

## Impact of COVID-19 on Surgical Service Provision, Medical Staffing and Training at a Large Acute NHS Trust in the United Kingdom

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ARTICLE INFO	ABSTRACT
<p><b>Article type:</b> Research Paper</p> <hr/> <p><b>Article History:</b> <b>Received:</b> 9-Apr-2021 <b>Accepted:</b> 19-Dec-2021</p> <hr/> <p><b>Key words:</b> Covid19, General Surgery, Management.</p>	<p><b>Introduction:</b> The COVID-19 Pandemic has been widely accepted as a challenging period for the medical community. The impact of the virus posed challenges on the surgical service provisions in the General Surgery department at a large acute NHS trust. The department learnt to adapt to the challenges and changes in the system which can be summarised into 4 phases, 'Alarm', 'Resuscitation', 'Stabilisation' and 'Adaption'.</p> <p><b>Materials and Methods:</b> The General Surgical department implemented a 'Gold Command', 'Silver Command' and 'Platinum Command' hierarchical system as a systematic method to make decisions to implement change. To assess the outcomes, electronic records were reviewed for number of NCEPOD cases, emergency laparotomies, elective surgeries that took place over the trust and these were compared at each phase.</p> <p><b>Results:</b> Between 26/03/20-30/09/20 a total of 1578 surgeries took place, of which 869(55.1%) were emergency operations, from that 152(17.5%) were emergency laparotomies. 709(45.9%) were elective operations, 197(27.8%) performed at the satellite hospitals, 468(66.0%) performed at King George's hospital and 44(6.2%) at Queen's Hospital.</p> <p><b>Conclusion:</b> The BHRUT General Surgery Department has successfully implemented a system to work through the pandemic to minimise its effects on surgical provisions. This template can act as a guide to nationwide hospitals if ever faced again with a similar challenge.</p>
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## Introduction

The Barking, Havering, Redbridge University Trust (BHRUT) is a large acute National Health Services (NHS) trust that provides complete acute surgical services independently across two sites - King George's hospital and Queen's hospital, Romford.

While it did not take long for the virus to expose the unsustainability of the current system in place, the amalgam of clinical judgement, managerial skills, staff cooperation and the nimbleness of both clinicians and managers helped blunt the potential long-term detrimental effects of COVID-19 on surgical waiting-lists in the NHS. In an attempt to control the spread of virus and contain the infection, the BHRUT General Surgical department made changes to be able to operate at more than maximum capacity for an indefinite period of time. The ever-changing nature of the pandemic meant the need to constantly adapt the surgical services provided. The challenges included the shielding of vulnerable staff, re-deployment of junior surgeons to medical wards, step-down work, standby staff, dynamic rotas, annual leave and concern for burnout, lack of opportunities for surgical training, an increased demand for day time and on-call cover, triaging of non-emergency surgery and admissions, and the temporary withdrawal and restoration of some services.

### Division into phases summary

Phase 1- 'Alarm' (23/03/2020-15/05/2020): Once the lockdown was declared nationally, overnight the trust was expected to stop elective work, ramp up intensive care capacity fivefold, increase the number of COVID-19 dedicated wards from three to twenty, build up and retrain medical and nursing employees on medical wards to keep leverage for an increased staff sickness rate, and change the way medical care is delivered to ensure sustainability and prevent being overwhelmed (1).

Phase 2- 'Resuscitation' (16/05/2020-30/06/2020): With the backlog of surgical patients, surgeons in particular had to be reallocated from General Medicine back to

the surgical departments (2). Additionally, staff that were placed on stand-by/medical wards were required to be repatriated to the surgical duties. Trainees' concern for lack of training required addressal, and was achieved by taking trainees to the private leased hospitals and the establishment of a covid-mitigated 'Green Pathway'.

Phase 3- 'Stabilisation' (01/07/2020-31/08/2020): With an accumulation of patients that had been deprioritised as a result of the pandemic,,e.g those deemed high-risk to contract COVID-19 and have fatal complications and those who opted to delay elective surgery (3), the green pathway was improved to allow for more service provisions such as clinics, theatres, endoscopy, Imaging and Cancer surveillance whilst keeping the patients protected from COVID areas.

Phase 4- 'Adaptation' (01/09/2020-30/09/2020): With the aim of ensuring service provisions are robust in subsequent waves of the pandemic to maintain safe levels of staffing for patient care, a segregation system was created. Patients and staff were separated into untested (amber), positive (blue), and negative (green) zones.

## Materials and Methods

The BHRUT was spread over 6 sites during the pandemic, these include: Prince's Grace hospital, Holly House hospital, Hartswood hospital, Spire Roding hospital, King George's hospital and Queen's hospital. The data provided in this paper were found from electronic databases used by the trust. A record of total operations that took place over the 6 sites were collected and separated according to location, they were further subdivided into emergency surgeries and elective cases. Surgeries that did not take place from the given day list were excluded from this paper.

Patients that were selected for elective cases during the pandemic were risk stratified according to a surgical multidisciplinary team that constituted a clinical director, post-CCT fellow and the general manager for surgical services. This allowed clear communication with patients towards plans for elective surgery.

### Results

During phase one- ‘Alarm’, elective surgical procedures stopped at Queen’s hospital on March 25<sup>th</sup> while all surgical services were shut down at King George’s hospital on March 26<sup>th</sup>. The shutting down of elective service highlighted the importance of reviewing those cases scheduled during the COVID-19 period to ensure elective procedures were prioritised in order to minimise detrimental outcomes. By April 21<sup>st</sup>, elective procedures started to take place at satellite hospitals and a total of 43 surgeries were conducted for cancer patients in whom surgery was time critical by the end of June 2020.

At the end of phase one and onto second phase we implemented ‘Resuscitation’ phase, and the backlog of surgical patients was overwhelming. Nearing the end of phase one the number of critically ill

patients seen in A&E had increased, with patients requiring emergency laparotomies increasing by a further 38.7%. The number of National Confidential Enquiry into Patient Outcome and Death (NCEPOD) patients had dramatically increased by an additional 237 operations from 157 during phase one, which all took place in Queen’s hospital (8). The total number of elective surgeries that took place at these hospitals, during this period, was 71 of which 9 were non-cancer operations (8). During phase 3- ‘Stabilisation’, the total number of elective surgeries had significantly increased to 271, the majority of them taking place at King George’s hospital on the green pathway (fig.1). The emergency operations all took place at Queen’s hospital; in phase 3, a total of 342 emergency operations took place, the percentage of laparotomies decreased by 22.9%. (fig. 2).

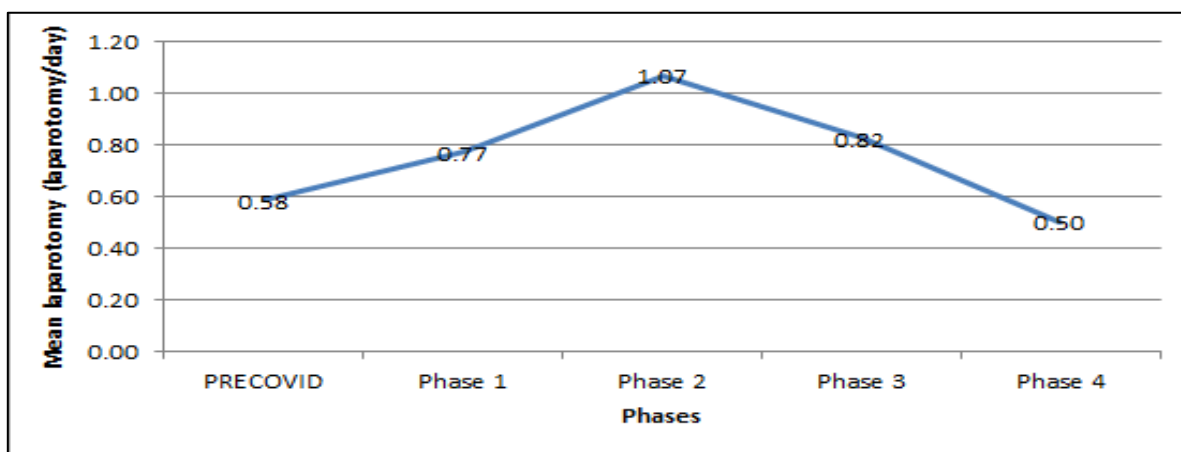


Fig 1: Number of Laparotomies per day during each phase

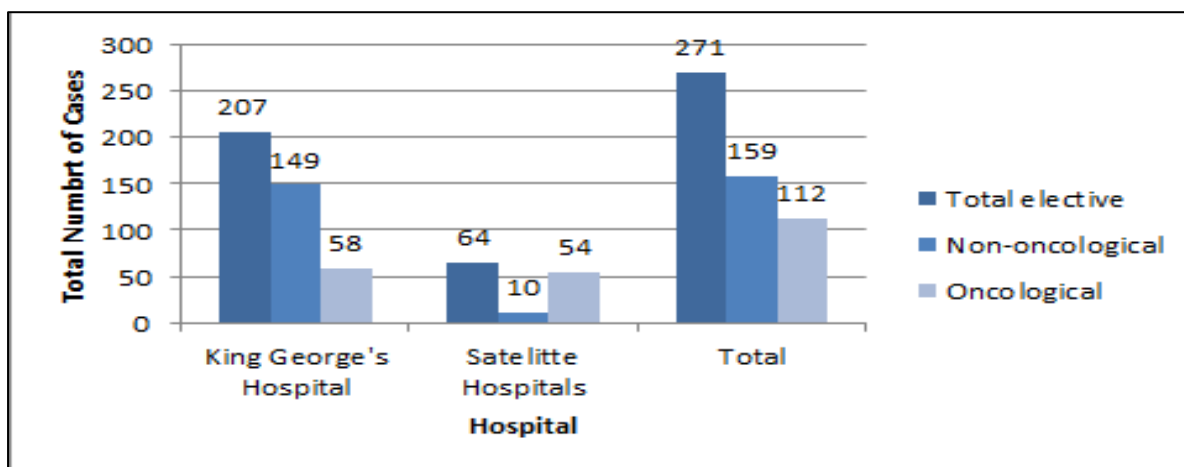


Fig 2: Number of Operations on green pathway during Phase 3

In the 4<sup>th</sup> Phase – ‘Adaption’, the green pathway was already very well established. It was further consolidated during this period with an increase in cases per month by 35.8% from the previous phase and reached 89.5% of the total number of operations that took place in King George’s hospital prior to the pandemic. The total number of elective surgeries over September was 178, with 117 at King George’s, 38 at Queen’s and 15 at the satellite hospitals (8). The numbers of NCEPOD cases were still on a rise, a total of 190 cases in September 2020; this was 11% greater than phase 3 and 48.4% greater than pre-Covid period. However, the number of laparotomies had now begun to normalise similar to the pre-Covid period (*fig.1*).

### **Challenges faced by Surgical Service Provisions**

During the first phase, triaging surgical patients from A&E became vital to ensure that only those who needed emergency care were admitted. Due to the high transmissibility of this virus, patients and staff needed to be protected from any aerosol generating procedures such as endoscopy and basic procedures such as ryles and tube insertion. Unfortunately, a challenge faced with this guideline was the definition of ‘aerosol generating procedure’ as this was constantly amended. NHS England created a speciality guide for hospitals to follow to ensure only those that required surgery were operated upon (7,9). More patients underwent conservative management and laparoscopic procedures were no longer permitted. Despite this the mean number of laparotomies per day increased by 31.9% as compared to pre-COVID (*fig 1.*).

### **Increasing capacity virtually and face-to-face**

As hospital services were limited, it became imperative that the prior interruption of diagnostic work was mitigated by increasing NHS capacity in the community and private healthcare settings. This was achieved by engaging with local and national care systems to ensure time-critical services such as cancer follow-ups,

outpatient clinics and regional vascular services were maintained throughout the region in spite of the crisis through virtual and digital means. In April itself, 5,700 appointments were held over the phone (1). Telephone consultations and hot clinic appointments for acute patients were put in place. Over this period of COVID-19, over 64,000 virtual appointments had taken place to compensate for those cancelled due to the virus with more continuously being rescheduled (5).

Previously in phase one, all surgical wards had been closed down except for the surgical assessment unit, a non-COVID-19 ward, and a COVID-19 ward. However now in phase 2, there was an increase in surgical patients as well as the need for more high dependency unit (HDU)/intensive treatment unit (ITU) beds. This meant more surgical wards were made available to cope with the patient load. With more surgical wards being opened, more staff were required to operate them to ensure safe practice. To tackle the backlog of elective patients on the waiting list, King George’s hospital had opened up its theatres on June 10<sup>th</sup> to trial the new green pathway and restart elective surgeries alongside those already undergoing in satellite hospitals. Every theatre list was converted into a twilight list to accommodate for the large backlog of surgeries. Endoscopy service returned to the trust, and nationally, to treat emergency procedures such as acute upper GI bleed and acute biliary obstruction (5).

### **Supporting surgical training**

A concern that arose through this period of the crisis was training opportunities for the surgeons. As scheduled theatre time was significantly reduced, training procedures were limited with elective surgeries near to none and all examinations and educational events postponed, which severely impacted training and career progression. Webinar series were created with access to online resources in an attempt to restore teaching. Some surgical trainees received limited surgical exposure at private hospitals where NHS patients were being treated. The Joint Committee for Surgical Training (JCST) informed that average logbook entries decreased by >50% (4). A campaign “No

training today, no surgeons tomorrow” was launched to sensitise clinicians to the need for surgical training.

### **Consolidation of Green Pathway**

The third phase began from July to the end of August with minimal new COVID-19 cases. The main aim was to restore previous practice as much as possible. To do this, it was crucial to be able to create a ‘clean area’ within the trust to operate. The trust implemented a new system to colour coordinate the areas of the hospital - green areas were clean, while yellow areas had possible COVID-19 exposure. To take this one step further, King George’s hospital which had previously trialed the green pathway at the end of June now fully reintroduced a number of services safely. To ensure the green site did not get contaminated prior to a procedure, each patient was required to self-isolate for two weeks, followed by antigen testing 48 to 72 hours before admission, and finally a screening process upon entering to avoid contamination (10). Staff were equally monitored to ensure that the green zone was safe and COVID-19 free. They were subsequently provided with self-testing kits where the results were to be uploaded to an online portal. The green pathway serviced all specialities such as ENT, Orthopaedics, General Surgery, Urology and Vascular with consultant cover and an off-site speciality registrar. A general SHO provided on-site cover for all inpatients.

### **Changes made to the Surgical Rota**

With the chaos of the pandemic causing constant changes to the NHS, it was necessary to create a three tier hierarchical body. This involved a Platinum Command as senior clinical management, middle-ranking Gold Command and junior Silver Command comprising clinicians, nurses, and managers from different fields to support and implement decision-making. A joint decision across the trust was to redistribute surgical junior doctors such as Foundation Doctors, Senior House Officers and a few Registrars to support the medical teams (2). As a result, job roles were redefined to ensure medical wards were well staffed and managed during the crisis.

To ensure that the staffing was adequate, the General Surgery rota was designed to account for the increase in staff taking sick leave due to self-isolation or those that were shielding. The rota implemented ‘stand-by’ shifts, which decreased the number of staff present in the hospital at the same time, and allowed for the easy replacement of members who fell ill. The new design made the shifts longer but limited the exposure by having more time between shifts. There was no longer a team based structure, instead, a large general surgical team to cover all patients including vascular patients due to the decrease in admissions.

After the first COVID surge was over, the rota was redesigned in August 5<sup>th</sup> 2020 to encompass both the green and yellow sides. A firm-based structure returned - staff were split into teams of ‘Colorectal’, ‘Upper GI’, ‘Emergency/ Breast’, and Vascular. As more staff were available each day, annual leave could now be scheduled more readily as opposed to earlier. With numbers reducing in critical care, more nursing staff were reallocated to ward based duties.

Lastly, the team based rota has been maintained to improve continuity of care. New trainees were introduced to the trust following pre-pandemic format and the staff isolation regarding COVID-19 followed the government policy in place.

### **Discussion**

The ever-changing nature of the pandemic resulted in the General Surgery Department being faced by challenges from all aspects, and the need for dynamic change increased throughout this period. It required involvement of staff members from all levels from administration to consultant surgeons to make multi-disciplinary decisions to ensure the department and the patients did not suffer. The main aims of the department were to provide safe and appropriate clinical management for each surgical patient, ensure cancer patients were being treated during these uncertain times in a timely manner and finally to preserve the staff’s resilience whilst providing them adequate training to progress their careers.

The results show there was an overall increase in NCEPOD cases by 48.4% from pre-Covid time to the end of the first wave.

This highlights the strain the surgical department had faced in terms of surgeons required daily as well as need for other surgical service provisions to normalise.

Despite time passing since the first phase we see permanent changes in the surgical service provisions. The first one being the surgical rota; previously, the teams would be consultant based, however now it allows for more rotations across the sub-specialities ensuring that training is not compromised and there is adequate staff at all times to provide safe and effective healthcare. The second being an increase in phone-call consultations to ensure each patient is followed up and treatment plans are expedited when necessary or followed-up once again on a later date. Arguably, we now face a 'new normal' with no end date in sight. Whilst the changes have shown a favourable outcome for the General Surgical department, there is no guarantee that COVID-19 may not once again burden the NHS. Therefore, it is important to continuously reflect, evaluate and adapt to each new challenge faced.

## Conclusion

Our trust was at the coalface of the NHS response to the first wave of the pandemic. Our experiences in managing the first wave have made us wiser and have helped us respond better in the second wave. The successes were repeated and failures avoided. We've recognised from the first wave that medical staffing has been the bane of NHS trusts and the Nightingale hospitals. We believe that our experiences in managing the first wave can be replicated across other NHS trusts until the vaccination drives provide us herd immunity or if ever faced in a similar outbreak. The response of the surgical department has proven that with dynamic responses to challenges presented by the pandemic, we can maintain successful service delivery. While it is unlikely that the NHS will return to what it was pre-pandemic as reflected in the "No going back" slogan, the successful implementation of the 'Green Pathway' means we can continue training, elective procedures, and return operations back to full capacity setting an example for other trusts. We continue to evaluate and

seek feedback to improve and protect our staff and community.

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