

Title page

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**Short title:** Impact of COVID-19 on trainees and their training

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**Abstract**

COVID-19 (SARS-CoV2) has dislocated clinical services and postgraduate training. To better understand and to document these impacts, we contacted anaesthesia trainees and trainers across six continents and collated their experiences during the pandemic.

All aspects of training programmes have been affected. Trainees report that reduced case-load, loss of sub-specialty experience and supervised procedures are impairing learning. Cancelled educational activities, postponed exams and altered rotations threaten progression through training. Job prospects and international opportunities are downgraded. Work related anxieties about provision of Personal Protective Equipment, risks to self and to colleagues are superimposed on concerns for family and friends and domestic disruption. These seismic changes have had consequences for wellbeing and mental health.

In response, anaesthetists have developed innovations in teaching and trainee support. New technologies support trainer-trainee interactions and e-learning predominates. National training bodies and medical regulators that specify training and oversee assessment of trainees and their progression have injected flexibility into their requirements. Within anaesthesia departments, support transcends grades and job titles with lessons for the future. Attention to wellness, awareness of mental health issues and multi-modal support can attenuate but not eliminate trainee distress.

**Key words**

Anaesthesia, training, education, wellbeing, mental health, COVID-19, coronavirus, SARS-CoV2

## Main article

Anaesthesia trainees are our current inspiration, our future colleagues and our replacements.

Training in anaesthesia and intensive care - whose degree of overlap varies on a country by country basis - has evolved from a time-serving apprenticeship to structured programs with bespoke models of learning, reflection and assessment. The pandemic crisis prioritises critical care for those COVID-19 patients who have been most profoundly affected and hospitals, staffing, and working practices have been radically adjusted to accommodate this. In addition, recent experience with elective surgery suggests the impact of COVID-19 may extend far beyond an ICU capacity and staffing problem<sup>1</sup> with as yet unknown implications for training. Selection into the speciality, placements, workplace-based assessments, examinations, and career progression have all been disrupted. Ireland and Australia had a delayed onset of the pandemic and more time to prepare, this is reflected in their trainees' experiences.

The BJA is a global journal originating from the UK. In May and June 2020 we sampled the experiences of trainees and trainers with contributions from within the footprints of **the Journal's** partner organisations (the Royal College of Anaesthetists, the College of **Anaesthesiologists** of Ireland, the South African Society of Anaesthesiologists and the Hong Kong College of Anaesthesiologists). These were supplemented by additional contributions from North and South America, and Australia. Contributors were identified by current or recent Council members of the partner organisations and through personal contacts. They described the impacts of the pandemic on themselves and their colleagues including: change of case mix, altered experiential learning opportunities, senior staff taking the lead on procedures, deferral or cancellation of teaching, workplace based assessments and exams, impacted rotations, anxiety and mental health. Local and national and international innovations in practice and support were identified.

We present a (necessarily) selective overview of COVID-19's impact on anaesthesia training through the lens of our partner bodies and contacts on 6 continents. This small sample is not comprehensive

but does allow a partial snapshot of the pandemic's impact. From these contributions and the outputs of public bodies we have identified recurrent themes which we present with reference to the UK system supplemented by notes from other countries. Anaesthesia is not an island and trainees in other specialties are also impacted by the pandemic. We attempt to identify and learn from their experiences<sup>2</sup> as well as our own and to look ahead. Finally, we recognise a duty to document contemporary experiences and present the individual vernacular contributions online, Appendix 1. [\\*\\*\\*link to Appendix 1, internet-only material](#)

### **Recruitment**

Guidance on social distancing has prevented face-to-face interviews. In the UK, training posts are allocated by competitive national recruitment. Trainees compete again to progress into year three of training. These processes continued without interviews, on the basis of portfolio self-scores precipitating concerns of unfairness. Successful applicants now have their training number and will be monitored by enhanced review during training. However, those unsuccessful feel they have only been able to present half of themselves and perhaps in different times, their story would have been different. Continuing recruitment allows scheduled rotations and progression through training.

### **Clinical teaching**

When each contact with a patient becomes a potential health risk, supervised procedures performed by a trainee may seem unnecessary. Aerosol generating interventions such as **bag and mask ventilation**, tracheal intubation and tracheostomy appear to carry the greatest risks<sup>3</sup> and there is understandable pressure for the most experienced practitioner to perform the procedure swiftly and efficiently. This diminishes the experience gained by the trainee and the opportunity to be signed off for a workplace-based assessment.

### **Introduction to anaesthesia**

Mindful of patient safety, initial anaesthesia training typically focuses on a limited range of techniques learned whilst caring for low risk patients. In Houston, the introductory month is highly structured with emphasis on bag and mask ventilation and direct laryngoscopy. This has been replaced by two weeks of simulation then a fortnight to learn intubation using a video-laryngoscope and extubation under deep anaesthesia to avoid coughing and droplet exposure. Out of theatre rotations to surgery, medicine and the blood-bank were cancelled. In Hong Kong, rapid or modified rapid sequence induction with video-laryngoscopy has become universal to avoid bag and mask ventilation. Use of laryngeal masks is minimised. Some hospitals have set up airway management teams, which intubate and extubate most of the general anaesthesia patients, limiting staff exposure but excluding junior trainees. Other cases are diverted to regional techniques, with the patients continuing to wear surgical facemasks whilst in-theatre.

In Chile, some centres chose to keep first-year trainees away from clinical activity, prioritizing their safety. This group promoted theoretical teaching, especially online. Inequalities in resource were recognised with the provision of internet scholarships and laptops for trainees and teachers. However, trainees asked to be included in the clinical work and are now being reincorporated.

### **Caseload and case-mix**

Worldwide, most elective surgery has halted and the few cases undertaken prioritise cancer procedures, emergencies and obstetrics. Accordingly, the less complex workload comprising the bread-and-butter of early anaesthesia training has become scarce. UK trainees report lost opportunities for solo lists. Only senior trainees have access to emergency procedures and usually at night or the weekend.

### **Personal Protective Equipment, PPE**

Worldwide shortages of PPE have compromised safety and induced anxiety.

In some South African hospitals these shortages precipitated poor practice. Since activating COVID-19 protocols has implications for the amount PPE used and where the patient will be managed, labelling of a patient as a COVID-19 suspect becomes contentious. Protective N95 masks must be reused (if not directly contaminated) for at least one week before replacement. Staff were threatened with disciplinary action if they failed to perform COVID-19 swab tests despite inadequate PPE. This received a swift trade union response but remains a threat. By contrast, in Houston every anaesthetist has a fresh (re-sterilised) N95 or fitted P100 mask daily.

Training in full PPE challenges trainee and trainer. One trainee commented “Communication is difficult, but we have not yet started using sign language and code. Those of us who mumble must speak up. Those who tend to be verbose have had to become more concise.”

### **Teaching**

In Plymouth, weekly trainee meetings have increased in importance. Combining on-site with remote access increases participation and enables issues to be raised and dealt with in a timely manner.

Socially distanced tutorials can be accessed in person or virtually and saved for access on demand.

This flexibility can be a positive and permanent development.

The experience across the different academic institutions in South Africa is far from uniform.

Examination preparation and structured teaching were drastically reduced and, in some instances,

fell away completely. Some universities have embraced the virtual platforms to give tutorials and

webinars to their post-graduate students and have managed to keep to a regular schedule from the

start of the lockdown. These are usually attended after normal work hours and have shown a high

level of dedication and professionalism from teachers and registrars. Other institutions have offered

little teaching since the University closed, highlighting discrepancies in training across the country -

an issue already on the radar of educators and the College. This crisis may well usher in the next

revolution in post-graduate education with online teaching becoming the new normal.

Anaesthesia is a craft (**hands-on**) speciality and on-line study may be a poor substitute for part-task simulators and supervised procedures performed on patients. Loss of training opportunities also impacts surgical disciplines.<sup>4,5</sup> Reconfiguring obstetric anaesthesia training in Singapore involved experimentation, some failures and some compromises.<sup>6</sup> US directors of pain programmes have developed detailed guidance on adapting training.<sup>7,8</sup>

Many countries have redeployed non-anaesthesia trainees to ICU, an unsettling and challenging time for those affected.<sup>9</sup> In Dublin, anaesthesia trainees supported redeployed peers from surgery and psychiatry introducing them to ICU in a safe and controlled manner.

On a positive note, reduced time in theatre has focussed the minds of both trainees and trainers - every moment counts. Training objectives are identified for each list and both parties are more engaged than previously.

### **Compliance with curricula**

Medical regulators and national training bodies specify learning outcomes, and curricula to deliver them, in increasing detail. Inevitably (and properly) training programs focus on using trainees time well to route them through the curriculum with progressive completion of assessments and “time served” requirements. This inevitably diminishes flexibility whilst arguably increasing the quality and efficiency of training. The pandemic has disrupted the structure and content of curriculum compliant training programmes. Social distancing and logistics have impacted the assessments whose completion permit progression and evidence the completion of training.

Adjustments to lessen the impact to medical training are being agreed and implemented very quickly. Nevertheless, concerns remain that changes in exams and recruitment may tip trainees some into other specialties or leaving the profession altogether.

### **Continuation of training and progression**



Temporary flexibility within the UK anaesthesia curriculum facilitates progress within training. Specifically, progression that is exam success dependent will not be automatically halted, with the expectation that the exam is successfully completed at a future sitting. Patient safety considerations preclude complete omission of mandatory components although they may be rescheduled. Control of progression by Annual Review of Competency Progression (ARCP) panels will continue, using new COVID-19 specific learning outcomes to incorporate experiences and learning from the disrupted workplace into training.<sup>10</sup>

South African training programmes have opted to continue the rotation of trainees to different departments and hospitals, a decision supported by a survey of registrars. Whether these rotations will need to be supplemented with extra time is yet to be determined.

Chilean training programmes have dispensed with some rotations and been extended to permit achievement of required competencies.

The American Board of Anesthesiology permits trainees in quarantine for COVID-19 to count the time as clinical if the trainee can do some academic work from home. However, the Accreditation Council for Graduate Medical Education warn that accreditation of training programmes may be compromised by the pandemic.<sup>11</sup>

In Melbourne, junior medical staff keen to pursue careers in anaesthesia have had rotations changed or cancelled, negating their ability to acquire exposure to anaesthesia and find appropriate referees to support applications onto formal training programs. Some trainees have been prevented from changing hospitals with extended separation from family and friends for those on rural rotations and leaving others with only three months of exposure to tertiary obstetric or paediatric anaesthesia for the entirety of their training. Those able to finish their training are left worrying about employment in a market with reduced elective work and many overseas jobs cancelled.

Irish trainees usually undertake an international fellowship after completing the training scheme. These have been deferred indefinitely creating uncertainty over future employment and competitiveness for consultant posts.

### **Cancelled exams and changes to assessments**

Worldwide cancellation or postponement of exams has meant that trainees at these critical points have stalled (even if only psychologically) in their training. Plans made around the timing of exams and their preparation have been lost. Uncertainty as to when these will be held again causes considerable anxiety.

The cancellation of UK national FRCA exams will increase candidate numbers after the COVID-19 surge and the College are exploring alternative delivery. The General Medical Council (GMC), the UK regulator, recognises that exams have a role in protecting patients and are working with the College to continue their delivery via innovative methods. This implies measuring the same knowledge, understanding and capabilities with amended assessments. For example, setting computer based written exams with online proctoring and using video conferencing platforms to conduct vivas. The College must assure the GMC the new assessments meet current standards.

Many regulators and examining bodies specify participation of External Examiners as part of the quality assurance process for their exams. These roles are being reconsidered and refined to permit remote participation.

Some Chilean training centres have permanently suspended the final exams, allowing the early completion of training without further assessment.

At the Hong Kong College of Anaesthesiologists, the Intermediate and Final Fellowship exams were cancelled, prolonging training time for some. A backlog of candidates has stretched the capacity of

the examination committee. New exams are planned, with videoconferencing as the back-up plan if face-to-face vivas are not possible.

In South Africa, specialist exams were delayed or cancelled as candidates usually need to travel to a single venue. New workplace-based assessments and video-linked paper case discussions are being explored by the South African Society of Anaesthesiologists but will require approval by the Colleges of Medicine of South Africa. This delay contributed to anxiety amongst the final year trainees due to end their contracts with the prospect of completing their exams whilst out of a job. This may be ameliorated by contract extensions but has a wider impact on future intakes, and financial commitments from the Department of Health and universities.

The American Board of Anesthesiology sets written exams at the end of the second and fourth years of residency. The first of these have been devolved from specialist testing centres to individual institutions. The oral board exam is sat within a few years of graduation and is typically prepared for and scheduled almost a year in advance. Cancellations imply a back-log once in-person exams can be restored.

The oral component of the Australian and New Zealand College of Anaesthetists Fellowship exam was cancelled at short notice leaving candidates at the peak of their knowledge and efforts with no viva date in sight. October exams are now proposed but not confirmed.

The European Diploma in Anaesthesiology and Intensive Care is a supra-national examination interlaced with numerous national systems. The April On-Line Assessment, OLA in 12 languages for 1921 candidates in 39 countries was postponed for two months with complex country-specific implications for the next-stage assessments which it precedes.

### **Wellbeing and mental health**

The impact of the pandemic on trainees adds to existing challenges to morale, mental and physical health.<sup>12</sup> Professional and personal pressures in the workplace coincide with derangement of private lives. Loss of personal support due to social distancing measures has left many doctors struggling to juggle childcare and work commitments. Finances have become stretched with households dropping to a single income. Difficult clinical decisions and compromises in care may generate moral injury.<sup>13</sup> Trainees have expressed heightened anxiety at home and at work. Anaesthetists have responded with innovation and adaptation using measures shown to be effective in previous viral epidemics.<sup>14</sup> Other specialties<sup>15</sup> are also reporting impacts on the mental health of staff with trainees more affected than faculty.<sup>16</sup>

Internationally, anaesthesia departments have recognised these stressors and responded. Training on stress recognition, peer support and access to resources is variably implemented but universally understood.<sup>17</sup> In Durban, the mental health burden was recognized early and counselling sessions both in groups and individually were offered by the psychology department. The Houston programme provides one session of mental health counselling via video conferencing and offers trained faculty counsellors to trainees if they need to confide or talk. Melbourne trainees have senior mentors and access to welfare workshops including mindfulness and meditation, debriefing sessions, and stress management strategies. The Chinese Society of Anesthesiology and Chinese Association of Anesthesiologists identified the risk from the pandemic to anaesthetists mental health and established resources to provide support.<sup>18</sup>

### **Flattening the hierarchy**

Worldwide our respondents identified an increased sense of camaraderie between trainees and consultants, across different specialities and between medical and non-medical staff. In Dublin, trainees returned from abroad to assist with the battle against COVID-19 as hospital staff sharing a common goal supported each other.

In Melbourne, the formation of a departmental COVID committee - comprising staff from the head of department to trainee representatives - provided a consistent message through daily updates and regular online forums to answer questions and provide rationales for their chosen strategies.

In Durban, trainees have worked side by side with consultants in developing protocols, sifting through evidence, and running practical simulations. In this flattening of the hierarchy anaesthesia trainees have delivered simulation training to all theatre users (cleaners, nurses, surgeons) within the hospital. The training has been extended to anaesthesia providers working in satellite hospitals and the private sector.

### **Impact on medical students**

UK undergraduate programmes are all to some degree 'integrated' with exposure to patients in all years and often within weeks of starting. The total or near total withdrawal of clinical placements has turned the clock back with a focus on basic science and self-directed learning.<sup>19</sup> Problem-based learning groups function well by video-link but the context-setting patient encounters with which they might have been bracketed have disappeared. The set-piece lecture may be a dinosaur to educationalists, but it is cheap and easy to provide remotely. Innovative small-group techniques are harder to replicate if they depend on anatomical models, surface anatomy or part-task simulation.

The greatest impact is undoubtedly on senior students who should be concentrating on maximising their clinical encounters, building consultant and diagnostic skills, and progressively integrating into clinical teams as they prepare for the transition from student to care-providing trainee. Temporary arrangements whereby patient contact is minimal or non-existent are not sustainable and feel inconsistent with the production of patient-focussed and clinically skilled medical graduates.

Looking ahead, exclusion of medical students from the operating rooms may impair recruitment to the specialty even if a temporary fillip is provided by current media exposure.

For Hong Kong medical students, all patient contact has been suspended. Didactic components of the program have been moved and grouped together, with all the teaching material, including lectures and small-group discussions, delivered on-line. Clinical components are moved to later in the program. If patient examination is required in the medical school exam, patients would be COVID tested and wear N95 masks. Final year medical students are expected to graduate as scheduled.

### **Looking ahead**

COVID-19 will not go away any time soon and therefore the new balance between service provision and training needs to be agreed in a sensitive way to avoid further frustration amongst the trainee body. Adaptations to these circumstances have delivered new forms of teaching and supervision and the pandemic has provided a brutal laboratory to test them. Video-calls, extensive electronic learning and computer-based exams are probably here to stay. So too is the video-laryngoscope whose promotion from fall-back option to instrument of choice<sup>20</sup> has been accelerated.

Variation in national responses and possibly unknown epidemiological factors have produced dramatically different COVID-19 burdens on health services. In Australia, case numbers remain very low and elective surgery is escalating. New Zealand have no active cases and all restrictions are removed. Other countries remain greatly disrupted with the pandemic worsening. In consequence the impacts on trainees are increasingly heterogenous.

Our ability to work effectively in teams and to support each other through crises was already well developed<sup>21</sup> but has been pre-eminent of late. As one trainee commented “this sense of community is a welcome silver lining and will be paramount in helping our health service transition smoothly out of crisis mode into the new normal”. Our trainees and their supervisors have made pastoral and professional innovations and their departments have the opportunity to make them permanent. They are improvements just as important as teleconferences and video-laryngoscopes.

**Authors' contributions**

Designed the study: JRS

Collected the information from which this paper was developed: SEM, RCS, EPO'S, VCS, FRR, AAP,  
LIC, RSO, CJM, MAB

Wrote the first draft: JRS, SEM

Contributed to writing and revising the paper: all authors

Approved the final draft: all authors

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