

The COVID-19 pandemic: considerations for resuming normal colorectal services

G. Pellino*[†] , C. J. Vaizey[‡] and Y. Maeda^{§¶}  and the European Society of Coloproctology (ESCP) Guideline Committee[¶]

*Department of Advanced Medical and Surgical Sciences, Università degli Studi della Campania 'Luigi Vanvitelli', Naples, Italy, [†]Colorectal Surgery, Vall d'Hebron University Hospital, Barcelona, Spain, [‡]Department of Colorectal Surgery, St Mark's Hospital, London, UK, [§]Department of Colorectal Surgery, Western General Hospital, Edinburgh, UK, and [¶]University of Edinburgh, Edinburgh, UK

Received 5 May 2020; accepted 7 August 2020; Accepted Article online 13 August 2020

Abstract

This European Society of Coloproctology guidance focuses on a proposed conceptual framework to resume standard service in colorectal surgery. The proposed conceptual framework is a schematic and stepwise approach including: in-depth assessment of damage to non-COVID-19-related colorectal service; the return of service (integration with the COVID-19-specific service and the existing operational continuity planning); safety arrangements in parallel with minimizing downtime; the required support for staff and patients; the aftermath of the pandemic and continued strategic planning. This will be dynamic guidance with ongoing updates using critical appraisal of emerging

evidence. We will welcome input from all stakeholders (statutory organizations, healthcare professionals, public and patients). Any new questions, new data and discussion are welcome via <https://www.escp.eu.com/guidelines>.

Keywords Colorectal surgery, COVID-19, service, conceptual framework

What does this paper add to the literature?

The article provides a conceptual framework of things to be considered on resuming colorectal service post-pandemic, based on disaster and conflict management knowledge.

Background

The COVID-19 global pandemic has changed our health service operation drastically, with reduction of or no service in outpatient clinics and elective surgeries. It is difficult to predict the direction of the pandemic with potential recurrence of outbreaks. Some restrictions in society are likely to continue for the foreseeable future to contain the spread of COVID-19, so it is expected that a degree of alteration in hospital service will continue.

The European Society of Coloproctology (ESCP) Guideline Committee has collated the available knowledge and strategies to resume nonemergency colorectal services in a proposed conceptual framework.

Method


The committee has collated information and data to formulate statements based on the following:

- 1 Review of the existing literature, particularly related to COVID-19;
- 2 Review of other available guidelines, statements and documents by statutory organizations and major surgical societies;
- 3 Review of general concepts and the framework of healthcare recovery strategies from natural disasters and conflicts.

The committee aimed to address the following clinical questions:

- 1 How should we start planning to resume normal service?
- 2 What assessment do we need to restart normal service?
- 3 What could be re-started first and as a priority?
- 4 What are the key numbers/indicators we could consider when restarting and stepping up normal service?
- 5 What setups are required to restart service?
- 6 How much screening of patients for COVID-19 is still required?
- 7 How much of the COVID-19-specific preoperative preparation needs to be continued?

Correspondence to: Miss Yasuko Maeda, MPhil, FRCS, Department of Colorectal Surgery, Western General Hospital, Crewe Road, Edinburgh EH4 2XU, UK.
E-mail: yazmaeda@gmail.com

 @yazmaeda

- 8 How can we ensure safety for both staff and patients?
- 9 How can we reduce exhaustion and stress of both staff and patients?
- 10 How best can we communicate information and support for patients regarding the safety of attending hospital and having treatment?
- 11 What can we do to prepare for a possible recurrence of the outbreak?

Contextualization

The present guidance is of a general nature, as it is important to reflect the extent of the COVID-19 outbreak according to the situation in each country, local region, hospital and surgical team and offer adaptable suggestions. It is primarily aimed at healthcare professionals and hospital managers in areas where the COVID-19 is currently in Phase 6 (pandemic) and/or postpandemic according to the World Health Organization (WHO) pandemic phase definitions [1]. Readers are recommended to refer to country-specific plans for easing the lockdown, which in Europe are being developed autonomously by each state and proposed time-scales are different [2].

Due to the rapidly changing situation and the fluidity of information, this is interim guidance at the time of writing. We are intending to evolve this as dynamic guidance on our website with ongoing updates using critical appraisal of emerging evidence and incorporating discussions and opinions based on experience that may be useful to consider. For this reason we will welcome input from all stakeholders (statutory organizations, healthcare professionals, public and patients) to continue improving this guidance and to make it adaptable to real-time clinical changes. Any input, including new questions, new data and new information along with suggestions and discussion, is welcome via <https://www.escp.eu.com/guidelines>.

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Proposed conceptual framework

The proposed schematic and stepwise approach to resume normal service is as follows:

- 1 In-depth assessment of damage to the colorectal service due to the pandemic;
- 2 Return of service: integration with the COVID-19-specific service and the existing operational continuity planning;
- 3 Safety arrangements in parallel with minimizing downtime;

- 4 The support required for staff and patients;
- 5 Aftermath of the pandemic and continued strategic planning.

In-depth assessment of damage to the colorectal service due to the COVID-19 pandemic

Before proceeding to recovery of service, assessment of the current situation due to disruption of normal service and a thorough evaluation of the available facility and residual capacity should be undertaken.

Consequences of disruption to normal service

It is important to start with an assessment of damage due to lack of access to health care and social support resources, and disruption of the continuity of care during the pandemic. These may include: (1) delayed diagnosis and delayed treatment, (2) exacerbation of preexisting risk factors and clinical conditions and (3) backlog of deferred investigations, diagnostic and therapeutic procedures [3,4].

ESCP proposals

A thorough assessment and planning are required to address the above points, in particular:

- 1 Checking all the waiting lists and contacting patients who are likely to require urgent intervention;
- 2 Assessing whether the patient's need for treatment has changed or not and deciding on the appropriate timing to offer necessary intervention (e.g. surgery required urgently, could wait, re-assess in outpatients, re-assess by telephone/virtual clinic). A documentation of assessment such as status of condition and symptoms alongside the use of American Society of Anesthesiologists and a comorbidity index may be helpful for clarity of decision-making. Further documentation should be made of the patient's attitude towards risking treatment in the COVID era;
- 3 Ensuring if the prepandemic assessment of comorbidities and functional capacity is still valid for the patient to be considered for elective surgery. The patient may have had COVID-19 infection and an associated decline in general health and/or respiratory/renal function;
- 4 Re-triaging to establish priorities needs to be extended to all endoscopy and outpatient waiting lists, either simultaneously or in phases according to available resources;
- 5 Assessment of the personnel who are available to resume service. Planning should not only consider the number of available staff, but also the availability

of staff with adequate skills required for operations and procedures and whether there are any pandemic-related issue (e.g. shielding, stress, bereavement, personal and familial arrangements) that may prevent staff from returning to activities in full capacity.

Return of service: integration with the COVID-19-specific service and the existing operational continuity planning

Shift from risk mitigation strategies during the COVID-19 pandemic

Many societies, both in colorectal surgery and gastroenterology, have advocated risk mitigation strategies during the COVID-19 pandemic [4–16]. The default position of all the guidelines and advice has been to go for the safest option.

ESCP proposals

- 1 It is essential that all patients are managed under a risk mitigation pathway/plan until further notice;
- 2 If the timing of definitive treatment is likely to be delayed further, risk-mitigating or emergency intervention should be considered. A few examples of such interventions may include: optimizing immunosuppression and nutrition, drainage of abdominal/perianal sepsis and formation of a stoma;
- 3 All patients need to be built in to normal service in phases, either with a definitive management plan and timing to address it or discharged with a safety net plan. If the patient is expected to monitor his or her symptoms in the community advice should be provided on what to do if symptoms/condition worsen.

Numbers and indicators to be considered for transitioning service

Trend of infection curve

The median incubation time for COVID-19 has been estimated to be 5 days, with 97.5% of those who develop symptoms doing so within 14 days [17,18]. The American College of Surgeons have proposed that a decrease in COVID-19 incidence for at least 14 days should occur prior to transitioning to the provision of elective surgical services [19]. However, as data on virulence and knowledge about transmission emerge this timeframe may need further review.

Basic reproduction rate

The basic reproduction rate (R_0) is an estimate of the speed of spread of disease in the population [20]. This has often been cited in the context of policy decisions on

quarantine, social isolation and lockdown. The modelling was established during the influenza pandemic a decade ago and gives a valuable insight into the pandemic. Reaching a certain preset R_0 as a threshold could be a useful indicator for scaling up COVID-19 services.

Rate of admission of COVID-19-infected patients against available beds

A staged approach according to the in-hospital COVID-19 infection rate has been recommended by the Spanish Surgeons Association (AEC) [21]. It proposes de-escalation of the level of alert and resumption of clinical practice according to defined phases in a sequential fashion based on the number of patients with COVID-19 infection in the hospital. This type of approach and its scale was endorsed by 89.2% and 89.1% of surgeons according to a national survey by the AEC and the European Association for Endoscopic Surgery, respectively [21].

A major pitfall of this approach is that the infection rate in the hospital is dependent on local health policy, particularly with regard to admission of patients with mild symptoms. It may also depend on the type of hospital (secondary or tertiary) and other specialities in the setting (e.g. co-existing with an infectious disease department, scale and expertise in intensive care). The figures could differ significantly from country to country and from facility to facility.

Number of available beds in intensive care/high-dependency unit

This is probably a useful indicator to consider when choosing the type of operations to re-start along with the extent of patients' comorbidities. It may not simply be an absolute number of empty beds; the number of isolated beds reserved for elective non-COVID cases and the ability to escalate care should also be noted. The US Centers for Disease Control and Prevention have suggested several additional indicators, taking into account intensive care unit (ICU) resources such as the number of available ventilators [22]. As approximately 30% of COVID-19 in-patients required ICU admission [23], hospitals are likely to continue reserving some ICU bed capacity for COVID-19 patients, which may be adjusted according to the number of infections in the population whilst resuming non-COVID-19 services.

Operations such as pelvic exenteration or major resections for patients with multiple comorbidities are likely to need at least a high-level care bed, possibly an ICU bed, with adequate staff cover. The availability of a COVID-19-free ICU/high-dependency unit needs to be established prior to performing complex major surgery.

Number of available skilled staff and equipment

The capacity of the service should be assessed taking into account the availability of surgical theatres, recovery rooms, ventilators, endoscopes and instruments.

Assessment of staff availability should not be limited to the number of surgeons but also the availability of anaesthetists and intensivists, theatre scrub staff, nurses and healthcare workers needed to run theatres. Junior doctors and specialist nurses to support cancer care, stoma care and enhanced recovery may have been deployed to other services and their availability needs to be confirmed, depending on the area of service to be resumed.

The inventory of disposable supplies should be checked and revised in order to detect any shortages or outdated instruments during stoppage of elective operations [19]. Considering the prioritization of other medical equipment required during the pandemic, it is essential to check if the supply chain for equipment and devices and the repair service required for resuming service have also returned to normal or at least to the level required to resume service; if not, an alternative procurement process should be established. Sourcing of personal protective equipment (PPE) is vital to support resumption of service and an increase in elective activities and ensure personnel are protected.

ESCP proposals

- 1 Monitoring of the ongoing situation and up-to-date information from the WHO, national government, local authorities and statutory organizations is necessary to determine the phase of pandemic in the local setting;
- 2 Some of the suggested key numbers/indicators for consideration are a persistent downward trend in the number of infected patients, R_0 , the number of COVID-19 patients in the hospital, the number of available beds (intensive care/high dependency) and availability of staff and equipment;
- 3 Checking whether the supply chain and repair service for equipment, including PPE, required for service resumption has also returned to normal, or at least to a level which is sufficient to restart the service.

Prioritization of resumption of elective surgery and outpatient clinics

In most countries and settings, an emergency service offering operations for cancers, sepsis and other life-threatening conditions that require intervention within 72 h was maintained during the pandemic.

Prioritization by condition

In principle, the first priority for the resumed service will be any condition that is not immediately life-threatening but needs urgent intervention. Most of the cases in this urgent category are likely to be cancer, inflammatory bowel disease, anal fistula and benign conditions that need at least temporizing.

A few examples include: cancer or a stricture that is progressing toward obstruction; not transfusion-dependent but slow, persistent bleeding cancer; and highly suspicious lesions that need confirmation of pathological diagnosis to proceed to the next step of management (e.g. endoscopic/surgical biopsies). Potential interventions include stenting, stoma formation or resection for obstructing or bleeding tumours or intra-abdominal sepsis (e.g. in Crohn's disease), colectomies for medically refractory colitis, repair of symptomatic hernias with recurrent obstruction and excision of transfusion-dependent haemorrhoids, but this is not an exhaustive list.

In the UK, the following categorization of surgical cancer patients has been defined by NHS England and Healthcare Improvement Scotland [24,25]:

- 1 Priority level 1a: emergency – operation needed within 24 h to save life;
- 2 Priority level 1b: urgent – operation needed within 72 h.

Priority levels 1a and 1b have been covered under emergency service during the COVID-19 pandemic and will continue to be dealt with under the scope of emergency care during the transitional period.

Relevant priority categories for elective settings are:

- 1 Priority level 2: elective surgery with the expectation of cure – within 4 weeks to save life/progression of disease beyond operability;
- 2 Priority level 3: elective surgery can be delayed for 10–12 weeks with no predicted negative outcome.

The remaining category is level 4, which encompasses patients who can wait for 3 months for an operation.

A few tools (e.g. scoring systems) have been devised to aid the prioritization of patients needing surgical treatment. These tools take into account factors related to procedure, disease and patients, including vulnerability [21,26–28]. However, these may not necessarily conform to specific practice in colorectal surgery. Any devised scoring systems should be subjected to rigorous assessment with regard to usefulness and validity.

Prioritization by resource availability

The order of re-starting services may not always be in the order of clinical prioritization. For example, nonurgent minor operations may be required to dry run a new and/or unfamiliar setup [e.g. operating theatre not normally used for colorectal surgery with different

equipment (lights, laparoscopic instruments etc.), operating with staff unaccustomed to major colorectal operations and procedures, utilization of purchased extra capacity at private hospitals] or as ‘filler’ of planned theatre lists with other major resections due to limited high-level postoperative care.

A patient’s particular comorbidities, such as asthma, chronic obstructive pulmonary disease, hypertension, cardiac conditions and diabetes, may need more detailed assessment prior to consideration for an operation during this transition period. If proceeding to surgery, they are likely to require further input which may stretch the residual capacity of a depleted anaesthetic department.

Surgical planning may need to be on a weekly or short-term basis. If patients are required to self-isolate for 2 weeks theatre lists have to be planned in advance, reducing flexibility. Expansion of capacity may be possible by extending hours of elective surgery to the evening and weekends [19].

ESCP proposals

- 1 Clinical urgency (conditions that require intervention within 4 weeks) should be the priority when resuming elective service;
- 2 Prioritization according to resource availability may be needed to test unfamiliar settings.

Considerations for elective operations and outpatient clinics

Operations in non-COVID-19 hospitals/theatres

In the absence of a vaccine or definitive treatment for COVID-19, elective procedures should be considered in dedicated COVID-free areas independent from other sections of the hospital, or they should be concentrated in COVID-free centres. A dedicated COVID-19-free, disease-specific hub can be adopted as a temporary measure during transition [3,21,24,29].

Preparation of patients

Patients scheduled for surgery should be advised to self-quarantine before surgery in order to reduce the risk of infection [21]. Currently the American College of Surgeons and ACPGBI set this self-quarantine period as 14 days with active monitoring (daily recording of temperature) [27,30]. Patients should be counselled in depth about the rationale for strict self-quarantine, as it has been reported that more than half of viral transmission is likely to have occurred from asymptomatic people [31]. Patients could be telephoned 24–48 h before admission and screened for fever, travel, occupation, cluster and contact, as well as for respiratory or gastrointestinal symptoms and anosmia and/or ageusia

[21]. All colorectal elective patients should continue to be tested, with serology and reverse transcriptase polymerase chain reaction (RT-PCR) 48–72 h before surgery, possibly in combination with preoperative chest CT 24 h before, as poor postoperative outcomes have been reported in COVID-19-positive patients who are asymptomatic at surgery, with up to 44% of such patients being admitted to the ICU postoperatively and a mortality rate of 20–24% [27,32]. Drive-through facilities or home testing would be ideal to avoid additional in-hospital attendance [27].

Patients should be encouraged to exercise within the limitations of self-isolation, and advice/input via telemedicine could be used to optimize prehabilitation, especially focusing on moderate exercise and good nutrition [27].

Outpatient clinic

Outpatient clinics should be planned with consideration for spacing to maintain social distancing and avoid congestion with a sufficient time interval between appointments. Patients should be asked to attend on their own or with the minimum number of escorts.

ESCP proposals

- 1 A COVID-free zone or hub should be considered for elective operations;
- 2 Preoperative preparation of patients should be continued as during the COVID-19 pandemic with RT-PCR testing ± CT chest;
- 3 Planning for outpatient clinics requires consideration for spacing and avoiding congestion.

Embracing different approaches adopted during the COVID-19 pandemic

Telehealth and telephone clinics

Teleconsultation or virtual clinics could be implemented and continued if installed during the pandemic in order to reduce in-person attendance at outpatient clinics [21].

The use of telephone or video conferencing should be considered to facilitate communication between patients and families/relatives after surgery to avoid unnecessary visits and crowding in small areas. Other areas to which this technique could be extended to are inter-speciality consultations (between general practitioners and coloproctologists), multidisciplinary meetings or e-signatures of informed consent [21]. The latter would need discussion with medicolegal experts and should be implemented according to local policies.

The use of apps has been suggested for several aspects of patient management in coloproctology.

Screening services for colorectal cancer have been developed using the Android interface [33]. Telehealth has proven beneficial in colorectal surgery, for example to accelerate postoperative recovery [34], to deliver virtual outpatient consultations [35] or to monitor stoma output [36,37]. Remote monitoring could be used to identify patients with symptoms of alert (e.g. temperature) and to track COVID-19-positive patients [38].

These modern techniques need to be based on a secure platform. This depends on available infrastructure and will require commitment from hospital management to invest in IT systems to facilitate smooth operation and ensure security of information exchange. The setup may need to be subjected to rigorous legal advice prior to installation for governance purposes and requires ongoing input from patients with regard to accessibility, usability and acceptance.

ESCP proposal

1 Newly adopted technologies during the COVID-19 pandemic could be continued to conform to social distancing and ease immediate pressure on service.

Safety arrangements in parallel with minimizing downtime

Establishing safety in the workplace

Instructions regarding PPE in the transition period

Appropriate levels of PPE should be available for all procedures, and healthcare workers should have access to the specific PPE required as well as the administrative and cleaning staff needed to maintain safety. Conventional PPE can be used in COVID-19-negative patients if adequate screening and testing have been performed [21].

During hospitalization, the personnel on the ward should use PPE, frequent hand-washing and social distancing. During complex wound dressing and stoma management, eye protection and masks are recommended; when attending to a patient infected with COVID-19 a higher level of PPE should be available and used for these procedures [11,21].

Although no cases of oro-faecal transmission have been reported so far, it is prudent to err on the side of safety. Whilst gastroscopy is considered to be an aerosol-generating procedure requiring full PPE and high levels of ventilation, colonoscopy, flexible sigmoidoscopy, rigid sigmoidoscopy, proctoscopy, anorectal physiological testing and endorectal/endoanal ultrasound require only standard PPE for a low-risk patient and can be carried out in rooms with a smaller number of air changes. [11,39].

Measures should be adopted to allow early discharge in safe conditions by means of accurate perioperative management, enhanced recovery and the use of remote postoperative monitoring and consultation [19].

Cleaning and other safety measures

Cleaning, disinfection and sterilization should be continued using standard methods [40]. It is recommended that social distancing should continue to be respected whenever possible, particularly in enclosed office environments.

Testing of staff for COVID-19

Each hospital is encouraged to develop local guidelines and pathways for testing personnel and patients, including the possibility of re-testing symptomatic staff who were negative at their first testing as false negatives can occur [21]. Healthcare workers who are being reincorporated after isolation or quarantine for contact with COVID-19 or were found positive at a SARS-CoV-2 test must be screened, ideally with serology and RT-PCR. All healthcare workers allocated to the sector of the hospital or working in a COVID-19-free hospital should be tested before attending the centre, with repeated testing at scheduled intervals.

ESCP proposals

- 1 The level of PPE during the transitional period should be maintained at the same level as during the pandemic;
- 2 No change is required to cleaning, disinfection and sterilization methods.

Required support for staff and patients

Support for staff

Proactive action should be taken to detect stress, fatigue, burnout and psychological struggles among healthcare workers during the de-escalation phase, especially in those who have suffered from COVID-19 infection [19]. There is a possibility of anxiety about outbreak recurrence, excessive alcohol intake and distress from redeployment to an unfamiliar working environment. In some cases, prolonged absence from work may be required to care for families and other personal issues; it is recommended that workers with high-risk medical conditions should be shielded.

The services established to help healthcare workers struggling to face the pandemic should be kept in place in order to provide a support net for personnel during resumption of elective activities.

Many health authorities and training bodies have set up helplines for healthcare professionals [41,42]. The

Physician Council of Barcelona (Colegio de Medicos de Barcelona), for example, established a telephone-based service to support healthcare workers experiencing psychological stress, and similar initiatives are being offered to struggling doctors at local hospitals (e.g. Hospital Vall d'Hebron in Barcelona, Spain [43,44]). The British Medical Association (BMA) [42] has produced detailed guidance directed to those who manage staff (line manager, general practitioner employer, senior staff member) in order to identify healthcare workers who are struggling and prevent this from happening. According to a BMA charter for mental well-being [45], employers are advised to build a supportive culture, develop a well-being strategy, create healthy workplaces, tackle the stigma around mental ill-health, foster peer support, ensure that support services are accessible and of high-quality, and ensure services have the confidence of those they are intended to help.

ESCP proposal

- 1 Consideration should be given to staff well-being, including appropriate support and signposting to helplines.

Considerations on patient information

Most patients with benign and chronic, nonlife-threatening conditions have not been receiving treatment or in-person assessment since stringent lockdown measures were adopted [4,29]. A prolonged period of staying at home may have generated excessive anxiety, and some patients will present late to hospital or may remain reluctant to seek medical help.

To alleviate anxieties and address uncertainties, patients should be provided with detailed information ahead of their hospital visit and planned operation. The information that could be included in such a letter/leaflet includes:

- 1 Patients attending outpatient clinics should have no COVID-19 symptoms. Appointments should be postponed until patients have been symptom free for 14 days;
- 2 It is recommended that patients use masks in waiting areas. There are many countries that mandate people to wear a simple cloth mask on public transport and indoors; the WHO have changed their position and are now recommending their use [46];
- 3 Patients undergoing an elective operation should be counselled in depth well before surgery. Counselling will include the usual explanations on general perioperative complications and additional COVID-19-related risks, such as poor outcomes in the event of COVID-19 infection. The proposed operation will

proceed only after well-informed consent is given by the patient and that consent should be clearly documented;

- 4 During the postoperative hospital stay, visits by family and friends may be restricted and kept to a minimum. Any visitor should have their temperature checked and be asked to adhere to protective measures, including frequent hand washing and use of a mask;
- 5 It is likely that there will be a different arrangement for recovery from surgery during the post-COVID-19 pandemic period, with earlier discharge, community-supported recuperation and continued isolation at home.

ESCP proposals

- 1 Consideration should be given to patients who may have increased levels of anxiety about attending hospital following lockdown and are reluctant to seek medical help;
- 2 Thorough information should be provided prior to the hospital visit and/or operation.

Aftermath of the pandemic and continued strategic planning

It is essential that a formal and sound analysis of strategies, guidance and planning during the COVID-19 pandemic should take place in parallel with recovery efforts. This is both to review the validity of the implemented plan for a COVID-19 outbreak and to prepare for a possible recurrence of a pandemic peak.

Regional and local rates of infection should be monitored, and thresholds should be set in order to define the need to take a step back if COVID-19 rates increase again [19].

ESCP proposals

In principle, we should look into:

- 1 The adequacy and extent of pandemic preparation: infrastructure, zoning of hospital/separation of non-COVID/COVID areas;
- 2 The chain of equipment supply, including the amount, the procurement process and reduction of reliance on single suppliers;
- 3 The COVID testing strategy;
- 4 Refinement of the current COVID framework/protocol based on emerging research outcomes; and
- 5 Continue monitoring the number of COVID-19 infections and switch the plan back to the contingency plan in the event of a resurgence of infections or a recurrence of an outbreak.

References

- 1 World Health Organization (WHO). *Pandemic Influenza Preparedness and Response: A WHO Guidance Document*, 2009. https://www.who.int/influenza/resources/documents/pandemic_guidance_04_2009/en/ and <https://www.ncbi.nlm.nih.gov/books/NBK143061/> (accessed April 2020).
- 2 *Europe prepares to ease coronavirus lockdowns*, *The Financial Times*, 2020. <https://www.ft.com/content/1fa5ae87-b3b6-4708-b9c5-58d2077b8d95> (accessed April 2020).
- 3 Spinelli A, Pellino G. COVID-19 pandemic: perspectives on an unfolding crisis. *Br J Surg* 2020; **107**: 785–7.
- 4 Gallo G, La Torre M, Pietroletti R *et al.* Italian society of colorectal surgery recommendations for good clinical practice in colorectal surgery during the novel coronavirus pandemic. *Tech Coloproctol* 2020; **24**: 501–5.
- 5 *Association of Coloproctology Great Britain and Ireland (ACPGBI), Inflammatory Bowel Disease (IBD) management by the Association of Coloproctology Great Britain and Ireland (ACPGBI)*, <https://www.acpgbi.org.uk/content/uploads/2020/04/ACPGBI-Guidance-on-Management-of-IBD-Patients-requiring-Surgical-Intervention-during-COVID-19-v15-4-20.pdf> (accessed April 2020).
- 6 *Association of Coloproctology Great Britain and Ireland (ACPGBI), Consideration for Multidisciplinary Management of Patients with Colorectal Cancer during the COVID-19 Pandemic of the Association of Coloproctologists of Great Britain and Ireland (ACPGBI)*. <https://www.acpgbi.org.uk/content/uploads/2020/03/ACPGBI-statement-on-CRC-treatment-during-COVID-19-FINAL.pdf> (accessed April 2020).
- 7 British Society of Gastroenterology (BSG) expanded consensus advice for the management of IBD during the COVID-19 pandemic. <https://www.bsg.org.uk/covid-19-advice/bsg-advice-for-management-of-inflammatory-bowel-disease-during-the-covid-19-pandemic/> (accessed April 2020).
- 8 Spanish Working Group for of IBD (Grupo Español de Trabajo en Enfermedad de Crohn y Colitis ulcerosa, GETECCU) Recommendations of the GETECCU on the management of IBD during COVID pandemic. <https://drive.google.com/file/d/1zLi4tOxqYliJ8Mfjq2sovP PA6rEajYQK/view> (accessed April 2020).
- 9 Joint guidance by the Association of Coloproctologists of Great Britain and Ireland (ACPGBI), British Society of Gastroenterology (BSG) and British Society of Gastrointestinal and Abdominal Radiology (BSGAR): Joint ACPGBI, BSG and BSGAR considerations for adapting the rapid access colorectal cancer pathway during COVID-19 pandemic. <https://www.acpgbi.org.uk/news/joint-acpgbi-bsg-and-bsgar-considerations-for-adapting-the-rapid-access-colorectal-cancer-pathway-during-covid-19-pandemic/> (accessed April 2020).
- 10 *Spanish Society of Surgery (Asociación Española de Cirujanos AEC), Recommendations of the AEC Surgery-AEC-COVID-19*. https://www.aecirujanos.es/Recomendaciones-from-the-Spanish-Society-of-Surgery-AEC_es_1_158.html (accessed April 2020).
- 11 *Spanish Association of Coloproctology (Asociación Española de Coloproctología, AECP), Recommendations of the AECP on how to manage colorectal diseases during the COVID-19*. <https://aecp-es.org/index.php/recomendaciones> (accessed April 2020).
- 12 *Italian Society of Surgical Oncology (Società Italiana di Chirurgia Oncologica, SICO), Practical Recommendations of SICO for the surgical treatment of oncologic patients during COVID-19 pandemic*. https://www.sicoweb.it/racc_omandazioni-sico.pdf (accessed April 2020).
- 13 *Société Nationale Française de Gastro-Entérologie (SNFGE), Société Savante Des Maladies et Cancers de L'Appareil Digestif - Thésaurus National de Cancérologie Digestive (TNCD) 21. Prise en charge des cancers digestifs en fonction de la situation épidémique COVID-19 (Dernière mise à jour le 10/04/2020)*. <https://www.snfge.org/content/21-prise-en-charge-des-cancers-digestifs-en-fonction-de-la-situation-epidemique-covid-19> (accessed April 2020).
- 14 *European Society of Surgical Oncology (ESSO), Advice for surgical oncologists on cancer service provision of the ESSO*. <https://www.essoweb.org/news/esso-statement-covid-19/> (accessed April 2020).
- 15 van de Haar J, Hoes LR, Coles CE *et al.* Caring for patients with cancer in the COVID-19 era. *Nat Med* 2020; **26**: 665–71.
- 16 *European Association for Endoscopic Surgery (EAES) and Society of American Gastrointestinal and Endoscopic Surgeons (SAGES) recommendations regarding surgical response to Covid-19 crisis*. <https://eaes.eu/eaes-and-sages-recomendations-regarding-surgical-response-to-covid-19-crisis/> (accessed April 2020) and *European Society of Coloproctology ESCP endorsement* <https://www.escp.eu.com/guidelines/covid-19-recommendations> (accessed 29 April 2020).
- 17 Lauer SA, Grantz KH, Bi Q *et al.* The incubation period of Coronavirus Disease 2019 (COVID-19) from publicly reported confirmed cases: estimation and application. *Ann Intern Med* 2020; **172**: 577–82.
- 18 World Health Organization (WHO). *Coronavirus disease 2019 (COVID-19) Situation Report – 73*, 2020. <https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200402-sitrep-73-covid-19.pdf> (accessed April 2020).
- 19 American College of Surgeons (ACS). *Local Resumption of Elective Surgery Guidance*, 2020. <https://www.facs.org/covid-19/clinical-guidance/resuming-elective-surgery> (accessed April 2020).
- 20 Ridenhour B, Kowalik JM, Shay DK. Unraveling R0: considerations for public health applications. *Am J Public Health* 2014; **104**: e32–41.
- 21 *Spanish Society of Surgery (Asociación Española de Cirujanos AEC), Recomendaciones de gestión para la vuelta a normalidad y “desescalada” en los servicios de cirugía general en el contexto de la pandemia COVID-19*, 2020. https://www.aecirujanos.es/-Recomendaciones-para-el-desescalado-COVID19_es_1_162.html (accessed April 2020).

- 22 US Centers for Disease Control and Prevention (CDC). *National Healthcare Safety Network. COVID-19 Module - Patient Impact and Hospital Capacity Pathway* <https://www.cdc.gov/nhsn/pdfs/covid19/57.130-covid19-pimhc-blank-p.pdf> (accessed May 2020).
- 23 Huang C, Wang Y, Li X *et al.* Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet* 2020; **395**: 497–506.
- 24 National Health Service (NHS). *Advice on Maintaining Cancer Treatment During the COVID-19 Response*, 2020. https://www.england.nhs.uk/coronavirus/wp-content/uploads/sites/52/2020/03/C0119-_Maintaining-cancer-services-_letter-to-trusts.pdf (accessed April 2020).
- 25 Healthcare Improvement Scotland. *COVID-19: Evidence for Scotland, Healthcare Improvement Scotland are Identifying Reliable Resources for NHSScotland in the COVID-19 Pandemic.* http://www.healthcareimprovementscotland.org/our_work/coronavirus_covid-19/evidence_for_scotland.aspx (accessed April 2020).
- 26 Prachand VN, Milner R, Angelos P *et al.* Medically-necessary, time-sensitive procedures: a scoring system to ethically and efficiently manage resource scarcity and provider risk during the COVID-19 pandemic. *J Am Coll Surg* 2020; **231**: 281–8.
- 27 Association of Coloproctology Great Britain and Ireland (ACPGBI), *Resumption of Elective Colorectal Surgery during COVID-19 - ACPGBI considerations on surgical prioritisation, patient vulnerability and environmental risk assessment.* <https://www.acpgbi.org.uk/content/uploads/2020/04/ACPGBI-considerations-on-resumption-of-Elective-Colorectal-Surgery-during-COVID-19-v28-4-20.pdf> (accessed April 2020).
- 28 Carlson G. *Prioritising surgical treatment in coronavirus pandemic “Salford Score”.* *BJS Cutting Edge Blog 1 Apr 2020 BJS.* <https://cuttingedgeblog.com/2020/04/01/prioritising-surgical-treatment-in-coronavirus-pandemic-salford-score/> (accessed April 2020).
- 29 Di Saverio S, Pata F, Gallo G *et al.* Coronavirus pandemic and Colorectal surgery: practical advice based on the Italian experience. *Colorectal Dis* 2020; **22**: 625–34.
- 30 American College of Surgeons (ACS). *COVID-19 and Surgical Procedures: A Guide for Patients*, 2020. <https://www.facs.org/covid-19/clinical-guidance/patient-guide> (accessed April 2020).
- 31 Arons MM, Hatfield KM, Reddy SC *et al.* Presymptomatic SARS-CoV-2 infections and transmission in a skilled nursing facility. *N Engl J Med.* 2020; **382**: 2081–90.
- 32 Lei S, Jiang F, Su W *et al.* Clinical characteristics and outcomes of patients undergoing surgeries during the incubation period of COVID-19 infection. *EClinicalMedicine* 2020; **21**: 100331.
- 33 Wu HC, Chang CJ, Lin CC, Tsai MC, Chang CC, Tseng MH. Developing screening services for colorectal cancer on Android smartphones. *Telemed J E Health* 2014; **20**: 687–95.
- 34 Bednarski BK, Nickerson TP, You YN *et al.* Randomized clinical trial of accelerated enhanced recovery after minimally invasive colorectal cancer surgery (RecoverMI trial). *Br J Surg* 2019; **106**: 1311–8.
- 35 Meehan D, Balhareth A, Gnanamoorthy M, Burke J, McNamara DA. Efficacy of physician associate delivered virtual outpatient clinic. *Int J Health Care Qual Assur* 2019; **32**: 1072–80.
- 36 Kontovounisios C, Smith J, Dawson P *et al.* The Ostomi™ Alert Sensor: a new device to measure stoma output. *Tech Coloproctol* 2018; **22**: 697–701.
- 37 Augestad KM, Sneve AM, Lindsetmo RO. Telemedicine in postoperative follow-up of STOMa Patients: a randomized clinical trial (the STOMPA trial). *Br J Surg* 2020; **107**: 509–18.
- 38 *Italy Working on Coronavirus Tracing app to Help Lockdown Exit.* Reuters, 2020. <https://www.reuters.com/article/us-health-coronavirus-italy-technology/italy-working-on-coronavirus-tracing-app-to-help-lockdown-exit-idUSKCN21Q2XE> (accessed April 2020).
- 39 Lui RN, Wong SH, Sánchez-Luna SA *et al.* Overview of guidance for endoscopy during the coronavirus disease 2019 (COVID-19) pandemic. *J Gastroenterol Hepatol* 2020; **35**: 749–59.
- 40 Centres for Disease Control and Prevention (CDC). *Guideline for Disinfection and Sterilization in Healthcare Facilities*, 2008 (Update May 2009) <https://www.cdc.gov/infectioncontrol/pdf/guidelines/disinfection-guidelines-H.pdf> (accessed April 2020).
- 41 Joint Committee of Surgical Training (JCST). *COVID-19: JCST Statement.* update 27 April 2020, 2020. https://www.jcst.org/-/media/files/jcst/key-documents/covid19_jcst-statement_update-iii_-27-april-2020.pdf (accessed April 2020).
- 42 British Medical Association (BMA). *COVID-19: Your Wellbeing - Looking after Yourself*, 2020. <https://www.bma.org.uk/advice-and-support/covid-19/your-health-and-wellbeing/covid-19-your-wellbeing/looking-after-yourself> (accessed April 2020).
- 43 *Pla de suport en salut mental al personal de l'Hospital Universitari Vall D'hebron enfront la COVID-19*, 2020. <https://intranet.vallhebron.com/sites/default/files/2020-03/Pla-de-suport-en-salut-mental-al-personal-de-l-Hospital-Universitari-Vall-d-Hebron-enfront-la-COVID-19.pdf> (accessed April 2020).
- 44 Pellino G, Spinelli A. *Guest post: The Effects of COVID-19 on Surgeons and Patients BJS Cutting Edge Blog*, 2020. <https://cuttingedgeblog.com/2020/03/18/covid-19/> (accessed April 2020).
- 45 British Medical Association (BMA). *Our new Charter for Mental Wellbeing*, 2020. <https://www.bma.org.uk/advice-and-support/your-wellbeing/creating-a-healthy-work-place/supporting-the-mental-wellbeing-of-doctors-and-medical-students> (accessed April 2020).
- 46 World Health Organization (WHO). *Advice on the Use of Masks in the Context of COVID-19*, 2020. [https://www.who.int/publications-detail/advice-on-the-use-of-masks-in-the-community-during-home-care-and-in-healthcare-settings-in-the-context-of-the-novel-coronavirus-\(2019-ncov\)-outbreak](https://www.who.int/publications-detail/advice-on-the-use-of-masks-in-the-community-during-home-care-and-in-healthcare-settings-in-the-context-of-the-novel-coronavirus-(2019-ncov)-outbreak) (accessed April 2020).