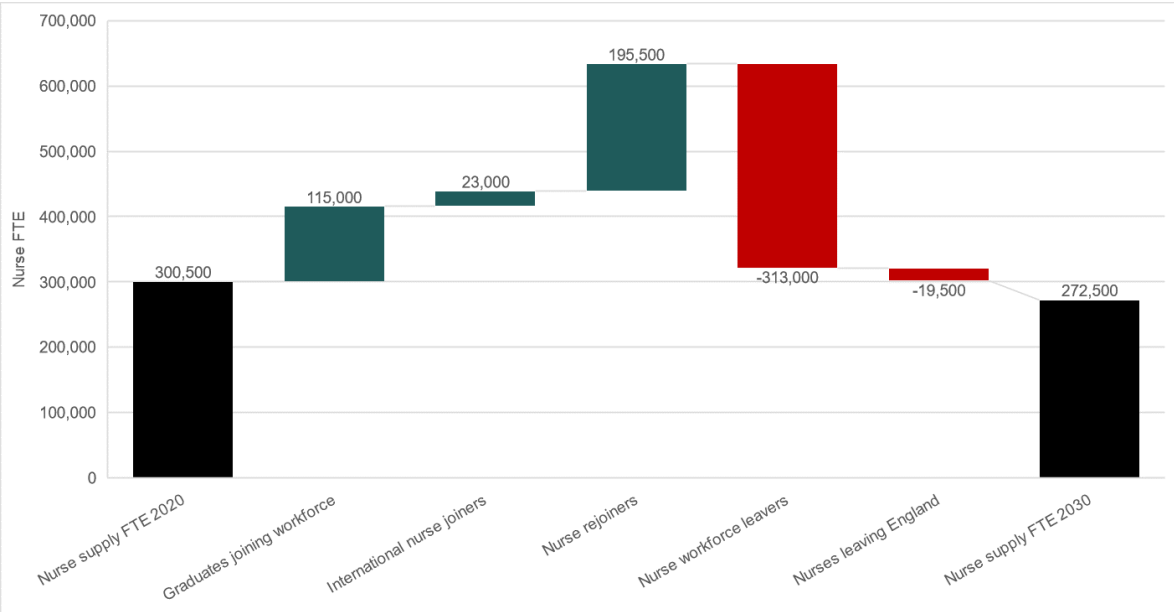
Note: These charts are derived from headcount data for registered nurses. As the optimistic scenario assumes that the nurse FTE-to-headcount ratio remains unchanged over time, we use the nurse FTE-to-headcount ratio observed in 2020/21 data to convert headcount numbers to FTE estimates in this scenario. As the pessimistic scenario assumes a change in the nurse FTE-to-headcount ratio over time, we account for the changing FTE-to-headcount ratio in our nurse supply projections for those segments of the workforce that do not 'leave' the nurse labour market (newly qualified graduates joining the workforce, international recruits and nurse rejoiners) in this scenario.

Figure D2: FTE nurse supply projections (numbers) in the NHS HCHS in England in the optimistic and pessimistic scenarios, from 2020/21 to 2030/31, waterfall charts

Optimistic scenario



Pessimistic scenario



Source: REAL Centre analysis using the nurse supply model, based on a range of data sources.

Note: These charts are derived from headcount data for registered nurses. As the optimistic scenario assumes that the nurse FTE-to-headcount ratio remains unchanged over time, we use the nurse FTE-to-headcount ratio observed in 2020/21 data to convert headcount numbers to FTE estimates in this scenario. As the pessimistic scenario assumes a change in the nurse FTE-to-headcount ratio over time, we account for the changing FTE-to-headcount ratio in our nurse supply projections for those segments of the workforce that do not 'leave' the nurse labour market (newly qualified graduates joining the workforce, international recruits and nurse rejoiners) in this scenario.

Table D1 presents FTE nurse supply and demand growth projections for the NHS HCHS, general practice, adult social care and the independent/other sector to 2030/31.

Table D1: FTE nurse supply and demand growth projections: projected percentage growth in FTE demand* and supply by sector, 2023/24 and 2030/31 relative to 2020/21

	FTE demand: growth to 2023/24	FTE demand: growth to 2030/31	FTE supply: growth to 2023/24	FTE supply: growth to 2030/31
NHS HCHS				
Current policy scenario	9%	22%	6%	27%
Optimistic scenario	9%	22%	7%	52%
Pessimistic scenario	9%	22%	2%	-9%
General practice				
Current policy scenario	12%	26%	-1%	-7%
Optimistic scenario	12%	26%	-1%	2%
Pessimistic scenario	12%	26%	-6%	-28%
Adult social care				
Current policy scenario	13%	43%	-2%	-7%
Optimistic scenario	13%	43%	-2%	-0.5%
Pessimistic scenario	13%	43%	-6%	-26%
Independent/other sector				
Current policy scenario	9%	24%	3%	5%

Optimistic scenario	9%	24%	4%	14%
Pessimistic scenario	9%	24%	-1%	-16%

Source: REAL Centre analysis using the nurse supply model, based on a range of data sources.

Note: *Our FTE nurse demand projections are based on the method discussed in section 3.2, which allows for sector-specific projections.

Sensitivity analysis

We explored the sensitivity of our main projections to changes in specific assumptions. In particular, we were interested in the extent to which the projections in the optimistic and pessimistic scenarios varied if specific assumptions regarding future numbers in undergraduate education, student nurse attrition, international nurse recruitment and pre-retirement-age and retirement-age nurse leaver rates were dropped.

We considered six alternatives for this analysis. Table D2 summarises how they differ from the optimistic and pessimistic scenarios outlined in Table 7 in the report.

Table D2: Scenarios for sensitivity analysis of nurse supply projections (blue shading = optimistic, red shading = pessimistic, Y = Yes, N = No)

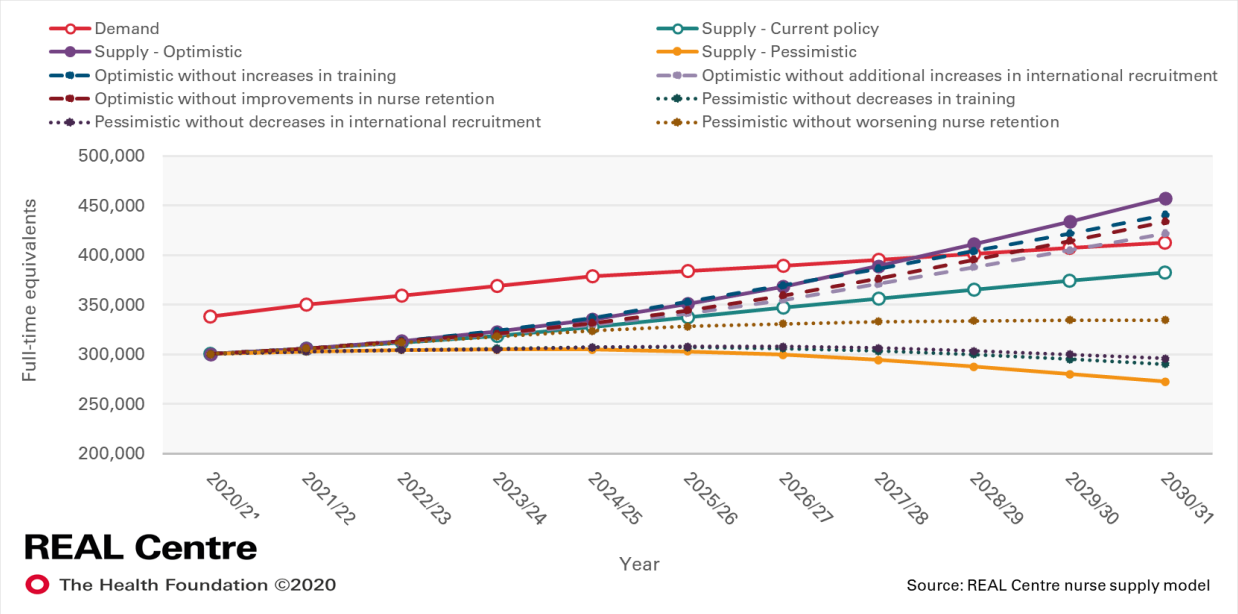
Scenario	**Assumptions regarding:**				
	Students starting undergraduate nursing degrees	**Nursing student attrition rate**	**International nurse recruitment**	**Pre-retirement-age nurse leaver rate**	**Retirement-age nurse leaver rate**
Optimistic scenario without increases in student numbers	N	N	Y	Y	Y
Optimistic scenario without additional increases in international recruitment	Y	Y	N	Y	Y
Optimistic scenario without improvements in nurse retention	Y	Y	Y	N	N
Pessimistic scenario without reduced student numbers	N	N	Y	Y	Y
Pessimistic scenario without reduced international recruitment	Y	Y	N	Y	Y
Pessimistic scenario without worsening nurse retention	Y	Y	Y	N	N

Source: REAL Centre analysis.

Figure D3 presents the results of this sensitivity analysis. Some drivers of nurse supply have particularly striking effects on overall future nurse numbers, if other variables are assumed to remain unchanged up to 2023/24. These include significant increases in the nurse FTE-to-headcount ratio (where nurses reduce the average number of hours they work), reductions in international recruitment and increases in the pre-retirement-age nurse leaver rate.

As discussed in the main report, the three major routes to increasing nurse numbers are: increases in the number of nurses in training, increased international nurse recruitment and improved retention of existing nursing staff. If policy action were restricted to two of the major supply channels rather than three, our projections indicate that a combination of sustained increases in international recruitment and improved nurse retention is a 'second best' version of the optimistic scenario for nurse supply by 2030/31. In the longer term, if the UK's heavy reliance on increased international recruitment is to be reduced, this points to a need for a greater policy focus on the number of nurses in training and the retention of existing nurses.

Figure D3: Sensitivity analysis: FTE nurse supply projections (numbers) for the NHS HCHS in England, from 2020/21 to 2030/31



Source: REAL Centre nurse supply model, based on a range of data sources.

Note: The REAL Centre nurse supply model uses data from a range of sources. At the time of writing, the model has updated data up to 2020/21. Numbers are rounded and estimates for 2021/22 onwards are projections. For further detail, see Cave S, Woodham E, Derbyshire K, Lewis S, Wildblood R, Shembavnekar N. *Nurse supply model: overview*. The Health Foundation; 2021 (www.health.org.uk/publications/nurse-supply-model-overview).

Sectoral and regional variation in projections of nurse supply

The REAL Centre nurse supply model allows us to explore how our overall nurse supply projections vary by sector and NHS region. This section presents those findings. First, we consider sectoral variation, looking in more detail at general practice nursing and adult social care.

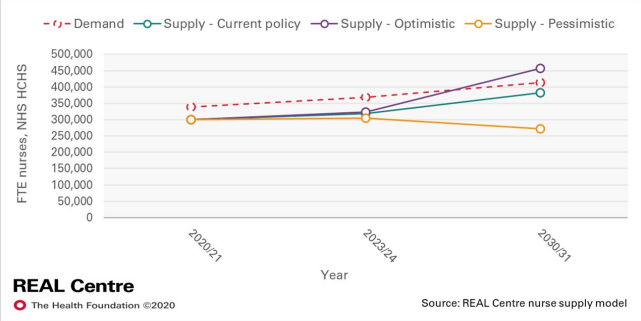
As discussed in section 6.2.2 of the report, there are concerns about the relative lack of policy focus on increasing the number of nurses working in general practice in England. The

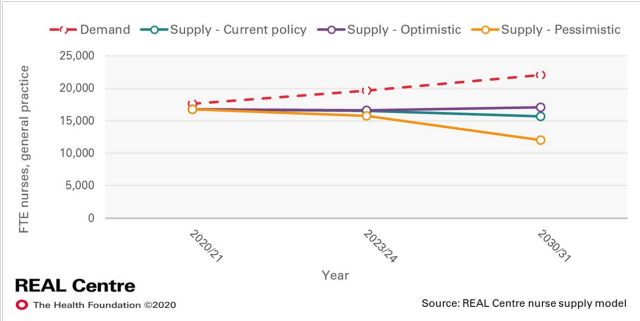
number of FTE nurses in general practice registered a modest increase between September 2015 and March 2020 but since then has shown a slow decline.

Given this context, it is perhaps unsurprising that our projections of FTE nurse supply up to 2030/31 vary substantially across sectors. Figure D4 highlights that in 2020/21 there were supply–demand shortages in FTE nurse numbers across all sectors. Building on the assumptions in Table 7 in the report, our projections suggest that these shortages can largely be addressed by 2030/31 in the current policy scenario in the NHS HCHS sector, with the optimistic scenario for this sector seeing potential oversupply by 2030/31. However, across all the other sectors, in no scenario is the supply–demand gap bridged or even prominently reduced by the end of the decade. If anything, particularly in general practice and adult social care, across all our scenarios, existing supply–demand nursing shortages are projected to worsen over time, with the scenarios merely offering alternatives regarding the extent to which these shortages can be contained.

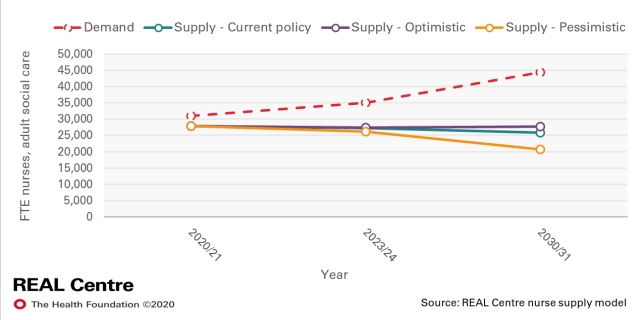
Figure D4: FTE nurse supply and demand projections (numbers) by sector, from 2020/21 to 2030/31

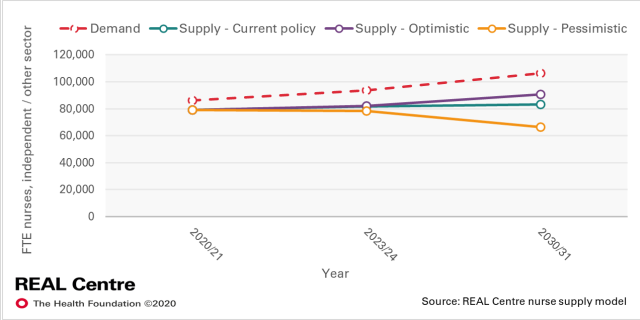
NHS HCHS general practice





Adult social care, independent and other





Source: REAL Centre nurse supply model, based on a range of data sources.

Further, our projections in each scenario vary across the NHS regions. Even in the optimistic scenario, where FTE nurse supply is projected to increase at the national level, there will be differences in the extent to which the nursing shortfall is addressed in across regions and local areas. An in-depth analysis of this variation is outside the scope of this annex. Our nurse supply model does not currently have sufficiently granular data to allow for projections at a sub-regional level, nor do we have regional demand projections. But such analysis is likely to grow increasingly relevant from a workforce planning perspective.

Annex E: A description of the three general practice workforce supply scenarios

This annex provides further detail on the assumptions and reasoning underlying our three general practice workforce supply scenarios.

The current policy scenario

The current policy scenario represents a world in which existing policy actions in the form of sustained efforts to increase GP trainee numbers and the ongoing expansion of primary care networks, supported by Additional Roles Reimbursement Scheme (ARRS) funding, are 'baked in' up to 2023/24, but no further measures are undertaken to boost general practice workforce numbers up to 2030/31. This scenario notes that:

- There are important gaps in the data on the number of GPs in specialty general practice training who successfully complete their training and transition to the workforce. We use publicly available data from NHS Digital and Health Education England and input from a number of stakeholders to estimate the number of newly trained, fully qualified FTE GPs joining the workforce every year from 2021/22 to 2030/31 (see Annex F for further detail).[4]

- Available data suggest that around 260 non-newly qualified FTE GPs joined the NHS in 2018/19. For 2019/20 and future years, we use this number as a base and model its future path using available data on GP leaver rates and our projections of future GP supply in this scenario.

- NHS Digital data published in December 2021 suggest that the annual averages for GP leaver rates in the period from 2018/19 to 2021/22 amount to approximately 5% for pre-retirement-age GPs (younger than 55 years, as a proportion of overall FTEs) and 3% for retirement-age GPs (aged 55 and older, as a proportion of overall FTEs). These are used as a base for this scenario.

- Given the ARRS funding commitment, there is potential for Direct Patient Care (DPC) staff numbers to sustain their recent rapid expansion, which could lead to the government's target of hiring 26,000 additional FTE professionals in general practice by 2023/24 (relative to 2018/19) being met. In March 2019, there were just over 2,000 FTE professionals employed in these roles, so an additional 26,000 FTEs amounts to a target of around 28,000 FTEs by 2023/24.

[4] Engagement with key stakeholders informed our assumptions regarding the proportions of GPs who complete specialty training and join the workforce. Data on these proportions and how they have changed over time do not appear to be publicly available. Likewise, there is uncertainty around the proportion of those who complete the 2-year foundation training programme and opt to train as a GP. There appear to be gaps in the data on these numbers and how they link to publicly available data on GP specialty trainee numbers (see Annex F).

The optimistic scenario

The optimistic scenario represents a world in which concerted policy action is undertaken beyond 2023/24 to match or extend the commitments in the *NHS Long Term Plan*,[5] improve staff retention in general practice and provide additional support to general practice teams to foster the effective integration of newer staff roles and potentially to meet the increases in demand driven by the COVID-19 pandemic. In particular:

- We assume that the record recent increases in the number of GPs in training boost the number of newly qualified FTE GPs joining the workforce by the end of this decade, through some combination of reduced GP trainee attrition, increases in workforce transition and better labour market participation (through increases in the FTE-to-headcount ratio for newly qualified GP joiners).

- There is significant potential for additional policy action beyond 2023/24 to sustain the recent shift towards increasingly multidisciplinary teams in general practice. This implicitly assumes continued funding and support for primary care networks beyond 2023/24, either through an ARRS 'successor' policy or through some form of cost and value sharing across primary and community care providers. If this occurs, coming on the back of the rapid recruitment of DPC staff through primary care networks and the ongoing round of ARRS funding, we assume that it leads to further substantial DPC staff expansion in the second half of this decade. Importantly, that would require sufficient funding not only to cover salaries and on-costs for new recruits but also support for longer term integration and team working.

- There are several ambitions behind employing new DPC staff in primary care networks under the ARRS.[6] This includes enhancing the range and quality of services offered in general practice, performing new work that general practice has not previously undertaken at scale. Alongside this, there is also an anticipated benefit to core general practice from overall capacity building, with the roles freeing GP time either directly or indirectly. This may be through DPC staff taking on appropriate patient care for their skillsets so that GPs are more free to undertake other work at the 'top of their licence', or by taking on work that is better dealt with by other staff, such as social prescribing link workers helping patients with social needs. We do not aim to model in detail the demand for these new services or the impact of DPC staff in freeing up GP time. Instead, we offer plausible effects on staff retention, unmet need and demand reduction in this optimistic scenario to illustrate how the expanding multidisciplinary team may affect demand for GP time and hence GP FTE demand overall.

- In a world where DPC staff are successfully integrated in general practice teams, we anticipate they could alleviate some of the existing workload pressures on GPs and general practice nurses, leading to substantial efficiency gains and a less pressured workforce. In the longer term, we assume that this leads to improved general practice

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[5] NHS. *The NHS Long Term Plan*. NHS; 2019 (www.longtermplan.nhs.uk).
[6] NHS England and BMA. *Investment and evolution: a five-year framework for GP contract reform to implement The NHS Long Term Plan*. NHS England; 2019 (www.england.nhs.uk/publication/gp-contract-five-year-framework).

staff retention and lower leaver rates for GPs, nurses and DPC staff, better quality of care in general practice and ultimately lower NHS waiting lists.

- In our modelling, this results in GP demand in 2030/31 attaining a level that is 9% below the level that it reaches in the current policy scenario.

- In the initial years of general practice team expansion, the increased administrative and managerial responsibility that GPs face could lead to GP demand in 2023/24 being 5% higher than the level that it reaches in the current policy scenario. This reflects the need for training, supervising and integrating the new roles in general practice teams.

- In the second wave of workforce expansion between 2023/24 and 2030/31, the efficiency gains promised by a more multidisciplinary team approach can be realised if newer roles are effectively integrated. With more 'mature' roles promoted by the ARRS up to 2023/24 being well embedded in general practice teams by this phase, there is real potential for workload pressures that GPs and practice nurses face to decline, culminating in GP demand in 2030/31 being below the level that it reaches in the current policy scenario. This could be realised through a mix of:

    - relatively mature ARRS roles (for example, first-contact physiotherapists and clinical pharmacists) realising their potential in general practice through efficiency gains and alleviated workload pressures for GPs and practice nurses

    - continuing increases in recruitment to these roles alongside the growth of other roles that currently account for smaller proportions of the total of ARRS-funded roles (for example, mental health staff in general practice) and potentially newer roles that are not currently covered by ARRS funding

    - regulatory changes that lead to increasing 'skill mix' related gains (for example, the potential for physician associates to gain independent prescribing rights in the coming few years under plans for their regulation by the General Medical Council).

- This broadening of the general practice workforce over time could help to meet some of the currently unmet demand for primary care. While this would be welcome, it may lead to the amount of GP time that the newer roles help to save being a little less than expected due to the demand for care from the newly recruited staff increasing (as the public gradually becomes accustomed to a broader primary care offer from general practice). As in previous research, we therefore assume that the evolving skill mix ultimately leads to GP demand in 2030/31 being 9% below the level that it reaches in the current policy scenario rather than 10%. In other words, the GP time 'freed up' by skill-mix expansion is sufficient for projected FTE GP supply to largely close the gap with projected FTE GP demand.

- In this scenario, it is also possible that growth in the general practice nurse workforce is able to alleviate some of the existing workload pressures on GPs. As we have highlighted in previous research, the literature suggests that nurses can carry out a significant proportion of primary care activity and nurse-led care delivers equivalent or better results across a large range of outcome measures. However, given the

constraints on nurse supply highlighted in section 2.3.2 of the report and the ageing profile of the general practice nurse workforce (discussed in section 2.4.1), our modelling of the changing skill mix in general practice in this scenario includes no assumptions of future changes in the demand for GP time driven by nurse-led care.

The pessimistic scenario

In the pessimistic scenario, we envisage a world in which the existing primary care networks and ARRS policy and funding commitments to general practice not only fail to be extended beyond the current parliament but also fail to be fully effective even up to 2023/24. This reflects the risks arising from the COVID-19 pandemic adding to longstanding systemic pressures alongside any assumptions built into ongoing policy delivery failing to deliver positive outcomes:

- The number of newly qualified GPs joining the workforce may not meet the 'current policy' targets up to 2030/31. This could result from one or more of the following:
    - the lack of a policy commitment to sustained increases in funding for GP specialty training
    - increases in the GP trainee attrition rate
    - a decline in the GP workforce joiner rate following completion of training
    - a reduced FTE-to-headcount ratio for new GP joiners.
- Even before the COVID-19 pandemic, there was concern about increasing work stress levels among GPs and some survey evidence pointing to a substantial proportion of GPs (37% of those surveyed) considering leaving their jobs within 5 years. Growing workload pressures and dissatisfaction with pay were likely contributing factors to the high proportion of GPs surveyed in 2019 by The Commonwealth Fund who were planning to quit or reduce their hours.

  The pandemic appears to have exacerbated these pressures and stakeholder input and emerging data point to the possibility of increases in GP leaver rates in the next few years. In May 2021, in a British Medical Association survey of doctors, 21% of over 2,000 respondents reported they were considering leaving the NHS, with a further 26% saying they were 'more likely' to take a career break. Further, a General Medical Council survey exploring the motivations of more than 13,000 doctors who had previously practised in the UK but were no longer doing so found that they reported higher levels of burnout and were markedly less likely to return to practising in the UK relative to other doctors. More recently, in the 2021 Eleventh National GP Worklife Survey, more than a third (33.4%) of respondents reported a considerable or high likelihood of them leaving 'direct patient care' within 5 years (see section 2.4.2), with GPs aged 50 years and older being significantly more likely (60.5%) to report this relative to those younger than 50 years old (15.5%). In June 2022, the Royal College of General Practitioners released fresh survey data in which 42% of 1,262 respondent GPs and trainees reported that they were likely to quit the profession in the next 5 years, with 60% citing stress, working hours and a lack of job satisfaction as being reasons for leaving.

- Moreover, as discussed in section 2.4.1, there are concerns about an increasing proportion of GPs, particularly younger male GPs, choosing to work part time rather than full time. This matters because this is a relatively recent shift and raises concerns regarding the potential for policy to achieve increases in the future supply of *FTE GPs* (as opposed to the GP headcount).

- At the time of writing, it is unclear whether the policy action underlying the primary care networks and ARRS funding will be sustained or extended beyond 2023/24. If there is no 'follow-up' action to these measures, the DPC workforce could grow at a slower rate than in the current policy scenario (and could even decline in the worst case). This would represent a lack of comprehensive general practice workforce planning going hand-in-hand with inadequate integration and organisational development support for ARRS-funded roles. Recent research from The King's Fund, employing focus groups and semi-structured interviews, points to this being a real risk, with ineffective implementation and integration having led to a lack of shared understanding about the purpose and potential contribution of staff working in four key roles.[7] The research suggests that addressing these issues calls for high-quality cultural, organisational and leadership development skills that primary care networks cannot easily access.

- This could lead to lower DPC staff joiner rates and continued pressure on GPs and general practice nurses. In the longer term, that could mean poor integration of the newer ARRS-funded roles in general practice teams and increased workload and burnout across all clinical staff groups. Consequently, the efficiency gains potential of multiprofessional general practice teams would not be realised through the next decade, with a potential 'multiplier' effect resulting in entrenched inefficiencies and low productivity by 2030/31.

These points of distinction between the three scenarios lead to differences in the assumptions that we use for modelling future workforce supply in each scenario, outlined in Table 9 in the report.

[7] The King's Fund's research focused on four key ARRS staff groups: social prescribing link workers, first-contact physiotherapists, paramedics and pharmacists. It explored the experiences of both staff working in these roles in primary care networks and people managing them. See Baird B, Lamming L, Beech J, Bhatt R'T, Dale V. *Integrating additional roles into primary care networks*. The King's Fund; 2022 (www.kingsfund.org.uk/publications/integrating-additional-roles-into-primary-care-networks?utm_source=linkedin&utm_medium=social&utm_term=thekingsfund).

Annex F: Our assumptions regarding the number of GPs entering and completing specialty training and joining the workforce

This annex summarises our analysis of publicly available data on medical student numbers in England in the context of projecting the number of newly qualified FTE GPs joining the workforce over the next decade (up to 2030/31). As opposed to nursing, where international recruitment can deliver fairly rapid increases in staff supply, when it comes to general practice there is little scope to increase GP numbers significantly through international recruitment. This means that increasing the number of GPs in training is vital to secure sustained increases in FTE GP numbers in the future. It takes at least a decade, and in many cases longer, to train a fully qualified GP. Analysis of the GP training pathway is therefore crucial in arriving at projections of future GP workforce supply.

Table F1 summarises our projections of the numbers of newly qualified FTE GPs who will join the workforce in England in 2021/22, 2023/24 and 2030/31 in our three scenarios. We outline our underlying reasoning below the table.

Table F1: Estimates and projections of the numbers of newly qualified FTE GPs joining the workforce in England in alternative scenarios, from 2021/22 to 2030/31

	2021/22	**2023/24**	**2030/31**
Current policy scenario	1,800	2,000	2,600
Optimistic scenario	1,800	2,000	2,800
Pessimistic scenario	1,800	1,900	2,300

Source: REAL Centre estimates based on data from Health Education England and NHS Digital, and informed by stakeholder engagement. Numbers are rounded.

The first step in qualifying as a medical doctor (in general practice or other fields) is to take up **undergraduate-level medical training**, which involves 4 to 6 years of study. System capacity in this area is determined by the number of undergraduate medical training places that Health Education England commissions every year. The second step is the integrated 2-year Foundation Programme of general training. In recent years, the Foundation Programme has been oversubscribed, with a record 791 applicants across the UK having been placed on a reserve list in March 2022.[8]

The next step involves a choice between training as a GP and training as a specialist doctor or consultant outside primary care. There is a lack of publicly available data on the number of students who complete foundation training in a given year and choose GP specialty training. Some estimates suggest that this may be just over a third immediately on completion of foundation training. General Medical Council data, for instance, suggest that around 35% of foundation year 2 doctors applied in the first round of GP training recruitment

[8] Lok P. UK's foundation training programme for 2022 was oversubscribed by almost 800 places. *BMJ*. 2022; 376 (www.bmj.com/content/376/bmj.o650).

in the 2012–14 cohorts. The attrition rate from foundation training is also unclear: a proportion of those who complete foundation year 2 training take a career break and others go abroad to study medicine (one estimate suggests that both of these groups together amount to around 25% of the pool).

Health Education England documents the number of GPs recruited into specialty training every year. The number for England has increased steadily over the past decade, from around 2,800 in 2010/11 to a record 4,000 in 2021/22. It includes foundation year doctors, locally employed or trust grade doctors and consultants who want to retrain as a GP. Importantly, as discussed in section 2.4.1, the proportion of GP specialty trainees who received their original qualification outside the UK has increased substantially in the past 5 years.

There appears to be a major data gap around attrition from GP specialty training. Stakeholder input suggests that the proportion of GPs who began specialty training in England between 2011 and 2014 and received their Certificate of Completion of Training (CCT), regardless of the time taken for completion, was around 87%, so we have assumed an attrition rate of 13%. This suggests that the number of newly qualified GPs available for recruitment into the general practice workforce has been between around 2,400 and 3,000 a year between 2016/17 and 2021/22. Based on the steady increase in the number of doctors taking up GP specialty training in recent years, in the current policy scenario this number is projected to increase to around 4,300 by 2030/31, assuming no change in the GP trainee attrition rate.

However, not all qualified GPs actually transition into the workforce. Stakeholder input suggests that an average of 74% of GP trainees who began training in the 2011–14 period and received their CCT had joined the workforce by March 2018. These data also suggest that the labour market participation rate of newly qualified GPs is around 0.8 FTE. For every five GP joiners by headcount, therefore, the workforce gains four FTE GPs. That suggests that between 1,400 and 1,800 newly qualified FTE GPs joined the workforce in each year from 2016/17 to 2021/22. Accounting for the recent increases in GP specialty trainee numbers, in the current policy scenario the number of newly qualified FTE GP joiners is projected to increase to around 2,600 by 2030/31 (Table F1).

In our ‘optimistic’ additional policy action scenario and our ‘pessimistic’ risks scenario, we make some assumptions around changes in the ‘current policy’ rates of attrition from GP specialty training, the workforce transition rate and the participation rate (Table F2). Given the data limitations that we have highlighted, our assumptions reflect alternative possible ‘states of the world’ rather than forecasts of differences in outcomes.

Table F2: Assumptions for the GP training pathway in England under alternative scenarios

	Current policy scenario	Optimistic scenario	Pessimistic scenario
Attrition rate from GP specialty training, defined in terms of the proportion of GP trainees who began training between 2011 and 2014 and receive their Certificate of Completion of Training (CCT)	Assumed to be 13% based on stakeholder input	Assume attrition rate declines by 0.3 percentage points a year from 2023/24 to 2030/31	Assume attrition rate increases by 0.3 percentage points a year from 2023/24 to 2030/31
Workforce transition rate (proportion of GP trainees who receive their CCT and join the workforce)	Assumed to be 74% based on stakeholder input	Assume workforce transition rate increases by 0.3 percentage points a year from 2023/24 to 2030/31	Assume workforce transition rate declines by 0.3 percentage points a year from 2023/24 to 2030/31
Labour market participation rate (headcount-to-FTE conversion factor) for newly qualified GPs	Assumed to be 0.8 based on stakeholder input	Assume participation rate increases by 0.3 percentage points a year from 2023/24 to 2030/31	Assume participation rate declines by 0.3 percentage points a year from 2023/24 to 2030/31
Result: number of newly qualified FTE GPs joining the workforce	Increases from around 1,800 FTEs in 2021/22 around 2,600 FTEs in 2030/31	Increases from around 1,800 FTEs in 2021/22 to around 2,800 FTEs in 2030/31	Increases from around 1,800 FTEs in 2021/22 around 2,300 FTEs in 2030/31

Source: REAL Centre analysis based on data from NHS Digital and Health Education England, and informed by stakeholder engagement.

Annex G: Sensitivity analysis: changes in GP leaver rates and projections of the shortfall in FTE GP supply in 2030/31

Table G1 presents the results of analysis exploring the sensitivity of the GP supply and demand projections discussed in section 5.3.1 of the report to alternative assumptions on changes in leaver rates for pre-retirement age and retirement-age GPs between 2022/23 and 2030/31.

Table G1: Sensitivity analysis: changes in GP leaver rates and projections of the shortfall in FTE GP supply in 2030/31

	Projected shortfall of FTE GPs* in 2030/31	
Assumptions (for the period from 2022/23 to 2030/31)	**Optimistic scenario**	**Pessimistic scenario**
• Pre-retirement-age GP leaver rate falls by 1pp • Retirement-age GP leaver rate falls by 1pp	– 1,200**	n/a
• Pre-retirement-age GP leaver rate falls by 1.5pp • Retirement-age GP leaver rate falls by 1.5pp	100***	n/a
• Pre-retirement-age GP leaver rate falls by 2pp • Retirement-age GP leaver rate falls by 2pp	1,500***	n/a
• Pre-retirement-age GP leaver rate falls by 0.5pp • Retirement-age GP leaver rate falls by 0.5pp	– 2,500	n/a
• Pre-retirement-age GP leaver rate falls by 0.25pp • Retirement-age GP leaver rate falls by 0.25pp	– 3,100	n/a
• Pre-retirement-age GP leaver rate rises by 5pp • Retirement-age GP leaver rate rises by 2pp	n/a	– 18,900**
• Pre-retirement-age GP leaver rate rises by 3pp • Retirement-age GP leaver rate rises by 1pp	n/a	– 16,300
• Pre-retirement-age GP leaver rate rises by 1pp • Retirement-age GP leaver rate rises by 0.5pp	n/a	– 13,800
• Pre-retirement-age GP leaver rate rises by 6pp • Retirement-age GP leaver rate rises by 3pp	n/a	– 20,500
• Pre-retirement-age GP leaver rate rises by 7pp • Retirement-age GP leaver rate rises by 4pp	n/a	– 21,900

Source: REAL Centre analysis based on data from NHS Digital and Health Education England, and informed by stakeholder engagement.

Notes: pp refers to percentage points, pre-retirement age refers to GPs younger than 55 years of age and retirement age refers to GPs aged 55 and older.

* As with our main results in section 5.3.1 of the report, these projections are for qualified permanent FTE GPs (all FTE GPs excluding GPs in training and locum GPs).

** These are the 'headline' optimistic and pessimistic scenario projections of the GP shortfall that we discuss in section 5.3.1 of the report. The other rows present the results of our sensitivity analysis.

*** This is a positive number, which implies that in this row, the projected supply of qualified permanent FTE GPs in 2030/31 is higher the projected demand for qualified permanent FTE GPs in 2030/31.