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From chaos to a new norm: The Birmingham experience of restructuring the largest plastics department in the UK in response to the COVID-19 pandemic



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Summary The coronavirus disease 2019 (COVID-19) pandemic presented unprecedented challenges for healthcare systems worldwide. The Queen Elizabeth Hospital, Birmingham, has one of the largest burns, hands and plastics department in the UK, totalling 83 doctors. Our response to the COVID-19 response was uniquely far reaching, with our department being given responsibility of an entire 36 bed medical COVID-19 ward in addition to our commitment to specialty-specific work, and saw half of our work force re-deployed to Intensive Treatment Unit (ITU). Our aim was to exploit the high calibre of doctors found in plastic surgery, and to demonstrate, we were able to support the COVID-19 effort beyond our normal scope of practice. In order to achieve this aim, the department underwent significant structural and leadership changes. Factors considered included: rota and shift pattern changes to implement depth and resilience to sudden fluctuations in staffing levels; a preparatory phase for focussed upskilling and relevant training packages to be delivered; managing the COVID-19 ward cover and ITU deployment; adjustments to our front of house and elective specialty-specific service, including developing alternative and streamlined patient pathways; mitigating the effects on plastic surgical training during the pandemic; the importance of communications for patient care and physician wellbeing; and leadership techniques and styles we considered important. By sharing our experience during this pandemic, we hope to reflect on and share lessons learned, as well as to demonstrate that it is possible to rapidly mobilise and retrain plastic surgeons at all levels to contribute safely and productively beyond a specialty-specific scope of care.

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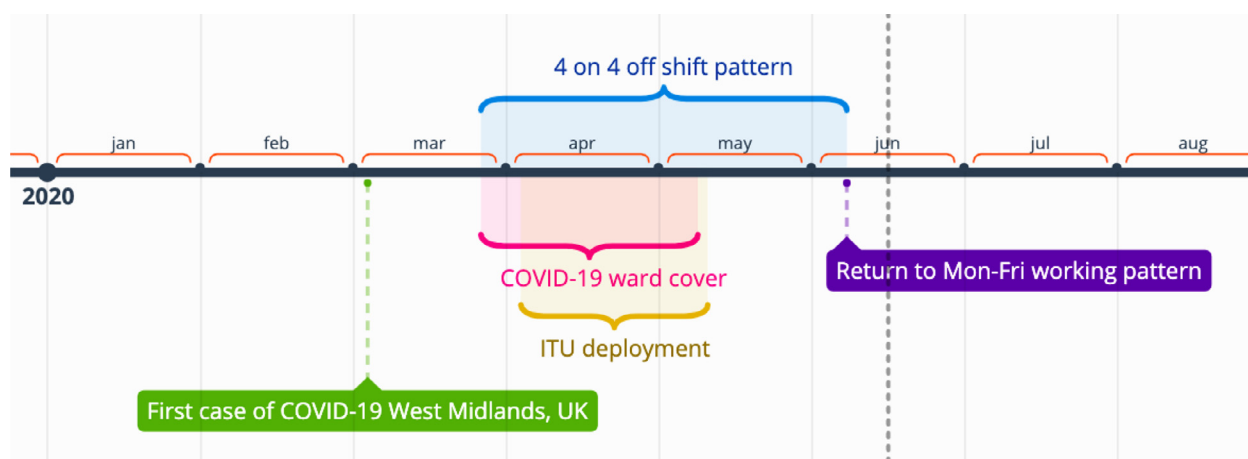


Figure 1 Plastic Surgery Department COVID response timeline.

Introduction

The coronavirus disease 2019 (COVID-19) pandemic presented unprecedented challenges for healthcare systems worldwide, including the UK's National Health Service (NHS). The first case of COVID-19 was reported in the UK on 31 January 2020,¹ with later declaration of a pandemic by the World Health Organisation (WHO) on 11 March 2020.² Birmingham (in the West Midlands) is the second largest city in the UK with a population of 1.3 million; the first case of COVID-19 was confirmed in the West Midlands on 4 March 2020. The aim of this paper is to outline the response of our plastic surgery department at the Queen Elizabeth Hospital (QEH), University Hospitals Birmingham NHS Foundation Trust, to the COVID-19 pandemic, which is outlined in Figure 1.

Our plastic surgery department is the largest in the UK in terms of staff numbers, and the hospital has the largest single-floor Intensive Treatment Unit (ITU) in Europe. Thus, we expected our departmental responsibility would extend beyond a speciality-specific response. Plastic surgery is highly competitive and attracts high-calibre individuals who are drawn to the challenges and diversity of the speciality. We found these characteristics to be transferable to the COVID-19 response. With focussed training and adequate inter-speciality support, they can serve and be utilised at the forefront of a COVID-19 response. Our duties included running a medical COVID-19 ward, redeploying half of the workforce to ITU, as well as running the regional plastic surgery, burns and hands service in a major trauma and burns centre. To the best of our knowledge, this is the first report in literature of a plastic surgery department overseeing a COVID-19 ward. We believe that the approach we took, and lessons we learned, can be reproduced among other units, thus allowing the safe and effective involvement of a plastic surgery workforce for major incidents.

Staffing and aim of our response to COVID-19

Plastic surgery is recognised as a competitive speciality that attracts hard-working doctors.³ The workforce in our de-

partment is composed of 83 doctors: 34 consultants (7 burns, 13 hands and 14 plastics), 18 specialist registrars, 16 senior house officers (SHOs), 12 hand fellows, 2 burns research fellows, and 1 sarcoma fellow. After taking into account those shielding, as recommended by Public Health England, and a redistribution of work (e.g. some consultants were required to cover other trusts exclusively, to reduce footfall across sites), we had a total of 48 doctors remaining to support the COVID-19 effort and front of house specialty work.

We believed that this cohort of highly trained professionals had the capability to mount a response extending beyond the role of providing specialty-specific service. Our aim was to be at the front line of the COVID-19 response in one of the biggest hospitals in the UK and Europe.

While other plastic surgery units in the UK have started publishing their responses,⁴ we feel that those reports were mainly specialty-specific. We acknowledge that specialty-specific response during COVID-19 offers unique challenges, but we wanted to describe our extension beyond this role during this time of need.

Building depth and resilience - a new rota

Providing medical care during a pandemic is best regarded as a marathon, not a sprint. We therefore aimed to develop a rota pattern supporting this ethos. COVID-19 is associated with high levels of staff absence due to illness, self-isolation or shielding. It is also associated with loss of staff due to its impact on mental health.⁵ Our aim was to build enough depth and resilience in the rota at all levels to allow for anticipated fluctuating staffing numbers at short notice. This was implemented by the Clinical Service Lead (senior author JB) appointing a deputy (author GF). At every level, from SHO to consultant, a second on-call person was pre-determined to support the team should the first on-call doctor become unwell, or in the event of an admissions surge across the trust requiring additional medical support.

We joined the trust pattern in working 12-h shifts for 4 days on, then having 4 days off. Having 4 days off allowed for sufficient physical and mental recovery. It also allowed for better adaptation to a shift work pattern. Having ad-

equate work-rest cycles has been demonstrated to reduce work-related errors.⁶ We utilised Google Forms as a readily available and free-to-use resource to record staff availability. All members of the plastic surgery department were requested to record on a daily basis whether they were at work, on a day off, self-isolating or on sick leave. This allowed the rota coordinator (first author CL) to have live updates regarding staffing levels. The Google Form also requested the member of staff to identify their expected duty for the day. This allowed the rota coordinator to identify areas of shortage and act accordingly. [Figure 2](#) demonstrates the Google Form utilised. Having this live system for staffing levels and duties is crucial during a response to a major incident, as it streamlines staffing updates and avoids individuals unnecessarily contacting the rota coordinator. It also contributes to situational awareness and allows for a rapid and reliable overview of staff levels and areas that need support.

Staff were encouraged to work from home (e.g. administration, research, organising teaching programmes) where possible, to reduce footfall in the hospital and, therefore, infection and transmission risk.

We remained on a 4-on-4-off rota pattern beyond our commitment to the COVID-19 ward and ITU, to take advantage of the resilience this rota structure offered while our COVID-19 patient numbers remained significant. Our department returned to a more traditional Monday to Friday working pattern with on calls, 1 month after being relieved from COVID-19 duties.

Preparatory phase

During the early phase of the COVID-19 response, University Hospitals Birmingham made the decision to postpone all non-time-critical clinic reviews or operations. This allowed a reduction of the footfall in the hospital. This phase, when elective work was reduced, allowed the precious time required for incident-specific training. Since our aim was to be involved with the COVID-19 response both on ITU and the wards, our focus was on improving our medical knowledge and skills that would become valuable during the next phase. The trust provided all doctors with focussed, high-yield, resource modules using the online learning platform Moodle. Moodle is a free, open source software package, designed to help educators create effective online courses; it has been shown to be more effective than didactic lectures as a delivery method.⁷ The modules included topics relating to the management of COVID-19 patients and common medical problems, including electrocardiograms (ECGs), acute delirium, end of life care, acute kidney injury, fluid management and hypo-/hyperglycaemia.

In addition to online teaching, we also utilised other resources available in the trust mainly for ITU training. These were available in the form of videos or small group teaching sessions covering the following topics: proning, vascular access, insertion of arterial lines and tracheostomies. We believe that a strength of plastic surgeons is the ability to rapidly acquire varied skills, and these five clinical skills (proning, vascular access, insertion of arterial lines, tracheostomies and basic monitoring of ventilators) are not beyond the skill set of a plastic surgeon, and proved

to be invaluable during a time of increased pressure on ITU staff. Although specialist teams were created for the implementation of these skills, knowledge of device management and complications was necessary, and this training is transferable to the future careers of plastic surgeons in the ongoing management of major burns and other critically unwell plastic surgery patients.

During our preparatory phase, other medical teams were already running COVID-19 wards. These teams issued regular “lessons learned” in-house publications which were disseminated to medical staff within the hospital. This prepared our team for the following phase of ward cover and ITU deployment.

ITU deployment and ward cover

After 2 weeks of focussed training, including 1 week managing a COVID-19 ward, the plastic surgery department was divided into two. Half of our workforce was deployed to ITU and the other half remained in charge of the 36-bed COVID-19 ward and the plastic surgery specialty-specific response.

Our department contributed 24 doctors to ITU for a duration of 5 weeks (7 consultants, 8 registrars and 9 SHO), creating the largest single-specialty presence on ITU (aside from ITU and anaesthetic doctors). Our contribution to the ITU work force proved invaluable as our ITU is the largest single-floor ITU in Europe and was consequently one of the busiest hospitals with COVID-19 pandemic in Europe. The workforce deployed to ITU was integrated into a pyramid of staff hierarchy based on skill set and seniority. At the top of each pyramid was a sector commander who was an ITU consultant. Plastic surgery trainees were initially on a COVID-19 ITU, and later distributed to non-COVID-19 as the first wave eased. They were actively involved in patient day-to-day management, formulating management plans and escalating clinical concerns. This freed airway-trained staff to manage those critically unwell who required specialist input. The ITU rota was managed by an ITU team. The ITU itself was re-designed to allow for an increased capacity for patients and re-structured to allow grouping of patients depending on the phase of their illness and treatment needs.

The other half of the workforce took charge of a 36-bed COVID-19 ward, managing those patients well enough for ward-based care, and those not for escalation. We, therefore, devised a ward round checklist to be utilised during the medical ward rounds. Having a ward round checklist is a safe practice that has been demonstrated to enhance patient safety.⁸ Having this checklist ([Figure 2](#)) meant that we were unlikely to miss essential points during the ward round. Following the plastics led ward round, a senior member of a medical team (senior registrar or consultant) would attend the ward to discuss any challenging medical problems or to review patients if required. In addition, we also had a clear and supportive safe escalation policy with medics and ITU in the event, if any patient required urgent input.

‘Board rounds’ took place in non-COVID areas, which took advantage of our trust’s electronic noting and prescribing and allowed interventions and basic assessments to be requested and instigated while reducing exposure of clinical staff as much as possible.

COVID-19 Workforce Planning (Burns, Plastics and Hands)

Please fill in the form below. Given how rapidly things are changing, we need to keep an accurate register of who is available to work. This form is confidential and the responses will only be seen by the senior clinicians/rota coordinators.

*Required

Grade *

Select your grade

Consultant

Registrar

Hand Fellow

SHO

Research Fellow

Registrar

Name *

Choose ▾

What is your position today *

At work (Days)

At work (Nights)

Isolating

Off day

Sick Leave

[Back](#)

[Next](#)

Page 7 of 9

Figure 2 Google Docs workforce planning form.

We also incorporated a second night team on standby in the rota in the event of a surge in COVID-19 patients, as two nearby hospitals were at capacity and diverting emergency patients to our centre, or in case, the night staff had to self-isolate. Our plastic surgery department was in charge of a COVID-19 ward for a total of 6 weeks at the peak of the COVID-19 pandemic in the UK.

Specialty-specific response

In addition to ITU deployment and a medical ward cover, we also provided, and continue to provide, a specialty-specific response. This was delivered by six plastic surgery consultants, four burns consultants, 13 hand consultants, five hand fellows, 12 registrars and five SHOs. All specialty-specific re-

sponses in plastics, burns and hands were consultant delivered at the front door. In our department, the majority of emergency department patients requiring plastics input is usually related to hand injuries. Therefore, to reduce footfall in the emergency department, we set up a separate see and treat area in a repurposed outpatients' department, with a hand consultant present 24-hours supported by juniors. The area was also equipped with a minor ops theatre and facilities to perform wide-awake local anaesthesia no tourniquet (WALANT) procedures. WALANT has been demonstrated to be equal to other methods in terms of patient satisfaction and complication rates.⁹ We believe that WALANT procedures are ideal during a time of a pandemic when resources are limited.

Cancer is a time-critical presentation in plastic surgery. We, therefore, utilised the facilities of the dermatology department to perform urgent skin cancer cases under local anaesthetic. We performed 63 skin cancer procedures in 2 weeks for excision and reconstruction of skin cancers under local anaesthetic.

For patients requiring general anaesthesia for cancer surgery, we partnered with nearby private hospitals with procedures performed by two consultants to increase list utilisation and efficiency. Patients were characterised by anaesthetic risk, with those low-risk triaged appropriately to hospitals without critical care facilities, and those higher risk booked at the QEH.

We implemented an accelerated discharge pathway for lymph node dissections. Patients would be discharged to the community within 48 hours where safe to do so, with advice and homecare services. We have a plastic outreach team run by five experienced plastic surgery specialist nurses who form a team and arrange home visits and specialist nurse clinics. To reduce footfall in the outpatient setting, we utilised video call software and phone clinics whenever reasonably safe.

Plastic surgery training opportunities

On top of the challenges of running a COVID-19 ward, ITU deployment and providing specialty-specific service, we also sought opportunity in a training crisis. The vast majority of elective operating, aside from the already mentioned cancer-related surgery, was postponed, and clinics were triaged and rescheduled. This required workarounds to mitigate for the negative impact on training and progression. The situation offered unique learning opportunities not necessarily afforded in the pre-COVID-19 setting. For example, the presence of a hand consultant at the front door 24 h a day facilitated teaching with decision-making and allowed trainees to utilise the WALANT technique under senior supervision in situations usually performed under a regional block or general anaesthesia. Again, local anaesthetic skin cancer lists that are usually performed by the dermatology department at the QEH became an opportunity for training within the plastics department during the pandemic.

Although the general anaesthetic cancer procedures were performed in private hospitals, they were under NHS indemnity. This allowed us the opportunity to utilise these lists as training opportunities like standard NHS lists. The shift pattern we utilised allowed for the free time for video

teaching. Shielding/self-isolating doctors were tasked with organising an online video-based teaching rota according to the Plastic Surgery Intercollegiate Surgical Curriculum Programme (ISCP). This was on Zoom (Zoom Video Communications, California, US), an online video communication software. The teaching was, and continues to be, delivered by the consultant and senior registrar. Shielding Consultants contributed remotely. Feedback was collected using Survey Monkey (SVMK Inc., California, US).

We acknowledge that surgical training is negatively impacted during a pandemic; surgeons at all levels are not operating at the capacity prior to the pandemic. We, therefore, believe that it is imperative for all surgical departments to proactively identify and utilise all training opportunities.

Communication

The COVID-19 pandemic posed unprecedented challenges to healthcare systems and staff. These challenges were exacerbated by anxiety generated by uncertainty with guidelines and protocols regularly being updated to reflect new evidence and opinion; resuscitation policy and personal protective equipment (PPE) being prime examples. Effective communication is useful in counteracting the negative impact of dealing with COVID-19.¹⁰ Back et al. discuss communication skills in the age of COVID-19 and highlight that, while it is not a panacea for all the challenges facing healthcare workers, it is definitely an essential aspect required by clinicians to survive well.¹⁰

The excellent communications received by our department came at all levels. The hospital directors sent out a daily email briefing to all staff. The plastic surgery Clinical Service Lead formed a link between our departmental staff and hospital management and communicated daily updates on hospital capacity and plans. The rota coordinator was in regular contact with the Plastic Surgery lead and could implement rota changes and share important messages with juniors. Junior doctors were also able to participate in online video webinars with hospital leaders to discuss any ideas or hospital policy-specific concerns.

We resonate the importance of continuous re-assessment, and involvement of all including junior level and non-clinical members of the team to deploy staff where best needed. We also relied on WhatsApp (Facebook Inc., California, USA) groups for effective communication. WhatsApp, a free-to-use instant messaging service, has been demonstrated to be an effective, timely and free tool of communication for healthcare workers.¹¹ The app utilises end-to-end encryption, and messages can only be seen by users, and cannot be intercepted even by WhatsApp itself. Nevertheless, we did not include any patient-recognisable data on WhatsApp and all members in the WhatsApp groups consented to being included.

Evidence-based leadership style

While it can be hard to narrow down leadership style into a single profile, our aim from the offset was to provide emotionally intelligent leadership. Our decision to engage

our department fully in frontline COVID-19 response meant that we were exposing all doctors in the department to even more unique stresses. It was crucial to acknowledge the emotions of vulnerability and fear among all levels including consultants. There was an opportunity to voice anxieties during the morning briefing meetings and in the daily emails.

The leadership behaviours demonstrated by senior clinicians have an impact on resilience within the team. Shanafelt et al. demonstrated that faculty ratings of leadership behaviours had a correlation with factors reflecting resilience.¹² We were mindful that the department was split into different teams, so we utilised this opportunity to encourage members of the same team to build group cohesion. West et al. demonstrated the positive impact of leadership support for the development of collegiality.¹³ In an article by Sotile et al., the authors discuss how to move from physician burnout to resilience.¹⁴ They highlight that when physicians engage in meaningful work their resilience is enhanced. We believe that being at the frontline of one of the busiest COVID-19 responses in Europe satisfies the criteria for meaningful work.

In parallel to emotionally intelligent leadership, we also adopted transformational leadership styles. Senior leadership inspired our work force of plastic surgeons to demonstrate that they are a work force capable of adapting and providing safe medical care to COVID-19 patients within a short period of time. We encouraged juniors at all levels to contribute with ideas and suggestions that would improve patient care.

Conclusion

We believe that our experience outlined in this paper demonstrates how a plastic surgery department can extend beyond its conventional role during the time of a pandemic. As infection rates drop, the demand on intensive care services is reduced, and staff are now back within their parent specialities. Plastic surgeons in our department safely took charge of a COVID-19 ward and positively contributed to the ITU workforce while concurrently delivering a specialty-specific service. We are in the process of developing a hospital-wide protocolised response for similar incidents in the future, which should form part of training and job contracts. The first wave of COVID-19 has passed for our region, and thus, it is vital that we pause to reflect on our experiences and learn from them, appreciating the positives as well as focussing on areas for improvement so as to optimise any future response. In particular, our response included: implementing resilient rota patterns, upskilling our team to deploy to ITU and take responsibility for a full medical ward, optimising pathways for trauma and cancer patients given the context the pandemic created, adapting training to mitigate for loss of elective theatre and clinic time, and having supportive leadership structures that recognised the importance of excellent communication. We acknowledge that the large size of our department facilitated the dramatic breadth of cover, we were able to provide during the COVID-19 pandemic, but this capability is not unique to us, and the lessons we have learned can be applied by other plastic surgery departments wishing to expand their scope of practice in times of need.

Declaration of Competing Interest

None.

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None.

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