

BMJ Open Changes to national postgraduate medical education during COVID-19: a scoping review of practice and impact within the UK

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ABSTRACT

Objectives Explore what is known about the impact of changes made at a national level to UK postgraduate medical education during COVID-19.

Design A scoping review, following Arksey and O'Malley's framework, reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews Checklist.

Data sources Ovid MEDLINE, Ovid Embase and ERIC were searched for peer-reviewed literature, and grey literature was searched via DuckDuckGo. The initial search was conducted on 17 January 2023 and updated on 5 June 2024. Forward citation tracking was performed.

Eligibility criteria English-language studies of any design examining national-level adaptations to postgraduate medical education (eg, curricula, examinations and Annual Review of Competency Panels (ARCPs)) within the UK during the COVID-19 pandemic. Studies were excluded, which focused solely on undergraduate education, international settings, grassroots-level changes (eg, to individual teaching sessions), or where full text was unobtainable.

Data extraction and synthesis Data were extracted using a piloted charting form and analysed thematically to identify recurring patterns across studies. Basic numerical data were collected to describe study characteristics.

Results Of 1067 records screened, 30 studies met inclusion criteria. Most were cross-sectional surveys, with a strong representation from surgical and craft specialties. Four themes were identified: (1) impact on career development (including concerns about career delays and shifts in aspirations); (2) impact on trainee progression (highlighting delays due to ARCP outcomes 10.1/10.2 and reduced procedure accreditation); (3) changes in teaching and learning (such as a shift to online learning and cancelled rotations) and (4) supervision and support (revealing mixed experiences, with reports of burnout and inadequate organisational guidance). The systemic impact was uneven across specialties and training stages.

Conclusions National-level changes mitigated immediate educational disruptions but are beginning to reveal long-term consequences for career development, workforce planning and trainee well-being, highlighting the need for resilient and equitable future frameworks.

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ The study follows a rigorous scoping review methodology, drawing on Arksey and O'Malley's framework and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews checklist to support systematic analysis.
- ⇒ Synthesises evidence across multiple specialties and training stages, highlighting cross-cutting impacts of national educational changes during COVID-19.
- ⇒ Inclusive of a broad spectrum of stakeholder experiences, including trainees, supervisors, organisational leaders and employers.
- ⇒ Studies from surgical and craft specialties are prominent, which may limit transferability to other specialties.
- ⇒ The review focuses on changes and impact within the UK, which limits transferability to international contexts.

INTRODUCTION

The COVID-19 pandemic acted as a stress test for postgraduate medical education systems, amplifying challenges and driving change and adaptation.¹ In the United Kingdom (UK), the rapid implementation of changes to curricula, professional examinations and progression frameworks aimed to maintain the delivery of medical education during a time of great disruption. These adaptations, while essential, have longer term consequences that warrant consideration, particularly in the context of an ongoing NHS workforce crisis and significant retention challenges.^{2 3}

Those managing and delivering health-care education need to understand what the impact of COVID-19 has been on both doctors-in-training and wider educational stakeholders, in order to anticipate and respond to the ongoing needs of trainees, trainers, leaders and the wider system.^{4 5} There is also important learning from that

experience in order to ensure preparedness for a future similar event, with a future pandemic being a matter of ‘when’, not ‘if’.² While another pandemic will have its own unique demands and features, understanding the effects, successes and weaknesses of responses to COVID-19 can inform effective preparations.

While there are postgraduate publications reporting, evaluating and summarising adaptations to teaching at the level of the individual (ie, on making changes to individual teaching sessions/series), and a global scoping review of changes around teaching innovation during COVID-19, which included 5 UK-specific papers,⁶ we have not yet seen a comprehensive synthesis of the impact of changes to the educational framework, which governs medical training at a national level—that is, to specialty curricula and associated postgraduate examinations.⁷ Not knowing trainees, trainers and leaders’ experiences of these national changes, and their legacy represents a significant gap in knowledge.

Changes to curricula, professional examinations and progression reviews (eg, Annual Review of Competency Panels, ARCP) affected all postgraduate doctors-in-training in the UK, across specialties and geographies. Synthesising and evaluating these changes within UK medical can offer important insights into what worked well, key challenges and how adaptations operationalised at short notice may meaningfully influence educational strategies beyond COVID-19.

The purpose of this scoping review is to explore what is known about the impact of changes made at a national level to UK postgraduate medical education during COVID-19, focusing on the experiences of doctors-in-training and educational stakeholders.

Changes to postgraduate medical education in the UK during COVID-19

In the UK, postgraduate medical training begins after completion of a medical degree and a 2-year foundation programme. Trainees then enter specialty training programmes, which vary in length depending on specialty and lead to the Certificate of Completion of Training (CCT), qualifying doctors to practise independently as consultants or general practitioners. Training is structured around approved curricula, workplace-based assessments, postgraduate exams and the ARCP, an annual process that determines whether a trainee can progress to the next stage of training.⁸ Standard ARCP outcomes include: outcome 1 (progressing as expected), outcome 2 (needs targeted support) and outcome 3 (requires additional training time).⁸

As the likely impact of COVID-19 became apparent in March 2020, bodies responsible for the oversight and governance of medical education and training (including the statutory regulator, the General Medical Council (GMC), the Royal Colleges and faculties responsible for curricula and examinations and the UK Statutory Education Bodies responsible for the delivery and quality management of education) developed several

derogations—that is, temporary exceptions or relaxations of standard postgraduate training requirements—to mitigate adverse effects from the disruption to normal health-care. These were implemented in four areas:

Curricula changes allowed trainees to progress without achieving all the requirements of the normal curriculum. These included, for most programmes, changes in the evidence required to demonstrate experience and competence. For some specialties, requirements in relation to particular activities were suspended entirely (eg, quality improvement projects), to reflect the impact of COVID-19 on clinical work. However, the requirements to complete training programmes and meet expected outcomes were not changed.

Changes to exam formats and processes allowed exams to be taken remotely, or with reduced contact between trainees, patients and examiners. These changes primarily involved a move to online delivery for knowledge tests. Adaptations were facilitated by third-party providers offering remote supervision or proctoring. Practical clinical examinations changed in several ways, including the use of simulated and online consultations. For example, the Royal College of GPs moved to more videoed consultations in the Recorded Consultation Assessment, replacing the Clinical Skills Assessment.⁹

Changes to the format and composition of progression panels: changes to ARCP panels included a move to online meetings, and there was also relaxation of requirements that panels include external and lay members, although they could be included if available.¹⁰ The provision of feedback to trainees following ARCP, where offered, also moved to online rather than in-person meetings.

Finally, *additional ARCP outcomes* were introduced: these new outcomes (10.1 and 10.2) reflected the impact of COVID-19 on training opportunities, recognising ‘acquisition of competencies/capabilities by the trainee has been delayed by COVID-19 disruption’.¹¹ Online supplemental material for a full list of ARCP outcomes available from April 2020. Outcome 10.1 allowed immediate progression (analogous to outcome 2),⁸ while 10.2 indicated further training time was required (analogous to outcome 3).⁸ Outcome 10.2 was specifically available for trainees at ‘critical progression points’, such as progression from core to higher specialty training, where there was no curricula derogation in place to allow progression. Notably, outcomes 10.1 and 10.2 were explicitly referred to as ‘no fault’ outcomes from the outset.¹²

METHODS

We conducted a scoping review of peer-reviewed and grey literature, following Arksey and O’Malley’s step-wise framework for scoping reviews¹³: (1) identifying the research question; (2) identifying relevant studies; (3) study selection; (4) charting the data and (5) collating, summarising and reporting the results. We used the Preferred Reporting Items for Systematic Reviews and

Meta-Analyses extension for Scoping Reviews Checklist¹⁴ as a quality guide within our review design and reporting.

Identifying the research question

This scoping review developed from a programme of research commissioned and funded by the GMC—*Evaluating the Wider Impacts of Changes to UK Medical Education in Response to the COVID-19 Pandemic*. The research questions stemmed from the focus of this commission, which was the impact of COVID-19 on postgraduate medical education, and the impact of changes made at a national level to postgraduate education delivery.

Our specific research questions for this review were as follows:

1. What literature has examined the impact of the COVID-19 pandemic on UK postgraduate medical education?
2. What does this literature indicate about the impact of COVID-19 on training progression and outcomes?
3. What does this literature report about the experiences and perceptions of stakeholders (including trainees, supervisors, organisational leaders, employers) regarding this impact?

Identifying relevant studies

On 17 January 2023, we ran an initial search of the peer-reviewed and grey literature using Ovid Medline, Ovid Embase and ERIC electronic databases. We also conducted a controlled web search using the search engine DuckDuckGo, which does not track activity across sites and so is less likely to skew results. We reviewed the first 20 pages of the returned search in DuckDuckGo and retrieved all articles from the literature databases. We updated our search on 5 June 2024, across Ovid Medline, Embase, ERIC and through an additional DuckDuckGo web search. We also conducted forward citation searching on the articles identified in our initial search.

Working with an information specialist, we developed the search strategy presented in [table 1](#). This was developed for Ovid Medline and translated to run in Embase and ERIC with the support of a librarian. See supplemental material for the full search strategy for all included databases.

Study selection

All retrieved titles and abstracts were screened by two independent reviewers (either MELB and BB or MELB and GF), with disagreements resolved by a third reviewer (either BB or GF). Inclusion and exclusion criteria are detailed in [table 2](#). In short, we included studies that focused on changes, adaptations or innovations made to UK postgraduate medical education during the COVID-19 pandemic; examined changes implemented at a curriculum or programme level (rather than individual teaching sessions); related to doctors at any stage of UK postgraduate training, as well as relevant supervisors, employers or educational organisations; were published in English; and were published between 2019 and June

2024. We excluded studies that focused on undergraduate or international medical education; described grassroots or local teaching adaptations without addressing curriculum-level or programme-level changes; were commentaries, letters, books or book chapters; or lacked full text, even after attempting to contact the corresponding author.

Full texts of the remaining papers were reviewed by MELB and discussed with the full team.

Charting the data

We created, through group discussions, a data extraction form of relevant content to answer our review questions: study title, authors, year of publication, journal, study design, participant characteristics, descriptions of curricula and associated changes, the impact of changes on outcomes, the impact of changes on experiences, benefits, challenges and directions for future research. Data were extracted (by MELB) from studies included in the review using this form. Final charted data were discussed and agreed as a group. Study quality was not assessed, in line with scoping review methodology.¹³

Collating, summarising and reporting the results

We performed a qualitative thematic analysis¹⁵ on all data, coding was conducted manually in Microsoft Excel using an inductive and descriptive approach, and codes were then grouped into overarching themes through team discussion and consensus to support interpretive rigour.

No specialised qualitative analysis software was used. To support transparency, coding and theme generation were discussed collaboratively among multiple reviewers (MELB, GF, BB, GV), with disagreements resolved through consensus. We did not use a formal bias assessment tool, in line with standard scoping review methodology,¹³ which does not require formal quality appraisal. We also conducted basic numerical counts of contextual information (year published, population studied, stage of training and study type), also in Microsoft Excel. These quantitative data add context to our qualitative findings.

Patient and public involvement

None.

RESULTS

Across all search sites, we retrieved 1067 records for screening. 989 of these records were excluded on title and abstract screening. This is representative of the expansiveness of our search. The text of two records could not be accessed, even with attempted contact with the corresponding authors. The full texts of 66 papers were assessed for eligibility, and 30 were deemed eligible for inclusion in the review. This process, with numerical counts for each stage, is detailed in [figure 1](#), as a PRISMA diagram.

Included papers

The studies included in the final review are listed in online supplemental material. For ease in navigating this

Table 1 Search terms for Ovid MEDLINE(R) ALL (1946 to 6 March 2023)

1	COVID-19/or exp COVID-19 Testing/ or COVID-19 Vaccines/ or SARS-CoV-2/
2	(coronavirus/ or betacoronavirus/ or coronavirus infections/) and (disease outbreaks/ or epidemics/ or pandemics/)
3	(nCoV* or 2019nCoV or 19nCoV or COVID19* or COVID or SARS-COV-2 or SARSCOV-2 or SARS-COV2 or SARSCOV2 or SARS coronavirus 2 or Severe Acute Respiratory Syndrome Coronavirus 2 or Severe Acute Respiratory Syndrome Corona Virus 2).ti,ab,kf,nm,ot,ox,rx,px
4	((new or novel or “19” or “2019” or Wuhan or Hubei or China or Chinese) adj3 (coronavirus* or corona virus* or betacoronavirus* or CoV or HCoV)).ti,ab,kf,ot.
5	(longCOVID* or postCOVID* or postcoronavirus* or postSARS*).ti,ab,kf,ot.
6	((coronavirus* or corona virus* or betacoronavirus*) adj3 (pandemic* or epidemic* or outbreak* or crisis)).ti,ab,kf,ot.
7	((Wuhan or Hubei) adj5 pneumonia).ti,ab,kf,ot.
8	1 or 2 or 3 or 4 or 5 or 6 or 7
9	limit 8 to yr=“2019 -Current”
10	exp Education, Medical, Graduate/ed, mt, st, td(Education, Methods, Standards, Trends)
11	((medicine or medical or doctor* or clinician* or physician* or surgeon* or consultant*) adj2 (educat* or course* or training or teach* or graduate* or postgrad* or post grad* or student* or trainee* or intern* or apprentice* or Junior* or Resident* or Residency)).mp.(mp=title, book title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms)
12	Education, Medical, Continuing/mt, og, st, td(Methods, Organization & Administration, Standards, Trends)
13	((((((((((allergy and immunolog*) or An?esthetics or dermatolog* or diagnostic radiolog* or emergency medic* or family medic* or general practic* or Internal medic* or Acute internal medic* or audiovestibular medic* or audio vestibular medic* or Cardiolg* or endocrinolog* or Gastroenterolog* or geriatric medic* or Genitourinary medic* or genito urinary medic* or Haematology* or medical oncolog* or metabolic medic* or palliative medic* or Medical genetic* or neurolog* or nuclear medic*OR obstetrics) and gyn?ecolog*) or ophthalmolog* or Pathology* or P?ediatric* or physical medicine) and rehabilitation) or rehabilitation medic* or renal medic* or nephrolog* or respiratory medic* or rheumatolog* or sports) and exercise medic*) or preventive medic* or Psychiatr* or learning disabilit* or medical psychotherapy or intensive care medic* or Histopatholog* or histo patholog* or diagnostic neuropatholog* or radiation oncolog* or Surge* or public health or Urolog* or vascular Surgery* or neurosurge* or plastic surge* or trauma) and orthop?edic surge*) or p?ediatric surge* or Otolaryngolog* or core surge* or general surge* or oral) and maxillofacial surge*).mp. [mp=title, book title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept) word, protocol supplementary concept) word, rare disease supplementary concept) word, unique identifier, synonyms
14	“psychiatry and psychology (non mesh)”/ or medicine/ or addiction medicine/ or adolescent medicine/ or “allergy and immunology”/ or anesthesiology/ or bariatric medicine/ or behavioral medicine/ or clinical medicine/ or community medicine/ or dermatology/ or emergency medicine/ or forensic medicine/ or general practice/ or genetics, medical/ or geriatrics/ or global health/ or hospital medicine/ or integrative medicine/ or internal medicine/ or military medicine/ or molecular medicine/ or naval medicine/ or neurology/ or osteopathic medicine/ or palliative medicine/ or pathology/ or pediatrics/ or perioperative medicine/ or “physical and rehabilitation medicine”/ or psychiatry/ or public health/ or radiology/ or regenerative medicine/ or reproductive medicine/ or social medicine/ or specialties, surgical/ or colorectal surgery/ or general surgery/ or gynecology/ or neurosurgery/ or obstetrics/ or ophthalmology/ or orthognathic surgery/ or orthopedics/ or otolaryngology/ or surgery, plastic/ or surgical oncology/ or thoracic surgery/ or traumatology/ or urology/ or sports medicine/ or optometry/ or psychology, medical/
15	13 or 14
16	10 or 11 or 12 or 15
17	Curriculum/ed, mt, st, td(Education, Methods, Standards, Trends)
18	((curricul* or syllab* or program* or study or studies or timetable* or time table* or schedule* or module* or subject* or trend* or assessment* or assessing or assess or assessed or framework* or frame work* or structure* or strateg*) adj2 (change* or adjust* or adapt* or derogation* or new)).mp.(mp=title, book title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms)
19	17 or 18
20	9 and 16 and 19

Table 2 Screening criteria

	Inclusion criteria	Exclusion criteria
Intervention	All material focusing on changes, adaptations or innovations during COVID-19 at a curricula or programme level.	Material focused on changes made at a grass-roots level (eg, to the delivery of a teaching session)
Setting	Studies of postgraduate medical education in the UK.	Studies relating to the undergraduate medical education setting within the UK or any setting outside the UK
Participants	Doctors at any stage of postgraduate training, within any specialty; their supervisors in any capacity, employers, and educational organisations (HEE, NES, etc.).	International literature focused on COVID-19 derogations outside of a UK context
Study design	All study designs. Empirical studies. White papers, grey literature not published in a peer-reviewed and indexed journal (eg, conference papers, abstracts, and posters).	Commentaries, letters, books, book chapters
Language	Published in the English language.	Non-English language papers
Other	Not applicable.	Those without full text following contact of the corresponding author

HEE, Health Education England; NES, NHS Education for Scotland.

online supplemental material, we have included their corresponding in-text reference number and key study details.

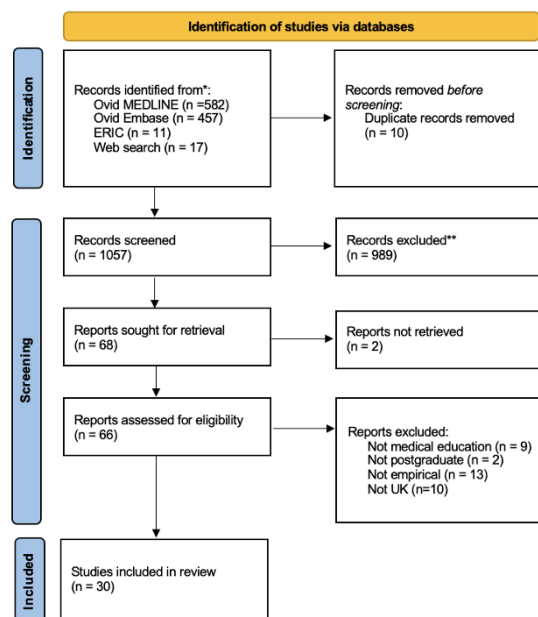


Figure 1 PRISMA diagram detailing the process of study identification, screening and inclusion. *Records were identified through systematic searches of Ovid MEDLINE, Ovid Embase, ERIC, and web-based sources (Google Scholar and relevant organisational websites) with English language restrictions. **Records were excluded based on title and abstract screening for not meeting inclusion criteria (eg, not related to medical education, not postgraduate, not empirical or not focused on UK context). PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

Summary of included articles

Of the final 30 included articles, 4 were published in 2020, 9 in 2021, 11 in 2022, 3 in 2023 and 3 in 2024. The peak in 2022 likely represents the publication of research conducted during the first wave of COVID. A range of specialities are represented in included studies (gastroenterology, anaesthetics, radiology, paediatrics, orthopaedics, cardiothoracic surgery, oral surgery, plastic surgery, obstetrics and gynaecology and public health), as well as perspectives from the foundation programme (2-year nationwide training programme postgraduation for new doctors in the UK), and studies that report across a range of surgical, or surgical and medical, specialities.

The studies skew towards perspectives from surgical and craft specialities (n=19). In the UK context, craft specialities are procedure-based disciplines—such as surgery, radiology, anaesthetics and emergency medicine—that often involve technical skill acquisition through supervised practice.

As per our inclusion criteria, all studies are empirical. There is a high proportion of cross-sectional mixed-methods surveys (n=22), with three studies collecting quantitative data from portfolios and ARCP, four interview studies, and one focus group study.

Thematic analysis

We identified four themes through thematic analysis of the included studies' data, which are summarised below. We have chosen to present themes in an order, which highlights and emphasises systemic impacts, before reporting more individual and logistical experiences.

1. Impact on career development.
2. Impact on trainee progression.

3. Changes in teaching and learning.
4. Supervision and support.

Impact on career development

The first theme reflects the long-term consequences of the pandemic on trainees' career trajectories, highlighting systemic challenges with potential implications for future workforce planning.

Some trainees were concerned that the reduced access to teaching and learning opportunities would negatively affect their achieving their career aspirations,¹⁶ and there were also reports of uncertainty about career decisions, due to trainees missing planned rotations, which would have helped inform those decisions.^{17 18} Limitations on experience imposed by shielding also raised concerns about career development for those affected trainees.¹⁹ Reduced opportunities outside clinical work, such as research, were also identified as potentially limiting career opportunities, particularly for early career trainees.^{16 17}

Some trainees indicated a change in career goals because of the pandemic. Some reported wanting to take a career break and/or work abroad following the pandemic, for reasons that included the personal toll of the pandemic, or wanting to develop additional core experience.^{20 21} Foundation trainees who did not rotate in 2020 reported that they came to favour the specialty they had spent longest within—the continuity they experienced positively influenced their view of that specialty as a career, but there were concerns about working as a specialty trainee in an area in which they had had no prior experience as a Foundation doctor.¹⁷ Some trainees redeployed to intensive care reported such a positive experience that they wished to continue training in that specialty.²²

Despite challenges, the pandemic provided some opportunities for skill development. Some trainees, particularly those who were redeployed, had the opportunity to develop new procedural skills (eg, line insertion) and knowledge (eg, ventilator management) as well as enhanced communication skills (eg, breaking bad news).²² Trainees in one study reported opportunities to develop management and leadership not only through online courses but also through involvement in managing the pandemic response.²³ There were also increased opportunities for reflection on practice.²³

Impact on trainee progression

Our second theme reflects descriptions of the impact of changes to teaching and learning on trainee progression. Here, some papers did explicitly address the national changes, and specifically the introduction of the COVID-19 ARCP outcomes 10.1 and 10.2.

More 10.1 outcomes than 10.2 were reported^{24 25} and it was more common for a higher stage trainee to be awarded a 'no fault' outcome than a core trainee (doctors in earlier stages of specialty training, typically within first 2–3 years).²⁵ Women, and those who were older at the

start of their training, were more likely to receive a no-fault outcome.²⁶ Outcome 6 awards (reflecting successful completion of training, CCT) remained unchanged, with a reduction in outcome 2s, 3s and 5s awarded,²⁵ although another paper reported fewer trainees obtaining their CCT.¹⁶ Cancellation of exams was cited as a reason for delaying CCT.^{16 24 27} Studies identified anxiety about meeting ARCP requirements, given reduced exposure to some conditions, and reduced opportunities for supervised learning events.^{23 25 27} There was reported evidence of reduced accreditation in key procedures (eg, oesophago-gastroduodenoscopy, colonoscopy) within gastroenterology.¹⁶ Shielding trainees appreciated the availability of out of programme pauses (introduced in Gold Guide 8th edition).¹⁹

Some trainees experienced delays in progression following a 10.2 outcome, and the risk of long-term impact on their careers was raised.^{23 28} Interestingly, however, some trainees expressed preferences, particularly early in the pandemic, for extensions to their training.^{24 25 29 30} However, most wished for this to be a voluntary option later in their training, rather than adding time at their current stage and felt they had enough experience to progress currently.^{18 31 32} Few were aware of the eligibility criteria for extensions. One study noted that trainees did not gain enough exposure to subspecialties during COVID-19 and would prefer to repeat subspecialties completed during the height of the pandemic later in training.³²

The cancellation of study days was also a major challenge for trainees, with a loss of valuable training opportunities, which may impact the development of skills and knowledge necessary for career progression.^{16 24 27}

Changes in teaching and learning

Several papers described significant changes to teaching and learning during the pandemic—both within clinical environments and within formal programmes of teaching.

Within work-based clinical learning environments, the changes brought about by the pandemic had a significant, negative impact on the availability of learning opportunities.^{16 20 23–25 31 33–39} These disruptions occurred at multiple levels, affecting specific specialties, training programmes and individual trainees.

Specialty disruptions: the effects were particularly pronounced in surgical specialties, where the loss of elective surgery lists^{20 24 25 36–38} and face-to-face clinic appointments^{19 29 40} limited opportunities for skill development. Conversely, public health trainees reported gaining valuable experience in managing pandemic responses, highlighting the variable impact across specialties.²²

Programme disruptions: at the programmatic level, disruptions to rotations affected trainees' ability to gain diverse experiences. Acute demands on COVID-19 wards and the need to cover staff sickness led to redeployment—voluntary or mandatory—outside of trainees' specialties for some across training grades.^{23 34 41 42} Planned rotations to new specialties were cancelled for many foundation

programme trainees in 2020, narrowing their exposure to clinical environments.^{17 43} Within formal teaching, one of the main changes reported was a shift towards virtual or online teaching.^{16 18 19 24 27 29 30 33 34} In some cases, online teaching allowed greater flexibility and accessibility, enabling more trainees to participate in educational activities.^{18 24 27 33} For others, online teaching could be challenging—some trainees struggled to engage with online material (sometimes due to technical issues) and felt isolated from peers and seniors.^{23 31 34} These findings highlight the evolving learning experiences available to trainees during the pandemic and their implications for future educational strategies.

Individual disruptions: for individual trainees, shielding requirements often involved working from home, which limited their opportunities for in-person clinical experience.^{19 23 34 44} However, the increased use of telephone and video consultations provided alternative learning opportunities for some and mitigated the loss of traditional clinical exposure.³³

Supervision and support

The importance of support, from supervisors, teams and the wider organisation, was also identified as important in several studies.

Remaining within one clinical team provided continuity of support for some trainees.¹⁷ Some trainees reported their relationships with supervisors could also provide this,^{18 31} with regular virtual meetings and email support being valuable.¹⁷ However, others found that their supervisors were not always able to provide the support they needed, due to increased consultant clinical workloads.^{25 32} The lack of opportunities for in-person feedback from senior colleagues and supervisors was concerning from some trainees.³⁴ There were many reports of trainees experiencing burnout, poor mental well-being during the pandemic and not receiving adequate support.^{36 38 45}

Concerningly, trainees reported a lack of organisational support, manifested through a lack of personal protective equipment (PPE),²³ increased workload,²³ low vaccine uptake in some trusts, which trainees felt meant they were working in unsafe organisational environments,¹⁹ and a failure for some work environments to adhere to necessary infection control measures.¹⁹

There was also uncertainty regarding the changes made to medical education and desire for greater clarity from organisational leaders.^{21 25 28 43} Shielding trainees were asked by some trusts to use annual leave rather than shielding, which caused anxiety and concern.¹⁹ The importance of preparation for redeployment,^{34 41 42} and clear departmental guidance, such as working from home protocols,³¹ and guidance regarding activities for shielding trainees^{19 44} were noted.

DISCUSSION

We set out to explore the impact of national changes made to UK postgraduate medical education during the COVID-19 pandemic. This scoping review has revealed

that national changes have had a significant impact on cross-speciality educational processes, and on the professional trajectories of doctors-in-training. There was a national shift to online learning and virtual assessments, modifications in curricular requirements to allow progression without meeting usual criteria and the introduction of new annual outcomes to acknowledge and account for disruption caused by the pandemic. The impact of these changes was varied—while some brought benefits (eg, the flexibility of online learning), there were many challenges (eg, lack of support, stress and burnout), and there remain ongoing concerns (eg, the preparation of trainees for practice, workforce shortages). In this discussion, we consider the *broader implications*, and *legacy*, of these national changes.

Several interventions brought immediate benefits—ARCP outcomes 10.1 and 10.2 were introduced as compassionate, flexible options to acknowledge lost opportunities; remote examinations and online teaching enabled continuity; and redeployment, though disruptive, occasionally created unexpected skill development or clarified career interests. However, each change also carried unintended consequences. Questions emerged regarding the fairness and clarity of ARCP outcomes, the adequacy of online learning as a substitute for clinical experience and the long-term effects of rotation cancellations and redeployment on trainee preparedness. These tensions are especially visible when considering one of the most consistently reported challenges in the literature: career progression.

Trainees, understandably, expressed significant anxiety regarding meeting ARCP competencies, and being able to progress without delay.^{23 25 27} The introduction of the ‘no fault’ outcomes (10.1 and 10.2), while intended to acknowledge the impact of the pandemic on training, was not without issue, with studies reporting delays in trainee progression,^{23 28} and trainee preferences for autonomy in deciding when to extend training.^{18 31 32} Coupled with the reports of delaying CCT,¹⁶ and reduced accreditation in key procedures in some specialities,¹⁶ concerns regarding workforce planning seem to be mounting.

Johnston *et al*, within the context of Australian medical practice, voice significant concerns regarding the career progression of junior doctors postpandemic, drawing attention to an impending workforce ‘bottleneck’, where ‘failure to progress at the expected rate may result in a surplus of junior doctors for positions available’.⁴⁶ Within the UK, similar concerns exist regarding training bottlenecks,^{47 48} which are exacerbated by the ongoing and escalating workforce crisis.⁴⁹ The findings of this review add to this context, highlighting how the pandemic’s impact on progression extends far beyond immediate disruption. This includes not only direct delays to CCT but also an increasing prevalence of desires for career breaks or changes,²⁰ and long-term risks such as disillusionment and burnout.^{36 38 45} These challenges are compounded by systemic issues, such as inadequate interpersonal and organisational support (evidenced through,

Table 3 Key considerations from analysis of this scoping review

Theme	Consideration
Impact on career development	Provide additional support for career planning and mentorship during disruptions. Post-pandemic, ensure catch-up of missed career development opportunities and planning. Support flexible ways of working, and career paths and provide guidance on alternative careers as appropriate.
Impact on trainee progression	Develop contingency plans for trainee progression during disruptions. Post-pandemic, establish a framework for recovery of missed training opportunities for example, supplementary rotations, increase in protected study days/study time, targeted workshops/simulations. Ensure trainee autonomy in taking up this offer.
Changes in teaching and learning	Support the maintenance and rapid delivery of online teaching to improve engagement and access. Continue to consider, appropriately acknowledge and support addressing of the impact of missed teaching opportunities during COVID-19 on the craft specialities.
Supervision and support	Continue to improve support mechanisms for trainees, including mental health resources and peer support networks. During times of crisis, implement a more resilient model of supervision that includes backup supervisors and networks of mentors, to guarantee trainees continue to receive guidance/feedback. Ensure adequate supervisor availability and training to address increased demands post-pandemic.

eg, PPE shortages²³) that have resulted in a disillusioned workforce.

Johnston *et al* also highlight the need for future research on career progression post-COVID,⁴⁶ which this review empirically supports, by identifying an absence of longitudinal follow-up studies, or studies focused specifically on the impact of medical education adaptations on career planning and aspirations. There are other notable gaps in available literature. While we were interested in, and scoped the literature for, the experiences of postgraduate doctors-in-training and educational stakeholders, we found an absence of work reporting the experiences of educators and academic leaders. This is an important gap, as an understanding of this group's experiences could generate rich data on the challenges and enablers of implementing educational change during times of upheaval.

Wider programme of research

This scoping review developed from a wider project,⁵⁰ which assessed the systemic and stakeholder-level impacts of changes introduced in 2020 in response to pandemic-related disruptions to practice and training. This project included a rapid review of the literature as well as qualitative stakeholder interviews and secondary data analysis. Following this, we were aware of the ongoing need for a more systematic and wide-reaching scoping review, as the rapid review and interviews revealed gaps in existing knowledge, particularly concerning the long-term effects of adaptations on the learning experiences of trainees.

Strengths and limitations

We adhered closely to established scoping review methodology, utilising Arksey and O'Malley's framework¹³ and the PRISMA ScR checklist,¹⁴ to support the rigour and transparency of our project. The review synthesises

evidence across multiple specialties and training stages, providing a cross-cutting view of national educational changes during COVID-19. We believe this is a useful foundation for future research in this area and could inform policy regarding changes to medical education during crises.

There are several limitations to consider. Importantly, this review focuses solely on UK postgraduate medical education, which may limit its relevance in international contexts. In addition, our search is limited by the databases we selected. While we were guided by a librarian's expertise regarding selection of our three included databases, it is possible that relevant studies could have been overlooked if they were not indexed in the databases we selected, and this may have led to selection bias. Some limitations of our review relate, not to the conduct of this review, but rather to the limitations of the literature we have included. For example, our literature skews towards the craft specialties, meaning that these findings may hold less relevance for other, non-craft specialties. Furthermore, our review suggests that the amount of research on the impact of COVID-19 within postgraduate medical education is decreasing, likely indicating shifting research priorities. This might limit the comprehensiveness and applicability of our findings over time, as continued impacts may emerge that are not reported by the literature.

Considerations

The consequences of COVID-19 on postgraduate medical education outlined in this review will likely persist for years, as trainees continue to navigate the challenges of delayed progression, missed opportunities and the personal and professional tolls of COVID-19. Addressing this requires urgent, targeted and sustainable interventions that go beyond existing policy frameworks.^{51 52}

We have brought together several considerations for educators and system leaders. These have been developed as part of this scoping review's dissemination strategy and are separate from the original GMC commission that funded the foundational work of this review.

We have reported these, grouped by theme for context, in [table 3](#).

CONCLUSION

This scoping review provides a comprehensive synthesis of what is known regarding the impact of the national, postgraduate changes made to medical education during COVID-19. Available literature reports the significant and mostly negative impact on doctors-in-training of the shift to online learning, loss of training opportunities, adaptations to assessments (including ARCPs), delays in progression and loss of support at both interpersonal and system levels. Though scholarship in this area is waning, there remain gaps in our understanding regarding the long-term impact on career progression and workforce planning, and regarding the experience and impact of national changes to education from the perspective of educational leaders. Future research could consider this, alongside exploring the effectiveness of the recommendations we have suggested above. This review supports recent literature calling for an increased focus on workforce retention^{50 51} and highlights the importance of flexible and resilient medical education frameworks to enable effective medical training and promote a sustainable workforce.

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Contributors GV, BB, GF and MB were responsible for conceptualising the review. MELB, GV, BB and GF were responsible for review design. MELB led on collecting data by reviewing studies, with support from GF and BB/GV. All authors (MELB, GF, BB, GV) were involved in analysis. MELB prepared the first draft of the paper and all other authors (BB, GF, GV) critically revised the work. All authors (MELB, GF, GV, BB) approved the final version for publication and agree to be accountable for all elements of the work. GV is responsible for the overall content as guarantor. ChatGPT-4o was used to generate a summary of the paper, that the abstract was created from. A draft of the paper sections (introduction, methods, results, discussion, background) was fed into ChatGPT, with the prompt 'summarise the content of this academic paper into an academic abstract'. This summary was helpful in identifying prominent key messages and design choices. It was reworded in the authors' own words, and the BMJ Open subheadings for an abstract were then followed.

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REFERENCES

- 1 Sahi PK, Mishra D, Singh T. Medical Education Amid the COVID-19 Pandemic. *Indian Pediatr* 2020;57:652-7.
- 2 Eva KW. Publishing during COVID-19: Lessons for health professions education research. *Med Educ (Chicago Ill)* 2021;55:278-80.
- 3 Bughara MS, Swanberg SM, Lucia VC, et al. Beyond COVID-19: the impact of recent pandemics on medical students and their education: a scoping review. *Med Educ Online* 2023;28:2139657.
- 4 Papapanou M, Routsis E, Tsamakidis K, et al. Medical education challenges and innovations during COVID-19 pandemic. *Postgrad Med J* 2022;98:321-7.
- 5 Lock FK, Carrieri D. Factors affecting the UK junior doctor workforce retention crisis: an integrative review. *BMJ Open* 2022;12:e059397.
- 6 Boutros P, Kassem N, Nieder J, et al. Education and training adaptations for health workers during the COVID-19 pandemic: a scoping review of lessons learned and innovations. *Healthcare (Basel)* 2023;11:2902.
- 7 Dedelila A, Papapanou M, Papadopoulos AN, et al. Health worker education during the COVID-19 pandemic: global disruption, responses and lessons for the future-a systematic review and meta-analysis. *Hum Resour Health* 2023;21:13.
- 8 Conference of Postgraduate Medical Deans of the United Kingdom (COPMED). *A reference guide for postgraduate foundation and specialty training in the UK: gold guide*. 9th edn. 2022. Available: <https://www.copmed.org.uk/images/docs/gold-guide-9thedition/Gold-Guide-9th-Edition-August-2022.pdf>
- 9 RCGP. Introducing the SCA. 2023. Available: <https://www.rcgp.org.uk/mrcgp-exams/simulated-consultation-assessment/introduction>
- 10 Health Education England. COVID19 and annual reviews of competency progression for specialty training programmes 2020/21: supplementary guidance for trainees and HEE PGME local teams. 2020. Available: <https://madeinheene.hee.nhs.uk/Portals/0/ARCP%20supplementary%20guidance%20-%20Nov%2020.pdf>
- 11 Health Education England, NHS Education Scotland, Northern Ireland Medical and Dental Training Agency, Health Education and Improvement Wales. Supporting the COVID-19 response: enabling progression at ARCP. 2020.
- 12 Statutory Education Bodies. Supporting the COVID-19 response and enabling progression at ARCP. Health Education England; 2020. Available: <https://www.hee.nhs.uk/sites/default/files/documents/Supporting%20the%20COVID19%20response%20and%20enabling%20progression%20at%20ARCP.pdf>
- 13 Arksey H, O'Malley L. Scoping studies: towards a methodological framework. *Int J Soc Res Methodol* 2005;8:19-32.
- 14 Tricco AC, Lillie E, Zarin W, et al. PRISMA extension for scoping reviews (PRISMA-ScR): checklist and explanation. *Ann Intern Med* 2018;169:467-73.
- 15 Terry G, Hayfield N, Clarke V, et al. Thematic analysis. In: *The SAGE handbook of qualitative research in psychology*. 2nd edn. 2017: 17-37.
- 16 Raju SA, Harris R, Cook C, et al. UK-wide study of the opinions of gastroenterology trainees: COVID-19, Shape of Training and the future workforce. *Frontline Gastroenterol* 2022;13:386-91.
- 17 Sasitharan A. COVID-19: The impacts on foundation training in district general hospitals in the East of England and the East Midlands. *Clin Med (Lond)* 2020;20:e253-4.

- 18 Gonzi G, Gwyn R, Rooney K, *et al.* The role of orthopaedic trainees during the COVID-19 pandemic and impact on post-graduate orthopaedic education: a four-nation survey of over 100 orthopaedic trainees. *Bone Jt Open* 2020;1:676–82.
- 19 Slater T, Round J. Shielding during medical training: an exploration of effects, consequences and best practices. *Future Healthc J* 2022;9:291–4.
- 20 Kilday C, Laughey W, Boland JW. Educational impact of COVID-19 on foundation doctors and the decision to take a break from structured approved training programmes in the United Kingdom. *Clin Teach* 2024;21:e13667.
- 21 Subramaniam J, Durrant F, Edwardson S, *et al.* Recruitment to higher specialty training in anaesthesia in the UK during the COVID-19 pandemic: a national survey. *Anaesthesia* 2022;77:538–46.
- 22 Payne A, Rahman R, Bullingham R, *et al.* Redeployment of surgical trainees to intensive care during the COVID-19 pandemic: evaluation of the impact on training and wellbeing. *J Surg Educ* 2021;78:813–9.
- 23 Harmer MJ, Southgate G, Raja M, *et al.* Paediatric trainees' training experiences during the COVID-19 pandemic: a national survey. *Arch Dis Child Educ Pract Ed* 2022;107:64–70.
- 24 Jayatilaka MLT, As-Sultany M, Gabr A, *et al.* Collaborative Overview of coronavirus impact on ORTHopaedic training in the UK (COVI - ORTH UK). *Surgeon* 2021;19:e331–7.
- 25 Clements JM, Burke J, Nally D. COVID-19 impact on Surgical Training and Recovery Planning (COVID-STAR) - A cross-sectional observational study. *Int J Surg* 2021;88:105903.
- 26 Barter CA, Humes D, Lund J. The impact of the covid-19 pandemic on annual review of competency progression outcomes issued to general surgical trainees. *J Surg Educ* 2024;81:1119–32.
- 27 Duggan I, Hablase R, Beard L, *et al.* The impact of COVID-19 on O&G trainees; where are we now? *Facts Views Vis Obygn* 2022;14:69–75.
- 28 Caruana EJ, Patel A, Kendall S, *et al.* Impact of coronavirus 2019 (COVID-19) on training and well-being in subspecialty surgery: a national survey of cardiothoracic trainees in the United Kingdom. *J Thorac Cardiovasc Surg* 2020;160:980–7.
- 29 Ibrahim N, Rich H, Ali S, *et al.* The effect of COVID-19 on higher plastic surgery training in the UK: A national survey of impact and damage limitation. *J Plast Reconstr Aesthet Surg* 2021;74:1633–701.
- 30 Wanis C, Aulakh G, Wilson G, *et al.* Impact of COVID-19 on dental specialty training in the UK: the trainee perspective. *Fac Dent J* 2021;12:23–9.
- 31 Veerasuri S, Vekeria M, Davies SE, *et al.* Impact of COVID-19 on UK radiology training: a questionnaire study. *Clin Radiol* 2020;75:877.
- 32 Elghobashy M, Stout A, Hatti A, *et al.* The effect of the measures taken during the coronavirus pandemic on specialty trainees in obstetrics and gynaecology in the United Kingdom: an online questionnaire survey in one region. *J Obstet Gynaecol* 2022;42:1455–60.
- 33 Chua EP, Tan Y, Mercer LK, *et al.* OA03 Impact of the COVID-19 pandemic on rheumatology training: results of the regional survey from the North West of England. *Rheumatology (Sunnyvale)* 2022;61.
- 34 Fossey S, Ather S, Davies S, *et al.* Impact of COVID-19 on radiology training: Royal College of Radiologists Junior Radiologists Forum national survey. *Clin Radiol* 2021;76:549.
- 35 Bodansky D, Thornton L, Sargazi N, *et al.* Impact of COVID-19 on UK orthopaedic training. *Bull R Coll Surg Engl* 2021;103:38–42.
- 36 Jarvis MS, Samuel K, Research and Audit Federation of Trainees (RAFT). Impact of the COVID-19 pandemic on anaesthesia training, recruitment, and examinations: a survey of UK trainees. *Br J Anaesth* 2023;131:e13–6.
- 37 Carpenter S, Graham Y, Kulkarni T, *et al.* A national survey investigating the impact of the COVID-19 pandemic on core and higher breast radiology training in the UK. *Clin Radiol* 2022;77:749–58.
- 38 Quyam S, Abumehdi M. An Interpretive Phenomenological Analysis of paediatric cardiology trainee experiences during COVID-19. *Med Educ* 2022;56:527–34.
- 39 Rashid M, Steggall M, Brown G. How has Covid-19 impacted the training of Urology trainees in South Wales? *Urologia* 2023;90:678–82.
- 40 Hall L, Bisset K, Lynch L, *et al.* Training during the COVID-19 pandemic: the experience of public health registrars in the London and Kent, Surrey, Sussex training programme. *J Public Health (Oxf)* 2023;45:529–34.
- 41 Young K, Yeoh S-A, Putman M, *et al.* The impact of COVID-19 on rheumatology training-results from the COVID-19 Global Rheumatology Alliance trainee survey. *Rheumatol Adv Pract* 2022;6:rkac001.
- 42 Lion P, McClenaghan F, Hall A, *et al.* ENT trainees' experience of redeployment during the coronavirus disease 2019 pandemic: a qualitative study. *J Laryngol Otol* 2021;135:391–5.
- 43 Prince S, Adhiyaman V. What was the impact of COVID-19 on the foundation training programme in north Wales? *Future Healthc J* 2021;8:e5–6.
- 44 Martin A. Experiences of junior doctors who shielded during the COVID-19 pandemic. *Clin Teach* 2024;21:e13685.
- 45 Mallick R, Odejinmi F, Sideris M, *et al.* The impact of COVID-19 on obstetrics and gynaecology trainees; how do we move on? *Facts Views Vis Obygn* 2021;13:9–14.
- 46 Johnston K, Tyson C, Danny I, *et al.* Impact of the COVID-19 pandemic on the career of junior doctors. *Med J Aust* 2021;214:295–6.
- 47 Beard A, Gill B. Medical registrar bottleneck. *Postgrad Med J* 2023;99:370–1.
- 48 Best J. The growing bottlenecks in specialty training. *BMJ* 2023;382:1732.
- 49 Dobson J. Time is running out to resolve the NHS workforce crisis. *BMJ* 2023;380:681.
- 50 Vance G, Brown M, Burford B, *et al.* Evaluating the wider impacts of changes to UK medical education in response to the COVID-19 pandemic. Newcastle University, University of Manchester; 2023. Available: <https://www.gmc-uk.org/-/media/documents/evaluating-the-wider-impacts-of-changes-to-uk-medical-education-in-response-to-the-covid-1-105541118.pdf>
- 51 Geary U, McKee M, Petty-Saphon K. Mind the implementation gap: a systems analysis of the NHS Long Term Workforce Plan to increase the number of doctors trained in the UK raises many questions. *Br Med Bull* 2024;150:1–10.
- 52 Wilkinson E. NHS workforce plan is broadly welcomed by medical colleges, but questions remain over implementation. *BMJ* 2023;382:1535.