

BMJ Open Factors affecting the UK junior doctor workforce retention crisis: an integrative review

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ABSTRACT

Objectives To determine the factors contributing to the junior doctor workforce retention crisis in the UK using evidence collected directly from junior doctors, and to develop recommendations for changes to address the issue.

Design Integrative review.

Data sources Searches were conducted on Ovid Medline and HMIC to locate evidence published between January 2016 and April 2021. This was supplemented by publications from relevant national organisations.

Eligibility criteria English-language papers relating to UK junior doctor retention, well-being or satisfaction which contained data collected directly from junior doctors were included. Papers focusing solely on the pandemic, factors specific to one medical specialty, evaluation of interventions, or numerical data with no evidence relating to causation were excluded. Review papers were excluded.

Data extraction and synthesis Data were extracted and coded on NVivo by FKL, then thematic analysis was conducted.

Results 47 papers were included, consisting of academic (qualitative, quantitative, mixed and commentary) and grey literature. Key themes identified were working conditions, support and relationships, and learning and development, with an overarching theme of lack of flexibility. The outcomes of these factors are doctors not feeling valued, lacking autonomy, having a poor work–life balance, and providing compromised patient care. This results in need for a break from medical training.

Conclusion This review builds on findings of related literature regarding working environments, isolation, stigma, and desire for autonomy, and highlights additional issues around learning and training, flexibility, feeling valued, and patient care. It goes on to present recommendations for tackling poor retention of UK junior doctors, highlighting that the complex problem requires evidence-based solutions and a bottom-up approach in which junior doctors are regarded as core stakeholders during the planning of interventions.

INTRODUCTION

Junior doctors (JDs)—qualified doctors in postgraduate training who have not yet reached consultant or general practitioner status—make up approximately half of the National Health Service (NHS) medical workforce.¹ England has the second lowest

Strengths and limitations of this study

- Review combines results of a large number of diverse sources of evidence.
- Data analysis was informed by the lead author's personal experience of working as a junior doctor.
- Exclusion of research specific to one specialty may have led to rejection of valuable evidence.
- Response rates to surveys in included papers were often low, risking response bias.
- Samples in some studies lacked diversity.

doctor-to-population ratio of all Organisation for Economic Cooperation and Development European Union countries, with a deficit of almost 50 000 doctors compared with the average ratio.² Loss of JDs is playing a major role in this workforce crisis, with 2019 data showing that only 35% of foundation doctors chose to immediately begin an NHS training post (a further reduction on previous years).³ 14% opted to take a career break and 0.5%, equating to 23 doctors, left the medical profession entirely after two years of working as a doctor. Although 84% of doctors do begin an NHS training programme within three years of completing the foundation programme, the remaining 16% who do not enter training leave a significant gap which must be considered in medical workforce planning.⁴ Some JDs will commence a training programme yet not complete it—latest figures show that one in ten JDs are considering leaving the NHS altogether.⁵ The national medical staffing deficit would be even more significant if it were not for the large numbers of international medical graduates working in the NHS—currently approximately 30% of NHS doctors are from overseas.⁶

The JD workforce retention crisis is a national public health issue due to its implications for patient safety, NHS cost, and the future of UK healthcare. In addition, it is of utmost importance that poor employee well-being and mental health within the UK's



biggest employer is confronted. The NHS Constitution states that staff should be treated with respect, compassion and care because it is the right thing to do, and because it improves patient experience and outcomes.⁷ Despite this, 2020 NHS survey data revealed that over 40% of trainee medics/dentists had felt unwell as a result of work-related stress in the preceding year, yet only a quarter felt that their employer took positive action on health and well-being.⁵ Improvement of population health cannot be achieved with a burnt out and dissatisfied workforce, therefore improving workforce well-being is an essential aim for the NHS.⁸

Quantitative data from the NHS, General Medical Council (GMC) and UK Foundation Programme annual surveys indicate that issues impacting JD retention may include work-life balance, teaching and supervision quality, and workload.^{3 5 9} Commentaries suggest that exhaustion affecting doctors' abilities to care for patients, lack of autonomy, and a perception of not feeling valued by one's organisation could also be playing a role.¹⁰⁻¹² Reviews related specifically to mental ill-health in doctors raise similar problems as well as issues such as isolation and the medical culture of invulnerability, whilst others highlight challenges particular to individual specialties such as psychiatry.¹³⁻¹⁶ Data on increasing numbers of doctors choosing to work abroad suggest that frustrations and stress may lie with the NHS rather than the job itself, yet the lack of exit interviews for doctors leaving UK medicine means there is not routine information captured on reasons for doing so.^{17 18} Research conducted with UK doctors in New Zealand suggests reasons include dissatisfaction with the NHS along with pull factors such as better quality of life, working conditions, and career opportunities abroad.^{19 20} The pressing situation has been exacerbated by the pressures placed on the NHS by the COVID-19 pandemic. Unprecedented demands have resulted in disruption of training for most JDs, coupled with high rates of exhaustion, burnout, and mental health disorder.^{9 21}

The problem of retaining JDs in the NHS is complex and therefore system-level changes are required to tackle it.²² This requires an evidence-based approach which recognises and acts on data gathered directly from JDs, rather than a top-down process. Current recommendations and guidance regarding JD retention and well-being produced by prominent organisations do not fully use the extensive body of research on the experiences of JDs.¹²⁻²⁷ Most involve limited, short-term workforce consultation and partial literature reviews, such as the Health Education England (HEE) document 'Junior Doctors' Morale', which is based on a brief listening exercise and review of six papers.²⁸ Although actions have been taken over recent years, such as introduction of the European Working Time Directive, exception reporting, and processes to enable changing specialties, these are insufficient changes which do not recognise the complexity of the issue.²⁹⁻³¹

There is an array of primary data on the challenges faced by JDs and what they value and need in their jobs,

however there is no existing research summarising all this information into one document that can be used by key bodies making recommendations for policy and practice changes to impact JD workforce retention. This paper aims to fill the gap in the form of an integrative review of this literature.

METHODS

An integrative review methodology was chosen for this research because it allows for the synthesis of information from diverse data sources.³² Provisional searching for literature on the subject revealed that useful data comprised of academic publications (qualitative, quantitative, and mixed research; commentaries) and grey literature (reports). The review methodology follows the five stages described by Whittemore and Knafl.³³

Problem identification

The problem being targeted by this review is poor retention of JDs in the UK. Retention issues include career breaks, working abroad and leaving the medical profession permanently. The aims are to determine the causative factors contributing to the JD workforce retention crisis, using evidence collected directly from JDs at various stages of training and in different clinical specialties, and to develop recommendations for changes to UK health-care policy and practice which address the issue.

Literature search

A comprehensive literature search was conducted on Ovid Medline and Healthcare Management Information Consortium for the period January 2016–April 2021 using the search terms described in [box 1](#). Advice on the search was obtained from an academic liaison librarian. The year 2016 was chosen as the start date because this is when JD contract reforms took place in England, during which JD working practices were altered.

Additional evidence was located via citation searching and by reviewing publications of relevant national bodies (HEE, GMC, British Medical Association (BMA),

Box 1 Search strategy

(junior doctor* or trainee doctor* or postgraduate doctor* or F1 or F2 or foundation doctor* or foundation year doctor* or specialty train* or young* doctor*)
 And
 (retention or break or career break or career choice* or leave or time out or quit or change* or intention* or plan* or training or wellbeing or well-being or stress* or burnout or mental health or morale)
 And
 (experience* or view* or attitude* choice* or factor* or priorit* or value* or motivat* or attract* or barrier* or challeng* or influence* or interview* or survey* or focus group*)
 And
 (UK or United Kingdom or England or Wales or Scotland or Northern Ireland or NHS or National Health Service)

Table 1 Inclusion and exclusion criteria for literature search

Inclusion criteria	Exclusion criteria
English language	Focuses on only the specific challenges experienced by one specialty and does not include evidence relevant to all junior doctors
Published no earlier than 2016	Does not include any evidence obtained directly from junior doctors
Focuses on doctors in the UK, with at least some evidence pertaining specifically to junior doctors	Focuses primarily on consultants or medical students
Focuses on workforce retention and/or well-being and/or job satisfaction	Focuses entirely on COVID-19 pandemic
	Intervention evaluation in which the only evidence from junior doctors relates to direct impact of intervention
	Considers specialty choice but not overall medical workforce retention
	Contains solely numerical data, for example, rates of retention or burnout, with no primary evidence relating to possible causes
	Review papers

Academy of Medical Royal Colleges). Inclusion and exclusion criteria are detailed in [table 1](#). Screening of title/abstracts and full texts for inclusion was carried out by FKL, with a random 10% sample reviewed by DC at each stage and discrepancies in opinion discussed.

Data evaluation

This review included papers with a range of research designs, as well as commentaries and grey literature, thus precluding the use of a simple scoring system.³³ The 2018 Mixed Methods Appraisal Tool was therefore used to evaluate the quality of primary research.³⁴ The scoring system was not used to exclude studies, but to critique their methodological quality. Quality assessment was undertaken by FKL with a 10% sample checked by DC. Any apparent quality issues found when reviewing sources were noted and considered when analysing data and drawing conclusions. This is explored in the Results and Discussion sections.

Data analysis

The initial stage of analysis was data reduction, in which the sources were first divided into subgroups based on the evidence type (qualitative studies, quantitative studies, mixed studies, commentaries, grey literature).³³ Data from each source, including original data and author's interpretation if this was entirely based on original data, were then extracted and coded by FKL using NVivo QRS International (a qualitative data management software). Initial display of data derived from individual sources revealed that codes within each of the five subgroups were overlapping to the extent that it was not appropriate to analyse them individually. For this reason, data comparison involved visualising networks of codes from all sources simultaneously and conducting inductive thematic analysis.³⁵ Codes from non-peer-reviewed subgroups (commentaries and grey literature) were only used if they also appeared in one of the other subgroups. Patterns in subthemes were identified by FKL in order to develop overarching themes. Finally, these themes were

developed into a conceptual framework by finding intervening factors and building a logical chain of evidence. This was verified with primary source data and revised by FKL and DC until it provided an overview of the reviewed data in its entirety.

Presentation

A Preferred Reporting Items for Systematic Reviews and Meta-Analyses flow chart illustrates the literature search and study selection process ([figure 1](#)). Analytical findings are presented visually in [figure 2](#) and described within text in the Results and Discussion sections.

Patient and public involvement

Patients or the public were not involved in the design, conduct, reporting, or dissemination plans of our research.

RESULTS

Study characteristics

47 papers were included in the review. These are summarised in online supplemental appendix 1. The most common type of evidence was qualitative research (n=17). Similar amounts of mixed (n=11), quantitative (n=8) and grey (n=7) literature were included. Commentaries made up a smaller proportion of the included papers (n=4). The most common research methods were interviews and surveys. There was a relatively even distribution of publication dates for the papers spanning the years 2016–2020, with no relevant papers found from 2021. Sample sizes varied greatly, ranging from 16 to over 75 000. Participants in the majority of papers were JDs of any training grade or specialty, with a smaller number of papers focusing solely on foundation doctors. There were no quality issues requiring exclusion of a paper. Research was generally of high quality, with the main issues of response rate and imbalanced samples discussed in the limitations section of the review. Some papers lacked

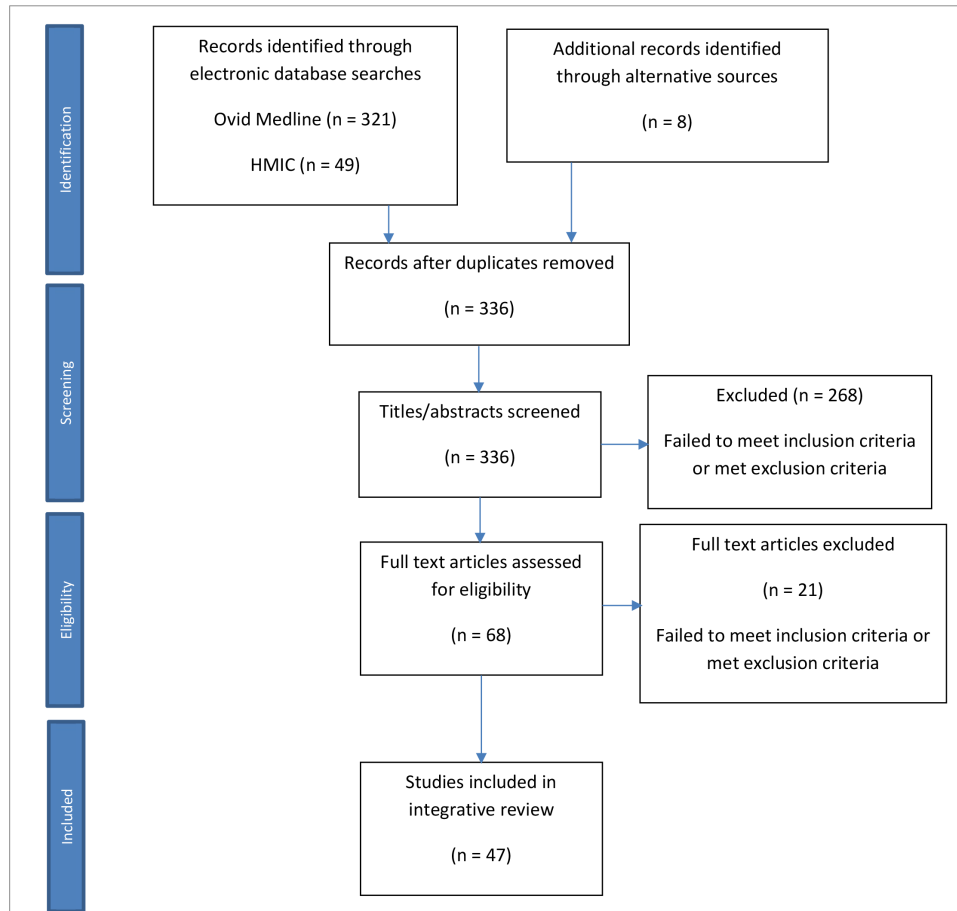


Figure 1 Preferred Reporting Items for Systematic Reviews and Meta-Analyses flow diagram for literature search.

transparency in the description of their methodological approach and/or analysis.³⁴

Figure 2 is a visual representation of identified themes and their relationships. There are three key thematic

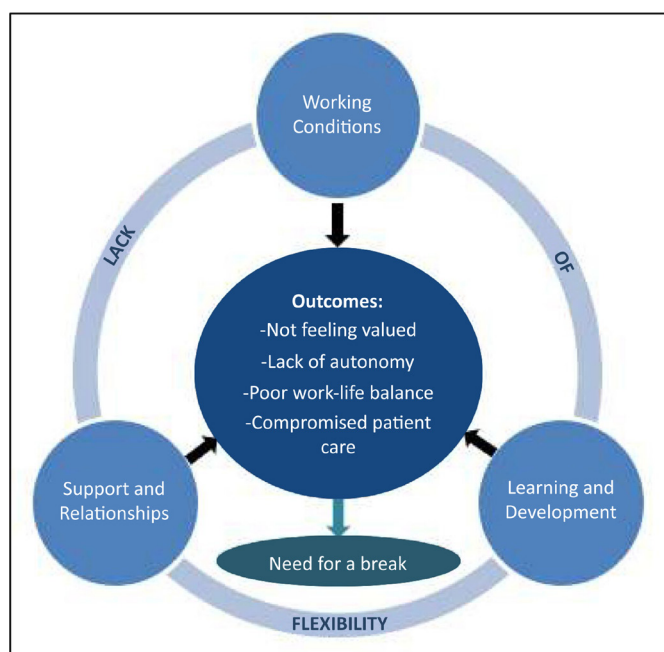


Figure 2 Framework identifying key themes.

groups of factors causing dissatisfaction among JDs with their working lives: working conditions, support and relationships, and learning and development. Across these, there is an overarching theme of lack of flexibility. The consequences of these issues are that JDs do not feel valued, they lack autonomy, they have a poor work–life balance, and they are concerned about compromised patient care. This ultimately results in need for a break.

All themes were identified in a large proportion of the reviewed literature, with no pattern of particular themes within certain subgroups. Poor mental health, well-being and morale were additional topics that were frequently identified in the reviewed literature. They have not been listed as a theme because they are outcomes of professional discontent which are closely related to poor retention, whereas causative factors for workforce retention issues are the subject of this review. Quantitative aspects of the data were not considered because this review aims to summarise all issues contributing to poor JD retention rather than quantify or rank them.

The themes and subthemes identified in the literature relating to JD workforce retention are described below. Examples of quotations supporting findings are shown in table 2, with a more extensive collection located in online supplemental appendix 2.

Table 2 Examples of quotations supporting findings

Theme	Quotation (reference)
Working conditions	The ... responses highlighted ... that incessant bleeps and lack of cross cover can sometimes make it impossible to take proper breaks. ³⁸
Support and relationships	UK trainees' satisfaction in relation to their training programme was positively and significantly affected by the level of clinical supervision ..., which is the explaining variable showing the strongest effect ... ⁵⁰
Learning and development	Most trainees agreed that there were several factors limiting learning opportunities, including time pressures, large volume of patients, frequent interruptions, lack of follow-up of cases ... ⁵⁵
Lack of flexibility	The most popular scenario [to encourage direct entry to specialty following foundation training] was for trainees to have more control over their geographical location, jointly following by the ability to secure leave to get married and to take time out of training programme activities. ³
Outcomes	There was also a sense of loss of autonomy, with participants feeling a sense of self-sacrifice and 'helplessness'. One even described 'Feeling like some greater power is in control of your life the whole way through'. ³⁹

Theme 1: Working conditions

Workload^{11 36–55}: High workload, exacerbated by rota gaps and excess administrative work, detracts from learning and building relationships and is believed to be unsustainable.

Working hours^{28 38–41 43–45 47–49 51 53 54 56–62}: Hours are long, antisocial, and often worked beyond due to staff shortages and excess workload. Lack of regular routine due to shift patterns is problematic. Essential tasks, such as completion of the ePortfolio (online training record used by JDs to log evidence of competencies), are often done outside working hours. Proposed 2016 JD contract changes threatened increased antisocial hours and reduced remuneration, which caused uncertainty about future career plans (following industrial action and negotiations, the BMA agreed a deal with the NHS and Department of Health and Social Care with less negative implications for hours and pay than that originally put forward).

Breaks^{36 38–40 43 48 54}: There is often insufficient time during shifts to eat, drink, use the toilet, and rest. If taken, breaks are disrupted frequently due to lack of cross-cover. There can be reluctance to take breaks because they may result in delays for patients or increased work for colleagues.

Rotas^{28 39 40 42–44 47 48 51–53 58 63}: Rotas are often distributed at late notice or last minute changes are made meaning it is difficult to plan life outside of work. Gaps in rotas are common and managed inappropriately, resulting in JDs being pressured to work additional hours or having to work above their grade. It can be difficult to obtain annual or study leave at the desired time, including for major events such as the funeral of a family member or one's own wedding.

Facilities^{28 36 38 40 43 44 47 49 52 54 60 63–67}: There is insufficient space for learning and engaging with one's team. Break rooms for during and after shifts are not consistently present and can require payment. Information technology systems and Wi-Fi are problematic and there are often not enough computers. Additional problems include lack of canteens, water fountains, parking, and accommodation.

Theme 2: Support and relationships

Supervision^{28 37 40 42 43 45 47 49–51 55 59 68 69}: There is little continuity with formal supervision. Supervisors can be disconnected from a trainee's day-to-day work, meaning feedback, including recognition of good work and constructive criticism, is limited and non-specific. Supervisors can be perceived not to care about or be interested in the trainee.

Support from peers, seniors and management^{28 36 37 39–45 47–50 54 59 60 67 69–75}: Peer support is reduced due to frequent rotation of specialty and location. Readily accessible and approachable senior support is not always available. This can lead to overwhelming situations involving excess responsibility which can damage confidence. Debriefs and mentoring regarding career progression from seniors are uncommon. Managers are not visible or involved with frontline staff and there is not noticeable action in response to concerns raised by JDs.

Well-being support^{40 47 48 56 75 76}: It can be unclear where to access support for well-being and mental health. Support units can feel too close to the workplace and associated disciplinary processes therefore be perceived as a form of surveillance or punishment. The cultural medical identity of coping results in belief that asking for help is a sign of professional failure or clinical incompetence, leading to stigma. This can delay or prevent seeking support and taking sick leave.

Team connection^{36 40 42–45 48 55 58 62 63 73 74 77}: Team relationships are affected by lack of stability in specialty and location. Hierarchies within the medical team and wider multidisciplinary team can also create barriers to cohesive working. Lack of integration can result in isolation and loneliness. International medical graduates can find these problems intensified. The loss of the previous firm structure (the traditional medical apprenticeship system in which groups of doctors of varying seniorities worked together regularly as a team; discontinued as a result of increased rotations for JDs during training) is begrudged due to its apparent advantages for team working over the current system.



Bullying and discrimination^{37 40–45 48 51 54 59 68 73 74 76 78 79}: Characteristics/situations subject to discrimination in the workplace include gender, ethnicity, part-time working, mental health problems, sick leave, maternity leave, and having children. Derogatory attitudes to some medical specialties can result in feelings of judgement if desires to pursue these specialties are voiced. There can be a blame culture regarding errors at work. This contributes to lack of openness due to fear that raising issues may reflect negatively on the reporter. This can be worsened by high profile cases of litigation against doctors such as the Bawa-Garba case.⁸⁰

Theme 3: Learning and development

Learning opportunities^{3 11 28 36 39–41 43–45 47–49 51 52 54 55 58 59 62}: There is a conflict between service provision and training in the workplace, with high workloads resulting in little bedside teaching, feedback, or debriefing. Formal teaching may not be protected and therefore interrupted by bleeps and general work pressures.

Development opportunities^{11 28 39–41 43 44 47 51–54 58 60 66 67 71}: There is little time or support for personal and professional development during work. Taking a break from training provides an opportunity to experience different specialties, improve one's curriculum vitae, attend conferences, travel and work abroad, and pursue wider qualifications and interests such as teaching, management or research. Formal career guidance is considered inadequate and there is concern regarding future career prospects due to a perceived shortage of senior posts.

Training programme arrangements^{3 28 37–45 48 51 52 54 58–61 63 65–69 71 74 79}: Application to specialty training during F2 is too early—at this stage insufficient experience has been gained in different specialties and there is often uncertainty over specialty choice. There may have been inadequate time to develop a competitive application. It is thought to be difficult to change specialty once a training programme is commenced.

Assessment during training is unsatisfactory. The ePortfolio appears to be a tick-box exercise, and the Annual Review of Competency Progression values clerical rather than clinical ability and fails to differentiate between trainees. Compulsory examinations are onerous and high financial costs must be met by the individual. Study must often be done outside of working hours which contributes to fatigue and stress.

Training is characterised by frequent rotations in specialty and location which can lead to a sense of disconnect and lack of continuity. Inductions for placements are often too generic and do not focus on essential clinical aspects of the new job such as computer systems and meeting colleagues. Location of jobs is subject to much uncertainty during training. Deaneries are large and therefore long commutes are common. JDs may choose to take breaks in order to remain in a chosen location, often for personal reasons such as marriage or children. Movement and unfamiliarity can lead to lack of support

during stressful periods. If a doctor's partner also works in medicine, the likelihood of separation can be heightened.

Theme 4: Lack of flexibility

Lack of flexibility is an overarching theme relevant to all three main themes: working hours, location, training structure and rotas are just several aspects of the job which are subject to rigidity, with little opportunity for JDs to tailor their work to suit them. This has a secondary effect on ability to obtain support and develop relationships. Opportunities for time out of training, working less than full-time, switching specialty and deferring training are desired.^{3 11 36 39 41 42 44 45 49 51 52 54 58 61 71 77}

Theme 5: Outcomes

Not feeling valued^{28 36 39–45 48 49 51 52 54 55 58 59 61 62 66 68 69 73 77 78}: There is a sense that JDs are not valued as people or professionals by managers or the government. Working tirelessly with no appreciation or recognition of good work leads to feelings of worthlessness, despite medicine being a highly specialised career. The negative presentation of the medical profession by the media can add to this. Salaries may not fairly represent workload or responsibility, and doctors can feel they are being taken advantage of, especially compared with jobs abroad or within other professions.

Lack of autonomy^{11 36 39 41 43 44 48 52 54 58 62}: There is desire for increased control over work and its impacts on life outside of work, including annual leave, workload, learning, rotas, living location, and future careers. Clinical autonomy may also be deficient, with minimal opportunity to make key decisions about patient care despite extensive medical education. This can result in a sense of helplessness due to high work demands but limited control.

Poor work-life balance^{3 36 38 39 41–45 48 49 51 52 54 58 59 61 66 76 79}: Sleep, exercise, hobbies and health needs can all suffer due to factors above such as working hours and examination preparation. Reduced time spent socialising can lead to concerns about letting friends and family down and missing out on valuable support. Conflict can occur between work and personal life, such as being a good doctor and a good parent. Problems may be heightened by the fact that this is often a life stage of significant events, such as buying a house or starting a family.

Compromised patient care^{36 39 41 44–46 48 53 54}: Many of the themes identified result in a feeling that it is impossible to build necessary doctor-patient relationships, empathise, and do one's job effectively, resulting in patients not receiving an adequate standard of care. This can lead to stress and guilt, along with frustration and concern about the damaged state of the NHS and the impacts of restructuring and inadequate funding.

Need for a break^{39 44 52 54}: The ultimate outcome is desire for a break in training, medicine, or employment. A break allows an opportunity to get off the conveyor belt of education and training and regain control. The culture of taking a break after F2 has now become a social norm, to the extent that those considering immediate progression

to specialty training may feel they are missing out on an opportunity.

DISCUSSION

Findings in context

This integrative review brings together the results from 47 sources of evidence to develop greater understanding of the challenges faced by JDs in the UK which may cause them to delay training, leave the country, or seek an alternative career. The findings show that issues relate to working conditions, support and relationships, learning and development, and lack of flexibility. These factors cause JDs to feel that they are not valued, lack autonomy, have poor work–life balance, and that patient care is compromised. This leads to a need to take a break from the JD training pathway. Although for many this means a break from the NHS, many JDs remain in NHS employment in a service appointment.³ This suggests that there are aspects specific to medical training which doctors want to escape. Research into the reasons behind the preference for service posts is recommended.

The themes identified in this review corroborate and add to those in recent literature. Poor working conditions are a key topic in work on mental health disorders in JDs and medical students.^{13 81} Issues relating to isolation, lack of support in the workplace, and stigma feature prominently in numerous publications relating to NHS staff well-being.^{13 23 24 27 81 82} Lack of autonomy has been identified as a cause of dissatisfaction and poor well-being for doctors, with a recent paper highlighting the value of supported autonomy in transforming challenging experiences into positive learning opportunities during the COVID-19 FiY1 post (the interim foundation year post created during the COVID-19 pandemic to enable final year medical students to graduate early and commence work in the NHS under provisional GMC registration).^{13 27 82} HEE's report on the foundation programme highlights problems with the structure of medical training and opportunities for learning and professional development, and emphasises the importance of increasing flexibility within training.²⁴ West *et al*'s 2017 paper demonstrates how a culture of compassionate leadership, involving team work, inclusion and support, can mirror NHS staff's core values and result in improved satisfaction and well-being.⁸³ Occupational theory shows that roles with high workload and demand also require high resources, such as control and support, to prevent impaired well-being and burnout.⁸⁴ This review confirms that findings in the above reports, many of which relate to a broad group of NHS professionals, are highly relevant to JDs. It expands on learning and development by considering problems with all stages of the training pathway and broadening inflexibility issues to include those relating to the work environment as well as training structure. It goes beyond literature on working conditions to emphasise the negative impact of poor work–life balance. It also identifies themes that are missing or overshadowed in current

literature, such as JDs not feeling valued as professionals and feeling unable to care for patients safely.

Strengths and limitations of research

This review has combined the results of a large number of diverse sources of evidence in order to produce a comprehensive summary of factors affecting JD workforce retention. The evidence consists of data from JDs at all stages of training and a variety of clinical specialties. Data analysis was informed by personal reflections of experiences of FKL working as an NHS foundation doctor and taking a career break, and the experiences of medical friends and colleagues. This review goes beyond existing reports to provide recommendations based entirely on evidence collected from JDs.

The first limitation is that the literature search only used two databases, which could have biased the literature identified. The second potential limitation is that exclusion of papers focusing on challenges specific to one specialty may have led to rejection of valuable evidence which also included themes relevant to all JDs, and would have allowed for factors relevant to individual specialties to be highlighted.

The other limitations of this research relate predominantly to the limitations of the included literature. Much of the evidence was based on questionnaires and surveys for which response rates varied between 25% and 95%. There is a risk of response bias with low response rates, for example, dissatisfied doctors may have been more likely to respond. Another issue, particularly found in the in-depth qualitative research, was lack of diversity within samples (typically gender imbalance, with women outnumbering men). In addition, most papers did not provide detailed participant characteristics such as ethnicity and country of graduation, so contribution of inclusive views towards the findings and recommendations could not be fully assessed. Finally, although inclusion criteria specified papers published after the JD contract negotiations, data collection for some papers took place around the time of the negotiations. This could have affected participant responses, although aside from contract-specific content, there were no major differences in themes between the older and more recent papers.

Recommendations

Changes to the working and training environments of NHS JDs should be prioritised within policy and organisational contexts to support recovery of the NHS and the mental health of its employees following the height of the COVID-19 crisis, and to ensure a sustainable medical workforce. The themes identified have purposefully not been ranked: they are all equally important and interlinked aspects of a complex system and should be addressed together. Patient safety is of paramount importance and must not be compromised by changes made, acknowledging that insufficient progress in workforce well-being will also impede patient care.⁷ Ultimately, the focus of changes should be on making JDs feel like valued professionals who have control over

**Table 3** Recommendations**Key principles:**

1. Increase flexibility in all aspects of work and training, ensuring junior doctors are treated as individuals rather than faceless workers.
2. Consider context when planning changes—one size will not fit all.
3. Work in partnership with junior doctors when planning, implementing, and evaluating changes, using a bottom-up approach.

Theme	Recommendation	National bodies which support recommendations
Working conditions	Reduce workload to ensure sufficient time is available for training, development and breaks during working hours, and it is possible to leave work on time.	GMC, BMA ^{27 86}
	Include time for mandatory activities (eg, ePortfolio completion, examination preparation) within rotas.	HEE ^{24 25}
	Evaluate exception reporting process to ensure junior doctors are confident reporting and reports are used to guide change.	GMC ²⁷
	Allow all junior doctors the option to work less than full time.	HEE, GMC ^{24 25 87}
	Improve rota management by distributing safe rotas with no gaps at least 6 weeks in advance of a placement and improving processes for taking annual, study and sick leave.	GMC, HEE, BMA ^{27 28 86}
	Improve facilities in the workplace.	HEE, GMC ^{23 27}
Support and relationships	Change the current supervision system to ensure supervisors have enough contact with trainees to provide meaningful feedback, including recognition of good work.	GMC ²⁷
	Increase availability of senior clinical support for junior doctors and make debriefs following challenging situations routine.	HEE ²³
	Ensure managers are visible and work closely with junior doctors on retention and wider issues.	GMC ²⁷
	Improve accessibility, availability and acceptability of formal and informal well-being support.	HEE, BMA ^{23 86}
	Make changes which help junior doctors integrate into medical and multidisciplinary teams.	HEE, GMC ^{25 27}
	Prioritise eradication of bullying, discrimination and stigma within the NHS.	GMC ²⁷
Learning and development	Ensure service work supports training requirements and is complemented by regular, formalised, protected teaching.	AOMRC ⁸⁸
	Facilitate development activities such as participation in research, leadership and teaching within training programmes.	GMC ²⁷
	Ensure career guidance is available to all junior doctors.	HEE ²⁴
	Continue to increase flexibility of medical training, including application timing, deferral options, transfer between specialties, and placement locations.	HEE, GMC ^{25 28 87}
	Improve induction processes, ensuring they are comprehensive and take place at the beginning of every new placement.	AOMRC ⁸⁸
	Change the rotation system so that doctors have more stability and choice in their placement locations and specialties.	HEE, GMC ^{23 27 28}
	Modify assessment processes for junior doctors so that they evaluate clinical aptitude and preparation is not required during rest time.	GMC ²⁷

AOMRC, Academy of Medical Royal Colleges; BMA, British Medical Association; GMC, General Medical Council; HEE, Health Education England; NHS, National Health Service.

their work and sufficient time off so that they are able to care for patients to the standard they aspire to.

Recommendations, developed based on the findings of the review, are presented in [table 3](#). Column 3 indicates relevant national organisations which have produced broader recommendations, for example relating to all NHS staff, that support these. Implementation of recommendations should be context specific, noting that at a local level some interventions are likely to be more (or less) relevant, and that some may have already been at least partially introduced. Due to the methodology of this review, it is not appropriate to prioritise certain recommendations above others. However, this could be a useful exercise at a local organisational level and could be guided by use of relevant sections of the NHS Wellbeing Framework Diagnostic Tool (noting that this is not aimed specifically at JDs).⁸⁵ As this research is based on data collected from JDs, recommendations do not incorporate opinions of other stakeholders. Delivering solutions will require involvement of stakeholders from the entire health-care system including policymakers, hospital managers, and patients. Further research involving data from these groups may be required to plan viable changes and implementation strategies. Additional recommendations for future research include research considering factors affecting retention of doctors in particular specialties, and reviews evaluating workforce retention of JDs in other high-income countries.

A suggested first step for national and local organisations responsible for improving JD retention and well-being is to engage a group of JDs of varying specialties and levels of seniority to work alongside. These groups of policymakers/managers and doctors should initially focus on instigating rapid changes to make the medical training pathway more personalised and flexible, considering features which make non-training NHS posts, medical positions abroad, and non-medical careers more appealing than current NHS medical training programmes. Development and promotion of accessible options which allow JDs to accommodate their professional and personal interests alongside their work will be an important starting point in tackling the UK JD retention crisis.

CONCLUSIONS

The results of 47 pieces of evidence have been combined to determine the factors that are contributing to the JD workforce retention crisis in the UK, and recommendations have been made based on these findings. Working as a JD is an innately stressful job. To an extent this cannot be avoided: high levels of responsibility, ambiguity, and emotion are inescapable. Yet, there are changes that can and should be made to provide JDs with the best possible environment within which to deal with the intrinsic stresses of their profession. These changes must

acknowledge the complexity of the situation and be based on evidence collected directly from JDs.

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APPENDIX 1: SUMMARY OF INCLUDED PAPERS

Year	Author(s)	Study type	Study design	Population	Sample size (response rate if available/ applicable)	Objectives	Findings
2020	S. Ansell, J. Read, M. Bryce (36)	Qualitative	Focus groups	Doctors in final year of GP training in the UK	16	To identify challenges to wellbeing experienced by GP postgraduate trainees and explore how they respond	Challenges to well-being included dysfunctional relationships with colleagues and patients, workload, perceived lack of support at work and physical environment.
2019	D. Bhugra, S. Sauerteig, D. Bland et al. (56)	Quantitative	Survey by BMA	Doctors and medical students in the UK	4347	To study prevalence of burnout, mental wellbeing, and psychiatric disorder among doctors and medical students in the UK	Doctors working the longest hours appeared most vulnerable. Medical students and junior doctors reported highest rate of formally diagnosed mental health condition in last 12 months. Junior doctors least likely to be aware of how to access support.
2019	British Medical Association (76)	Grey literature	Narrative interviews	Junior doctors in the UK	10	To explore lived experiences of doctors in training dealing with mental illness and make recommendations regarding support	Doctors in training are reluctant to take sick leave and work when they know they are unwell. They are concerned their illness will be disclosed, and struggle to access support. Returning to work can be difficult.

2020	B. Caesar, A. Barakat, C. Bernard et al. (64)	Quantitative	Questionnaire	Doctors of all grades in a UK hospital	165 (77.6%)-46 registrars, 71 doctors below registrar level	To assess degree of burnout among physicians of different grades and specialties in a major trauma centre	93% of respondents demonstrated moderate or high levels of burnout. Junior doctors had highest overall burnout score. Work-related factors contribute more to occurrence of burnout than patient-related factors or doctor-patient interactions.
2019	A. Carpenter, S. Vora, S. Kestenbaum et al. (57)	Mixed	Survey	Junior doctors (below registrar level) in the UK	172 (63%)	To assess prevalence of afternoon ward rounds and effect on those undertaking them	Approximately 1/3 of doctors did afternoon ward rounds. They contributed to late finishes, delayed patient discharge, reduced team efficiency and reduced job satisfaction. 80% felt less likely to consider a hospital medicine career as a result.
2020	E. Chandler, E. Briggs, H. Whitfield (78)	Quantitative	Survey	Foundation doctors in the UK	448	To assess whether foundation doctors had been influenced by recent history (strikes and Bawa-Garba case), and whether they feel prepared to deal with medico-legal issues	Some doctors were unaware of the need for malpractice indemnity cover. The Bawa-Garba case had had a significant impact on career intentions. Nearly 40% of respondents had been bullied.
2016	J. Cleland, P. Johnston, V. Watson et al. (65)	Quantitative	Discrete choice experiment	Junior doctors in the UK	1323	To investigate strength of UK junior doctors' preferences for training post characteristics in terms of monetary value	Good working conditions were the most influential characteristics, followed by opportunities for spouse/partner and desirable geographical location.

2016	J. Curran, P. Baker (66)	Mixed	Questionnaire and focus group	Medical students and foundation doctors in the UK	94 medical students and doctors	To identify reasons for unfilled foundation training posts in a hospital within an oversubscribed foundation school	Location identified as single biggest factor affecting where foundation applicants applied. Free/heavily subsidised accommodation or offer of additional qualifications in leadership/teaching identified as main incentives that would have a positive effect on applications.
2019	I. Gafson, K. Sharma, A. Griffin (74)	Qualitative	Focus groups	Junior doctors in a UK hospital	16	To establish what educational support junior doctors need to effectively raise concerns	Most participants dissatisfied with the teaching received on raising concerns. Current systems thought to be good for patient safety issues but not concerns about staff behaviour.
2019	General Medical Council (47)	Grey literature	Survey	Junior doctors in the UK plus trainers	>75,000 junior doctors (94.8%)	To obtain views of trainees on their training and the environments where they work, and views of trainers on their experience	Trainees highly rate quality of their clinical supervision, experience, and teaching they receive. There are signs that fewer trainees are working beyond their rostered hours.
2018	General Medical Council (58)	Grey literature	Telephone interviews with junior doctors and supervisors, focus groups with junior doctors	Junior doctors and supervisors in the UK	1008 junior doctors plus 18 supervisors	To explore the reasons, motivations and experiences of doctors taking a break in training	A break in training does not mean a break from medicine. Reasons for taking a break related to health and wellbeing, uncertainty about career direction, and dissatisfaction with the training environment. Need to prevent or recover from burnout is a key driver.

2017	A. Goddard (49)	Commentary	Personal reflection	UK medical registrar	1	To consider whether working conditions and future prospects for medical registrars have changed since the RCP report 'The medical registrar: empowering the unsung heroes of patient care'	There has been progress since the report, but not as much as many would have hoped.
2017	S. Gregory, C. Demartini (50)	Quantitative	Used data from 4 GMC National Training Surveys	Junior doctors in the UK	173,652 observations (97%) (some observations will be for the same doctors in different years)	To consider the training environment factors affecting satisfaction of trainee doctors with their training	Key factors that determine trainee satisfaction are strong clinical supervision, frequent and useful feedback meetings, an adequate workload and a supportive environment.
2016	R. Harries, M. Rashid, P. Smitham et al. (51)	Mixed	Questionnaire	Junior doctors in the UK	3603	To obtain a focused perspective on the proposed reforms from doctors in training	Trainees support some recommendations of the Shape of Training Review but one size does not fit all. Most trainees want to provide a specialist service on a generalist background.
2017	Health Education England (28)	Grey literature	Focus groups with junior doctors plus information	Junior doctors in England	Not stated	To address non-contractual issues that arose during the	Lack of support, feeling valued and autonomy are key issues. There is unequivocal evidence on low morale and

			from postgraduate deans			junior doctors' contract negotiation	this document presents a strategy for how to improve it.
2020	A. Hollis, J. Streeter, C. Van Hamel et al. (52)	Qualitative	Semi-structured interviews	F2 doctors in the UK who had not applied to specialty training	16	To explore the reasons why the number of UK foundation doctors choosing to go straight into specialty training has fallen	Reasons foundation doctors are choosing not to go straight into speciality training centre around themes of feeling undervalued, career uncertainty and a new cultural norm.
2018	G. Iacobucci (77)	Commentary	Summary of round table event at Nuffield health policy summit	Panel included a GP trainee (also national medical director's clinical fellow)	1 junior doctor included	To discuss how the NHS can do more to attract, enthuse and hold on to young doctors	Key points from trainee include not feeling valued, new cultural norms, and a recommendation to promote socialising within teams.
2018	C. Kirwan, A. Ali, N. McCarten (53)	Mixed	Review of routine data (exception reports) plus survey	Junior doctors in the UK	201	To reflect on exception reporting, its impact on trainees, and the views/opinions of trainees working under the new contract	Exception reporting works and is felt to be positive. Most reports are done by F1s. Trainees are not happy with the new contract due to concerns that it has generated a less safe environment for patients and doctors.
2018	S. Lachish, M. Goldacre, T. Lambert (71)	Mixed	Survey	Doctors 3 years after graduation in the UK	3390 (48.2%)	To assess doctor's views on the timing of choosing a clinical specialty	Most doctors agreed they had had to choose a specialty too early. Doctors felt rushed due to insufficient exposure to range of specialties, desire for greater

							breadth of experience, and inadequate career advice.
2016	S. Lachish, M. Goldacre, T. Lambert (70)	Quantitative	Survey	F1 doctors in the UK	2324 (45%)	To examine whether perceived level of support received by new medical graduates from their employer influences attitudes towards first postgraduate year	Strong positive associations between perceived institutional support and enjoyment of F1 year exist. Doctors who reported lower levels of support were significantly less likely to express intentions to continue practising medicine in the UK.
2018	T. Lambert, F. Smith, M. Goldacre (54)	Qualitative	Survey	UK doctors 3 years after graduation	5291 (46.2%)	To report the reasons why doctors are considering leaving medicine or the UK	For those considering working in medicine abroad, the most commonly cited reasons were to gain wider experience, that things would be 'better' elsewhere and a negative view of the NHS. For those considering leaving medicine, the main reason was a negative view of the NHS.
2016	F. Laskaratos, D. Parry, H. El-Mileik (55)	Mixed	Questionnaire and semi-structured interviews	Higher specialty trainees in medicine in a UK hospital	18	To investigate perceptions of post-take ward rounds (PTWR) among higher specialty trainees	Most felt that the focus of PTWRs was service provision. There was little time devoted to teaching and feedback was rare. Main barriers to teaching were time pressures, workload and interruptions.
2017	J. Lefroy, S. Yardley, R. Kinston et al. (37)	Qualitative	Logbooks, audio diaries, interviews, focus groups	Medical students and junior doctors in the UK	32 medical students (11 followed through to first	To identify causal chains of contextual factors and mechanisms that lead to a trainee being capable of	Transition is a step change in responsibility for which total preparedness is not achievable. Building self-efficacy for tasks was important. During transition, the key

					postgraduate role) plus 70 junior doctors	completing tasks for the first time	contextual factor was the provision of appropriate support from colleagues.
2016	K. Mattick, K. Kaufhold, N. Kelly et al. (72)	Qualitative	Interviews	F1 doctors, other trainee doctors, other stakeholders including deans and public	77 junior doctors, plus 188 other stakeholders	To explore UK stakeholders' views about the proposal that full registration is aligned with medical school graduation	This policy change would require considerable planning and preliminary work. Issues include the F1 year as a safety net, implications for undergraduate education and F1 working practices, and financial/political/structural implications.
2017	L. McClelland, J. Holland, J. Lomas et al. (38)	Mixed	Survey	Trainee anaesthetists in the UK	2231 (59%)	To assess the incidence and effects of fatigue on anaesthetic trainees	Fatigue is prevalent amongst anaesthetic trainees and has effects on physical health, psychological wellbeing and personal relationships. Night shift work is the most problematic.
2018	R. Penfold (11)	Commentary	Literature review and personal reflection	Junior doctor in the UK	1	To discuss why junior doctors need more autonomy in order to have improved morale	To tackle low morale, strategies must empower doctors in training by giving them more control over tasks and their working environment.
2016	A. Rich, R. Viney, S. Needleman et al. (59)	Qualitative	Semi-structured focus groups and interviews	Junior doctors and trainers in the UK	96 trainees, 41 trainers	To investigate the work-life balance of UK doctors in training from the perspectives of trainees and trainers	Lack of work-life balance in training negatively impacts on learning and wellbeing. Women with children are particularly affected.

2019	C. Rizan, J. Montgomery, C. Ramage et al. (39)	Qualitative	In-depth interviews	Doctors taking a break after F2 year ('F3')	14	To explore the reasons why F2 doctors are choosing to take a year out of training and the impact on future career choices	Exhaustion and stress; requiring more time to make specialty decisions and prepare portfolios; and feeling a loss of control all result in need for a break. Doctors returning to NHS posts brought valuable experience.
2016	Royal College of Physicians (40)	Grey literature	Survey plus round table discussion	Trainee physicians in the UK	528	To explore the challenges that face the NHS from the perspective of junior doctors	Being a junior doctor is intense, rewarding and challenging. Issues include workforce pressures, the working environment, wellbeing and training. The profession is under pressure and patient safety is at risk.
2018	C. Ryan, E. Ward, M. Jones (41)	Mixed	Online survey (closed and free-text questions)	Core and higher speciality physician trainees in Scotland	846	To understand the influences on career choice and retention of trainee physicians	70% of trainees stated experience prior to current role had a positive impact on career choice. Core trainees were less likely to report enjoying their job than higher speciality trainees. Uncertainty regarding job location and inability to demonstrate professional ability were key complaints.
2018	B. Sahib (63)	Grey literature	Ideas based on personal experience	Junior doctor in the UK	1	To discuss potential 'quick wins' which could help to improve the morale of junior doctors	Suggestions include improved rota planning, induction, rest facilities, out-of-hours support and debriefs.
2018	G. Scanlan, J. Cleland, P.	Quantitative	Discrete choice experiment	F2 doctors in Scotland	677	To investigate the relative value of UK doctors'	Location was the most influential characteristic of a training post, followed

	Johnston et al. (67)					preferences for different training post characteristics	by supportive culture and then working conditions.
2018	G. Scanlan, J. Cleland, K. Walker et al. (42)	Qualitative	Semi-structured interviews	Foundation doctors in the UK	21	To explore what a supportive culture means to early career doctors and how perceptions of support may influence career decision making	Support influenced job satisfaction and engagement. Feeling valued was important. Perceiving a poor level of support from the organisation and its representatives had a detrimental impact on intentions to stay working in the NHS.
2020	G. Scanlan, P. Johnston, K. Walker et al. (60)	Quantitative	Discrete choice experiment	F2 doctors in the UK	5005 (73%)	To examine the strength of work-related preferences in male and female doctors	The relative value of each attribute was similar for males and females, with location most valued and familiarity with specialty least valued.
2019	R. Singh, J. Kirtley, J. Minhas et al. (43)	Mixed	Survey	Junior doctors in a UK hospital	402 (42.6%)	To identify and explore factors affecting junior doctor morale in a UK teaching hospital	Overall morale score was 6/10 (IQR 5-8). The score for feeling supported was higher than feeling valued or autonomous. Diverse themes affect morale.
2018	S. Smith, V. Tallentire, L. Pope et al. (44)	Qualitative	Semi-structured interviews	F2 doctors in Scotland considering leaving UK medicine after foundation training	17	To explore the reasons for doctors choosing to leave UK medicine after their foundation years	Reasons given were similar to those for other professionals considering a career change. Medicine-specific factors included needing to choose specialty in F2, workplace bullying and difficulty raising concerns. Most viewed it as a temporary break rather than permanent job change.

2017	S. Spooner, J. Gibson, D. Rigby et al. (61)	Mixed	Survey and interviews	F2 doctors in England	816 (12.6%)	To examine the extent and nature of the impact of the proposed new contract on junior doctors' career decisions	Doctors reported that contract-related issues have affected their career plans. Most notable effect is a move from acute to community-based specialities, with the former perceived as more negatively affected by proposed changes.
2017	S. Spooner, E. Pearson, J. Gibson et al. (45)	Qualitative	Narrative interviews	F2 doctors in England	20	To examine how experiences of medical work and perceptions of specialty training shape junior doctors' career decisions	Junior doctors' preferences and perceptions about work are influenced by multiple intrinsic and extrinsic factors and experiences. Achievement of work-life balance was a key priority.
2016	E. Stratta, D. Riding, P. Baker (46)	Qualitative	Semi-structured interviews	F1 doctors from a UK hospital	9	To understand whether UK foundation doctors perceived ethical erosion and empathy decline during their initial year of work, and if so, why	F1 doctors experience ethical erosion and notice it in their colleagues as they start clinical practice. This has serious implications for patient care. Improving working conditions could help reverse this.
2020	UK Foundation Programme (3)	Grey literature	Survey	F2 doctors in the UK	6864 (93.1%)	To determine the career aspirations and planned career destinations of F2 trainees	The percentage of foundation trainees remaining in the UK to work as a doctor in service or training posts is slightly higher than 2018 (55.6%). The number of F2s choosing to progress directly to specialty training in the UK is continuing to decline.
2019	G. Vance, S. Jandial, J.	Mixed	Survey, semi-structured	Foundation doctors in the UK plus staff	3697 foundation doctors	To examine what activities make up the work of a foundation doctor	Junior doctors indicated their work constituted three roles: 'support' of ward and team, 'independent practitioner' and

	Scott et al. (62)		interviews and focus groups	who work with them	surveyed (~25%), 21 foundation doctors interviewed		'learner'. The support function dominated work but conflicted with stereotyped expectations of what 'being a doctor' would be.
2017	R. Viney, A. Rich, S. Needleman et al. (68)	Qualitative	Semi-structured interviews and focus groups	Junior doctors and trainers in the UK	96 junior doctors, 41 trainers	To understand trainee doctors' and trainers' perceptions of the annual review of competence progression (ARCP)	There is understanding of need for assessment but criticism of ARCP for perceived tick-box nature and assessment of clerical over clinical ability. ARCP is poor at identifying struggling trainees and discourages excellence.
2019	D. Wainwright, M. Harris, E. Wainwright (79)	Qualitative	Semi-structured telephone interviews	F2 doctors in the UK	24	To explore how recently qualified doctors make sense of banter	Trainees are commonly exposed to banter about the merits of different specialties and those who work in them, but these messages are not decisive in determining career choice. Other factors are often believed to be more significant.
2017	E. Wainwright, F. Fox, T. Breffni et al. (75)	Qualitative	In-depth telephone interviews	Junior doctors in the UK	8	To generate qualitative insight into how the Professional Support Unit (PSU) provided by one UK Deanery is experienced by the trainees who access it.	There was initial reluctance to seek help from the PSU, as acknowledging difficulties spoiled identity as a competent doctor. However, the PSU has a role in repairing medical identity by offering different and acceptable ways to be a doctor.

2016	C. White (69)	Commentary	Discussion with doctors	1 junior doctor and 6 other doctors	7	To understand how the job of a junior doctor now compares with the past	Various views from doctors who trained at different times regarding pros and cons of the style of medical training now compared to in the past.
2016	K. Woolf, A. Rich, R. Viney et al. (73)	Qualitative	Semi-structured focus group and interviews	Junior doctors and trainers in the UK	96 trainees, 41 trainers	To explore trainee doctors' experiences of postgraduate training and fairness in relation to ethnicity and country of primary medical qualification	BME UK graduates and international medical graduates could face difficulties that affected their learning and performance including relationships with senior doctors, cultural differences and lack of trust. Workplace-based assessment and recruitment considered vulnerable to bias.
2019	A. Zhou, A. Money, P. Bower et al. (48)	Qualitative	Focus groups	Junior doctors in the UK	44	To explore the determinants, coping mechanisms and effects of stress in trainee doctors	A range of determinants contribute to stress and a range of mechanisms are used to cope. Stress in working lives can also affect wellbeing and careers.

APPENDIX 2: QUOTATIONS TO SUPPORT THEMES

Theme	Sub-theme (references)	Quotations
Working Conditions	Workload (11,36–55)	Participants frequently discussed their passion for their role as a doctor but also described a difficult work environment that was under immense pressure. Participants related their high workload to staff shortages, patients' health demands as well as administrative duties. (48)
	Working hours (28,38–41,43–45,47–49,51,53,54,56–62)	They described an expectation that there would be less work-life conflict in their roles abroad: 'I've spoken to people who are doing A&E there [in New Zealand], and it's very similar, but, less hours. So, they normally do four days a week, whereas, right now, I'm doing seven ... and I'm working from either two or three, 'till midnight, every day. Next week, I'm going straight into nights. So that's two weeks that I cannot have any social life. (44)
	Breaks (36,38–40,43,48,54)	The freetext responses highlighted the fact that incessant beeps and lack of cross cover can sometimes make it impossible to take proper breaks. (38)
	Rotas (28,39,40,42–44,47,48,51–53,58,63)	Participants felt a loss of control across a broad range of factors during foundation years, including ... rotas. Participants also expressed great difficulties in arranging study leave or annual leave, feeling 'controlled by rota coordinators'. (39)
	Facilities (28,36,38,40,43,44,47,49,52,54,60,63–67)	The facilities for doctors within the trusts was a strong sub-theme ... , with doctors commenting that poor rest facilities, limited access to catering facilities and expensive, limited parking impacted on their feelings of being unappreciated. (52)
Support and Relationships	Supervision (28,37,40,42,43,45,47,49–51,55,59,68,69)	UK trainees' satisfaction in relation to their training programme was positively and significantly affected by the level of clinical supervision ($\beta_1 = 0.379$; p -value < 0.001), which is the explaining variable showing the strongest effect, among those included into this study. (50)

	Support from peers, seniors, management (28,36,37,39–45,47–50,54,59,60,67,69–75)	Lack of support from seniors was reported in a number of foundation jobs, and affected the F2s' enjoyment at work. 'In neurosurgery the registrars weren't very... they're not a very supportive bunch. There's someone suddenly blowing a pupil and you're like, is this person dying? What am I going to do? They'd be like, I'm busy, sort it.' (44)
	Wellbeing support (40,47,48,56,75,76)	A third of trainees told us that they're unsure who to approach at work about their own health and wellbeing. (47)
	Team connection (36,40,42–45,48,55,58,62,63,73,74,77)	Junior doctors also spoke of the detrimental impact that the medical hierarchy could have on their relationship with consultants. Too often, a focus on seniority and status created distance and tension between colleagues: not only between colleagues at different career stages, but also between colleagues in different specialties and teams. (40)
	Bullying and discrimination (37,40–45,48,51,54,59,68,73,74,76,78,79)	One hundred and ninety-one doctors (42.6%) had experienced bullying in the workplace, 122 (27.2%) by more senior doctors, 45 by a nurse (11.8%), three by a peer, two by a manager, one by a patient and eight had been bullied by more than one group. (78)
Learning and Development	Learning opportunities (3,11,28,36,39–41,43–45,47–49,51,52,54,55,58,59,62)	Most trainees agreed that there were several factors limiting learning opportunities, including time pressures, large volume of patients, frequent interruptions, lack of follow-up of cases, ... and that they often did not have the chance to present their patients on the PTWR and receive feedback. (55)
	Development opportunities (11,28,39–41,43,44,47,51–54,58,60,66,67,71)	... F2 trainees ... are thinking about their long-term career plans and the broader skillset they may need in the future. Trainees talked about having a portfolio career or wanting to do other things alongside clinical work, such as teaching, medical education, service improvement and positions in management and leadership. (58)
	Training programme arrangements (application, assessment, rotations) (3,28,37–45,48,51,52,54,58–61,63,65–69,71,74,79)	In addition to feeling that it was too early to make long term career decisions, doctors identified deficiencies in their preparation for choosing between specialties because of limited exposure to specialties ... (45)

		<p>ARCPs were described as a 'checkbox exercise' in 27 of the 65 interviews and focus groups; this was generally a criticism of populating the e-portfolio. ARCPs were felt to test clerical ability rather than clinical ability, which some believed were inversely correlated. (68)</p> <p>For F2s to accept a training position with an undesirable rather than a desirable geographical location, the expected potential earnings should be increased by 45.74%. This is the largest estimated WTP value, thus, indicating that a move from a desirable to an undesirable location would be the main driver of F2 doctors' choices. (67)</p>
Lack of Flexibility		<p>The 2019 survey also asked questions to attempt to establish scenarios or working practice that might encourage direct entry to specialty following foundation training. The most popular scenario was for trainees to have more control over their geographical location, jointly following by the ability to secure leave to get married and to take time out of training programme activities. (3)</p>
Outcomes	<p>Not feeling valued</p> <p>(28,36,39-45,48,49,51,52,54,55,58,59,61,62,66,68,69,73,77,78)</p>	<p>The general morale appeared low, both within participants and their colleagues. There was a sense that junior doctors feel undervalued and under-appreciated. Participants described being treated 'like a ward mule' or feeling used for 'service provision'. (39)</p>
	<p>Lack of autonomy</p> <p>(11,36,39,41,43,44,48,52,54,58,62)</p>	<p>There was also a sense of loss of autonomy, with participants feeling a sense of self-sacrifice and 'helplessness'. One even described 'Feeling like some greater power is in control of your life the whole way through'. (39)</p>
	<p>Poor work-life balance</p> <p>(3,36,38,39,41-45,48,49,51,52,54,58,59,61,66,76,79)</p>	<p>At its most extreme, a few trainees talked about being a doctor being a dehumanising experience that prevented participation in activities outside of work, such as having a family and being involved in the wider community. 'You can't be a person and a doctor.'</p>

		'You're almost not viewed as a human being who has the right to have a family, to be involved in society, you know, involved with church or local charities or whatever.' (59)
	Compromised patient care (36,39,41,44–46,48,53,54)	While all participants had a strong desire to do their best for patients, one reflected with regret that he became resentful of patients due to work overload. Others described feeling they were fighting an uphill battle: 'You couldn't do a good job. And we are all people that aspire for the best... the fight you were having everyday just to scrape through, and you're constantly providing inadequate care to people that you really want the best for'. (39)
	Need for a break (39,44,52,54)	The general feeling was that the difficulties within the practicalities of securing their FY3 year were outweighed by the ability to 'get off the treadmill' and looking after their own resilience and recharging. (52)



PRISMA 2020 Checklist

E 1 Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	Page 1 (NB Integrative not Systematic Review)
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	N/A (Integrative review)
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	Introduction (Page 3 and 4)
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	Introduction (Page 4)
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	Method (Page 6)
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	Method (Page 5)
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	Method (Page 5)
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	Method (Page 5 and 6)
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	Method (Page 6)
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	N/a
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	N/a
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	Method (Page 6)
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	N/a
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	N/a
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data	N/a



PRISMA 2020 Checklist

E 1 Section and Topic	Item #	Checklist item	Location where item is reported
		conversions.	
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	Method (Page 6)
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	Method (Page 6)
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	N/a
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	N/a
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	N/a
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	N/a
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	Figure 1
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	N/a
Study characteristics	17	Cite each included study and present its characteristics.	Appendix 1
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	N/a
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	N/a
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	N/a
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	N/a
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	N/a
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	N/a
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	N/a
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	N/a
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	Discussion (Page 13)
	23b	Discuss any limitations of the evidence included in the review.	Discussion (Page 14)
	23c	Discuss any limitations of the review processes used.	Discussion (Page 14)
	23d	Discuss implications of the results for practice, policy, and future research.	Discussion



PRISMA 2020 Checklist

E 1 Section and Topic	Item #	Checklist item	Location where item is reported
			(Page 13-16)
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	Review not registered
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	Not prepared
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	N/a
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	Funding statement (Page 18)
Competing interests	26	Declare any competing interests of review authors.	Competing interests statement (Page 18)
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	N/a

From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ* 2021;372:n71. doi: 10.1136/bmj.n71

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