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An tÚdarás Um Fhaisnéis agus Cáilíocht Sláinte

Scoping evidence summary for the effectiveness of pathways to enable the resumption of hospital-based care in the context of COVID-19

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Key points

- This scoping evidence summary includes 14 descriptive reports, all of which were case studies or situation reports of individual hospitals or services conducted during the COVID-19 pandemic. One additional study describing a scoring system designed to facilitate decision-making for elective procedures was also identified.
- These descriptive reports cannot be classified as research studies. The reports lacked a research methodology and had insufficient or absent information on data collection, analysis and reporting of outcomes.
- Data on effectiveness were sparse, reported as either the number of staff or patient infections, the number of patients seen or procedures conducted, or both.
- Organisational measures involved segregated team or area workflows, training and education for both patients and staff, scheduling approaches including online appointment management systems, use of personal protective equipment (PPE) for patients and or staff and detailed screening measures.
- Physical space measures involved regular cleaning and disinfecting, physical distancing, and zoning according to either geographical areas within a hospital, care sectors, or contamination levels.
- Patient flow measures focused on triage, including the use of risk stratification pathways, treatment workflows designed to minimise patient and staff contact, and changes to care delivery, such as the increased use of online consultations and care prioritisation.
- For the studies reporting staff and patient infections, the authors suggested that the measures introduced successfully prevented SARS-CoV-2 transmission.
- While a formal quality appraisal was not conducted for this scoping review, the quality of the evidence is critically low given the nature of the descriptive reports, which do not constitute research evidence of effectiveness. There are also concerns in relation to the duration of follow-up and testing to identify asymptomatic cases.

Scoping evidence summary for the effectiveness of pathways to enable the resumption of hospital-based care in the context of COVID-19

The Health Information and Quality Authority (HIQA) has developed a series of 'Evidence Summaries' to assist the acute operations sub-group of the Clinical Expert Advisory Group (EAG) in supporting the National Public Health Emergency Team (NPHET), as well as those developing infection prevention and control guidance in their response to COVID-19. These summaries are based on specific research questions. This evidence summary was developed to address the following research question:

> **What is the effectiveness of pathways (processes or principles) put in place to enable the resumption of scheduled hospital-based care postponed or cancelled due to mitigation measures implemented in the context of a pandemic respiratory virus (COVID-19, SARS, MERS, or H1N1 influenza)?**

The processes as outlined in HIQA's "*Protocol for care pathways support for the resumption of scheduled hospital care in the context of COVID-19"* were followed. Below is a summary of relevant evidence identified in the scoping review until 06 May 2020.

Background

In response to the COVID-19 pandemic, and following recommendations from the National Public Health Emergency Team, non-essential scheduled hospital care in Ireland was largely postponed as of 27 March 2020, representing an unprecedented interruption to activity. Data communicated internally by the HSE Quality Improvement Division showed a substantial drop in emergency department attendance. While a steady return to care has been observed since early April, figures for the period 1-17 May 2020 remained 27% lower than those observed for the same period in 2019.[1] Evidence also indicates a reduction in public attendance for unscheduled hospital care activity,[1, 2] thought to be a consequence of public apprehension of contracting the virus within the hospital setting. Given the continuing threat of SARS-CoV-2 infection within the Irish population, resumption of hospital services will occur within a context of ongoing risk of infection to both patients and healthcare staff, and the associated risks to the overall health service.

The Government of Ireland's Roadmap for Reopening Society & Business[3] indicated a planned increase in the "delivery of non-COVID-19 care and services alongside

COVID-19 care to meet demand" across phases 1 and 2 of the roadmap. Resumption of scheduled care within the Irish hospital setting must continue to occur in a planned, appropriate manner which optimises patient care while minimising risks to the public, to healthcare staff, and to the wider health service.

This scoping report summarises evidence on the effectiveness of measures put in place to facilitate the resumption of scheduled hospital-based care postponed or cancelled due to mitigation measures, implemented in the context of a respiratory virus pandemic.

Methods

A protocol outlining the methodology of this scoping report was developed by HIQA, which was followed throughout its conduct. A scoping review was undertaken between 24 April 2020 and 06 May 2020. A formal appraisal of the quality of these studies has not been conducted given the scoping nature of this report and the lack of formal research studies identified.

Results

The scoping searches identified 14 studies describing various measures put in place to facilitate scheduled hospital-based care during the COVID-19 pandemic.[4-17] Three studies each were set in general hospitals[10, 13, 17] and general surgical departments.[12, 15, 16] Two studies were set in oncology services,[6, 8] with one study each describing the measures introduced into paediatric,[7] radiotherapy,[9] urology,[4] endoscopy,[5] nuclear cardiology[14] and nuclear medicine[11] services. Five studies were set in China,[5, 8-10, 17] three in Singapore,[6, 14, 15] three in the United States[4, 7, 16] and one each in Taiwan[13] and Italy.[12] One study included experiences from clinics in Europe, Asia, Africa, Australia and the US.[11] Thirteen studies took the form of case studies or situation reports of individual hospitals or services. It is important to note that these descriptive reports cannot be classified as research studies. All of the reports lacked a research methodology, with insufficient or absent information on data collection, analysis and the reporting of outcomes. One report describing a scoring system designed to facilitate decision-making for elective procedures was also identified.[16] Data on effectiveness were sparse, reported as either the number of staff or patient infections,[8, 10, 13-15, 17] the number of patients seen or procedures conducted,[7] or both.[4-6, 9, 11, 12] Table 1 includes a description of the characteristics of each study.

Of the 14 included studies, only three specifically referred to resumption or restoration of care.[5, 9, 17] The remaining studies either described measures introduced to facilitate the continuation of care, or did not explicitly state whether

the measures introduced were in the context of the restoration or continuation of care. In accordance with the protocol, the studies identified were considered under the following three overarching themes: (i) organisational measures; (ii) physical space measures; (iii) patient flow measures.

Organisational measures

The organisational measures described involved segregated team or area workflows,[6, 9, 11, 12, 14, 15, 17] COVID-19 training and education for both patients and staff,[9, 10, 14, 17] scheduling approaches including online appointment management systems,[7, 8] use of personal protective equipment (PPE) for patients and or staff,[4, 5, 8-11, 14, 15, 17] and detailed screening measures.[5, 6, 8-15, 17]

Physical space measures

Physical space measures described by the included studies involved regular cleaning and disinfecting,[9-11, 14, 17] physical distancing and control of overcrowding,[13] and zoning according to either geographical areas within a hospital, care sector, or contamination level.[6, 9, 10, 12, 14, 17]

Patient flow measures

Patient flow measures focused on triage,[5, 10, 11, 16, 17] including the use of risk stratification pathways,[4] treatment workflows designed to minimise patient and staff contact,[9] and changes to care delivery, such as the increased use of online consultations[4, 7, 8, 17] and care prioritisation.[11, 12, 16]

There was considerable overlap in the measures described by individual studies. Details of the measures introduced by each study and the results are described below.

Measures described by individual studies

Three studies explicitly referred to the resumption or restoration of care.[5, 9, 17] In a Chinese study, Han et al. described measures introduced to facilitate the restoration of non-urgent endoscopy services.[5] The measures involved comprehensive triage, confirmation of a patient's COVID-19 negative status through RT-PCR testing (within the previous three days for non-emergency patients), detailed screening questionnaires and a chest CT scan if deemed necessary, and personal protective equipment (PPE) for staff, including surgical masks, face shields or goggles, disposable hats and shoe covers, gowns, and gloves. The authors reported that the number of endoscopies increased gradually over a period of 19 days, reaching 70 cases per day, which was equivalent to 35% of full capacity. No endoscopy-related

COVID-19 nosocomial infections were reported. The authors concluded that strict screening procedures may prevent the spread of COVID-19 during digestive endoscopy.

Wu et al. described a series of measures introduced to facilitate the resumption of radiotherapy services at Hubei Cancer Hospital in Wuhan.[9] These included patient and healthcare worker screening, health education for patients, staff training, and zoning. The authors noted that only patients confirmed not to have COVID-19 received treatment; however, details of the screening measures used were not provided. Patients were informed of the risk of cross-contamination during treatments, the workflow design of the radiotherapy centre, and necessary personal protection. All staff who returned to work were screened for COVID-19 and were trained on COVID-19 prevention and protection. The radiotherapy centre was zoned into different contamination levels and was disinfected according to protocols. The protection level needed for each zone was clearly defined. A treatment workflow was designed to avoid patient-to-patient contact and minimise patient and staff interactions. The authors reported that while over 100 patients were treated with radiotherapy since the measures were introduced, there had been no incidence of on-site SARS-CoV-2 transmission between patients and healthcare workers.

Shen et al. reported the measures introduced to facilitate elective services in a general hospital in China.[17] The measures included comprehensive triage, screening of patients and visitors, PPE, staff training, infection control measures, strict patient flow controls and zoning of hospital areas. The authors reported that since January 16, three cases of COVID-19 were confirmed in the hospital, with no cases of hospital-acquired SARS-CoV-2 infection in patients who received medical care in either inpatient or outpatient settings.

The remaining 11 studies either described measures introduced to facilitate the continuation of care, or did not explicitly state whether the measures introduced were in the context of the restoration or continuation of care. Xu et al. described management strategies for the prevention and control of SARS-CoV-2 infection in non-isolated areas of a general hospital in China.[10] These included infrared temperature screening on all individuals, including patients, families and staff, at all hospital entrances. Both patients and staff were screened for epidemiological history and symptoms of COVID-19. Outpatient appointments were scheduled to control the flow of patients. Nosocomial infection control was strengthened, including triage management and disinfection of medical equipment, surfaces and floors. The wearing of masks was checked regularly for both patients and staff. The hospital was divided into discrete units based on geographical area grids. Audits and on-site spot checks were conducted daily to ensure the prevention and control measures were being implemented in each area grid. All hospital staff received COVID-19

training. The authors reported that there were no hospital-acquired SARS-CoV-2 infections among staff.

Lee et al. similarly described measures introduced to a general hospital in Taiwan.[13] The authors outlined the introduction of detailed patient and visitor screening, updated visitor policies, physical distancing and control of overcrowding, including the establishment of an outdoor pharmacy service to maintain regular prescriptions for chronic conditions. The authors reported that while 147 suspected cases of COVID-19 were isolated at the hospital, no nosocomial cases occurred. However, the length of follow-up was not reported, and it is not clear if, or how asymptomatic cases were identified.

Yeo et al. described measures put in place in a general surgical department in Singapore to prevent healthcare worker transmission.[15] The measures included managing surgical workload and the reduction of outpatient clinic visits and non-urgent elective surgical cases. Surgical specialty teams were divided into sub-teams that had no contact with one another, to ensure service continuity if one sub-team was infected or quarantined. Patients undergoing essential elective surgery were screened on arrival at the hospital and on admission to a ward. All HCWs were mandated to wear a surgical mask when in contact with patients, such as in clinics and during rounds in the general ward. The authors reported no instances of HCW transmission, although the length of follow-up or efforts made to identify asymptomatic cases were not reported.

Guerci et al. similarly described measures introduced into a general surgical unit in Italy.[12] These included the introduction of dedicated pathways to separate "clean" areas, including wards, stairs, lifts and changing rooms, from those defined as "contaminated." Care was prioritised by dividing patients into three groups: those who should undergo surgical procedures within two weeks, two months, or delayed beyond two months. Patients were screened prior to admission to identify fever or respiratory symptoms and, when admitted, with unspecified blood tests and lung X-rays. Members of the medical and nursing staff wore PPE at all times. The authors reported that between 2 March and 20 March, 20 elective surgical operations were performed safely on oncological patients. No infected patients were identified in the general surgery unit and no patient developed COVID-19 after surgery, although the length of follow-up and testing procedures are not clearly stated.

Prachand et al. described the development of a scoring system that systematically integrates factors to facilitate decision-making and triage for elective or medically necessary, time sensitive (MeNTS) procedures.[16] The authors suggested that this scoring system, developed in the US, could be used to inform case triage once the acute phase of the pandemic subsides and capacity resumes. The scoring system

included 21 factors in three categories (procedure, disease and patient) that were identified by the authors as significant contributors to MeNTS procedure triage and prioritisation in the setting of the COVID-19 pandemic. Prachand et al. suggested that a higher cumulative MeNTS score may be associated with a poorer perioperative patient outcome, an increased risk of COVID-19 transmission to staff, and or increased hospital resource utilisation. Evidence of effectiveness was limited to proof-of-concept data on the scoring process.

Borchert et al., in a US study, described the processes used to manage 53 inpatient urology consultations, which focused on three risk-stratified triage pathways.[4] The standard pathway involved in-person consultations with non-COVID-19 patients, while a telemedicine pathway utilised telephone consults for low-acuity urologic issues in either COVID-19 or non-COVID-19 patients. A final high risk pathway involved in-person consults with COVID-19 suspected or confirmed cases. Patients in the high risk pathway were seen by only one urology physician who wore PPE, including an N95 mask during the consultation. The authors reported that of the 53 consultations performed, 36% were via telemedicine, 19% were high risk in-person consults, with the remaining 45% performed as standard in-person consultations. None of the physicians developed COVID-19. While there was no follow-up to identify outcomes associated with the consultations performed during the study, the authors concluded that most urology consultations can be managed in a patient and physician safety-conscious manner, by implementing a novel triage pathway.

Patel et al. described the introduction of remote child and adolescent patient enrolment and expansion of capacity for telehealth visits for a paediatric service of an academic medical centre, in order to comply with US governmental guidelines on physical distancing and executive orders to reduce non-urgent, in-person healthcare visits and elective scheduled procedures.[7] Weekly enrolment increased 10-fold for children (age 0-12 years) and 1.2-fold for adolescents (age 13-17 years). Weekly telehealth visits increased 200-fold for children and 90-fold for adolescents.

The National Cancer Institute in Singapore described the measures taken to facilitate cancer care during the COVID-19 pandemic.[6] These included a segregated team workflow, which involved dividing all staff into two teams to ensure that whole departments were not quarantined in the event of an infection. Sub-teams were further confined to specific ward, outpatient, and office areas to minimise exposure and cross-contamination. To facilitate contact tracing, each outpatient sector had its own registration counter, triage, venipuncture service, consultation rooms, isolation rooms, and toilets. Telemedicine consults, home delivery of medications, and online payment was encouraged. In the outpatient setting, thermal scanner and questionnaire screening was carried out on all patients and visitors at two checkpoints within the hospital. The authors reported that no staff members were

infected with SARS-CoV-2. There was one confirmed COVID-19 patient, but the source of the infection was not reported. The average monthly outpatient clinic load decreased by 20%, while the total number of admissions decreased by 30% during a one month period.

Wang et al. described the measures introduced to an oncology service in China.[8] These included the screening of outpatients and pre-admissions, online appointment management and consultations, PPE for admitted patients, and changes to treatment delivery. Multiple on-site temperature tests were performed at the entrances of the hospital, the outpatient clinic, and the wards, and contact and travel histories of all individuals were recorded. Pre-admission screening involved recording of symptoms and routine blood tests and chest CT scans, with RT-PCR testing in cases of suspected pneumonia. Changes to care delivery included altering anticancer drugs conventionally administered through infusion to orally administered drugs if available and lengthening infusion intervals depending on patients' conditions. The authors reported that the online appointment management system substantially reduced the flow of patients in the hospital, and that no patient or staff member had been diagnosed with COVID-19 infection as a result of the strict protective measures.

Loke et al. described an adapted nuclear cardiology service, with measures implemented to avoid intra-institutional and cross-institutional spread of infection to other services within the same hospital group network in Singapore.[14] The measures introduced included infection control and personal protective equipment, with training sessions on the proper use of PPE for staff. Regular audits and management walkabouts were conducted to help identify lapses in infection control practices. Patients and visitors were screened, including the use of mass screening thermal imaging devices at entrances and detailed contact histories. Physical distancing was practiced in the waiting areas by ensuring that every other seat was left empty. The authors described the introduction of physical segregation, which involved the definition of boundaries to divide clinical areas into high and low-risk zones where patient movement was strictly confined to their appropriate risk levels, as well as temporal separation, with patients separated by time. Clinical staff were segregated into two teams that worked and rested in alternate shifts of two or more weeks. The authors reported no patient-to-physician transmissions of SARS-CoV-2 within the local nuclear cardiology departments, although the length of follow-up was not reported. CT scans were reviewed prior to patients leaving the department in an effort to identify asymptomatic cases.

Czernin et al. summarised strategies, precautions and experiences from departments of nuclear medicine in Europe, Asia, Australia, Africa, and the US.[11] The measures introduced varied from clinic to clinic, but were broadly categorised by the authors

as focusing on patient triage, the reduction of elective studies, increased infection control measures, and the introduction of staff rotations to implement back-up teams. For the departments that outlined some evidence of effectiveness, two reported that no transmissions within their departments had been observed. One nuclear medicine department in California identified one staff member who had tested positive for SARS-CoV-2.

Discussion

Fourteen studies were identified that reported measures introduced to facilitate the delivery of non-urgent care. Seven were identified through scoping searches, with an additional seven reports identified through the searches conducted for a related research question that considered examples of pathways (processes or principles) for the resumption of scheduled hospital-based care postponed or cancelled due to mitigation measures implemented in response to COVID-19.

The included studies took the form of descriptive case studies or situation reports of individual hospitals or services, conducted in the context of general hospitals or oncology, radiotherapy, urology, endoscopy, paediatric, surgical or nuclear medicine services. None of the 14 descriptive reports could be considered research studies, due to a lack of research methodology and insufficient or absent information on data collection, analysis and reporting of outcomes. The evidence on effectiveness was limited to a statement on patient or staff infections with SARS-CoV-2, and the numbers of patients seen or procedures conducted. The reports included a variety of measures, most commonly involving detailed screening of patients and staff, triage, and use of PPE. For the studies reporting staff and patient infections, the authors suggested that the measures had successfully prevented SARS-CoV-2 transmission.

One of the studies screened for this summary described hospital wide measures to reduce transmission in the context of inpatient hospital care,[18] but was excluded as it did not explicitly relate to elective care. The authors suggested that the reported lack of SARS-CoV-2 transmission was as a result of the physical distancing and PPE protocols adopted throughout the hospital, although it is not clear if COVID-19 status was laboratory confirmed. The scoping searches did not identify any high quality studies on the effectiveness of measures introduced to facilitate the continuation or restoration of routine or elective hospital care during previous pandemics. One report was identified that described the approach used to manage patients with cancer during the Middle East Respiratory Syndrome (MERS) pandemic in Saudi Arabia, which reported no cases of in-hospital transmission of MERS-CoV infection among oncology patients.[19] This descriptive report was similar in format to those included in this scoping review, and should not be considered as research evidence.

While the majority of reports did not explicitly state whether the measures introduced were in the context of the restoration or continuation of care, there is likely to be considerable overlap in the measures introduced to facilitate resumption of postponed or cancelled care and the measures introduced to enable the continuation of such care. This distinction was not always clearly stated by the study authors.

Limitations and challenges

From the limited number of studies identified, it appears that there is a lack of formal research on the effectiveness of measures implemented to facilitate the resumption of routine or non-urgent care. The reports identified most closely resemble case studies or situation reports of the experiences of local services, rather than research studies designed to evaluate or report the effectiveness of the various measures introduced. One possible reason is that previous pandemics did not tend to result in the same level of wide scale cancellation or postponement of services as have been experienced as a result of COVID-19. The resumption of services halted due to COVID-19 is likely to be at an early stage in most areas, with limited published data on effectiveness or outcomes.

A formal quality appraisal of the included studies was not conducted for this scoping summary. However, the quality of the evidence on effectiveness is critically low given the nature of the descriptive reports, which should not be considered evidence of effectiveness. For studies reporting on (the lack of) SARS-CoV-2 infections among patients or staff, it is not always clear if duration of follow-up was sufficient or if testing to identify potential asymptomatic cases was conducted. The circulation or prevalence of SARS-CoV-2 infections in the surrounding locality was also not reported.

Given the broad range of services, the various types of measures that could be introduced and the potentially wide range of outcomes, designing effective search strategies to identify relevant studies is challenging. The majority of the literature screened as part of the scoping searches was descriptive in nature. For example, commentaries on guidelines, recommendations, descriptions of care reorganisation or current care delivery during the COVID-19 pandemic, descriptions of implementations of various measures without data on effectiveness, descriptions of consensus-based recommendations, descriptions of the impact of COVID-19 on current care based on local experience or other reports, descriptions of how intra-hospital transmission was controlled during the SARS pandemic, and the impact of previous pandemics on healthcare utilisation. Only a few descriptive reports described the effectiveness of the responses implemented, but this was limited to rates of infections among staff or rates of care utilisation by patients. When

effectiveness data become available, a concern will remain regarding their transferability across jurisdictions and institutions. The measures introduced are typically multi-component, with effectiveness impacted by the scale of community transmission, local infrastructure and staffing levels, among other factors. Collection of local level monitoring data will likely be required to assess the effectiveness of introduced measures and to inform decisions around their escalation or de-escalation.

Conclusion

This scoping summary identified a small number of case studies or situation reports detailing experiences of local hospitals or services, with limited data on the effectiveness of measures introduced to facilitate the resumption or continuation of non-urgent hospital care. Given the nature of these studies, it is not possible to determine the effectiveness of the measures introduced.

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Table 1. Characteristics of included studies

Author Country Study design DOI	Care type Pandemic setting	Description of measures Organisational Management/Physical Space/Patient Flow	Results Evidence of effectiveness	Comments/ conclusions
Borchert 2020[4] **United States** **Department-level case study** https://doi.org/10.1016/j.urology.2020.04.059	**Care setting/ type** 53 inpatient urology consultations (March 16 to April 2, 2020) **Pandemic** COVID-19	**Description of measures** Risk stratified triage pathway for inpatient urology consultations. Three pathways: 1. Standard: in-person consultations with non-COVID-19 patients 2. Telemedicine: telephonic consults for low-acuity urologic issues in either group of patients. 3. High risk: in-person consults with COVID-19 positive/suspected patients High risk patients were seen by only one urology resident and/or attending, especially if a bedside procedure or operative intervention was necessary. PPE were donned, including N95 masks, per CDC and hospital policy.	In March 2020: 19/53 consultations (35.8%) were performed via telemedicine with no in-person exposure; 10/53 consultations (18.9%) were High-Risk, in which there was strictly controlled in-person contact; 24/53 consultations (45.2%), were performed as standard in-person encounters. COVID-19 associated consultations represented 18/53 (34.0%) of all consultations during this period, and of these, 8/18 (44.4%) were managed successfully via telemedicine alone. Of the telemedicine consultations, nearly 85% (16/19) were managed non-procedurally (neither an intervention from urology or interventional radiology was required). **Evidence of effectiveness** None of the residents or faculty caring for urology consultation patients during the March 2020 period developed symptoms suggestive of COVID-19 and/or tested positive for it. **Comparison with consultations conducted in 2019** A greater proportion of patients were managed non-procedurally in March 2020 compared with March 2019 (66 vs 51.5%), with fewer patients undergoing operative intervention (9.4 vs 21.7%) and more undergoing IR interventions (9.4 vs 0.9%) (p=0.03).	There was no follow-up to identify outcomes associated with the consultations performed during the study. The authors conclude that most urology consultations can be managed in a patient and physician safety-conscious manner, by implementing a novel triage pathway. By utilising telemedicine during consultation with patients with non-urgent urologic problems, the authors were able to provide appropriate care and counselling, while mitigating the surge of future outpatient urologic visits and care following the COVID-19 crisis.

Czernin 2020[11] **International (Europe, Australia, Africa, Asia, US)** https://doi.org/10.2967/jnumed.120.245738	**Care setting/type** Departments of nuclear medicine **Pandemic** COVID-19	This paper summarised strategies, precautions and experiences from clinics in Europe, Australia, Africa, Asia and the US. **Description of measures** (reported by country, extracted only if effectiveness reported) *Italy* Triage for all patients accessing the building (nuclear medicine and radiation oncology). All patients are asked for possible exposure, temperature is measured, and health status is evaluated before moving any further in the division. *Germany* Patients were screened on arrival, including a brief questionnaire concerning contact persons and symptoms and assessment of body temperature. In case of suspicious findings (e.g., dry cough or elevated temperature), patients are liberally rescheduled to the next 1–2 d and advised to contact their general practitioner or the ER if necessary. Patients with only mild cold-like or likely allergic symptoms (but no temperature increase) received a face mask. Examinations focused on short-term (2–3 months) progressive malignant and urgent cardiovascular diseases. Exposure risk for older persons was minimised by cancelling nonessential studies. The number of PET scans were reduced by 25%, conventional scintigraphy (including SPECT/CT) by 50%, and thyroid outpatient visits by 80–90% while maintaining radionuclide therapies in cancer patients. Strictly separated teams were established. *US (California)* The authors report that they implemented protective mechanisms on many levels. Staff followed universal precautions and were instructed to practice frequent cleaning of high-touch surfaces. When staff experienced a cough or fever they stayed home. Staff with persistent symptoms and fever were tested as much as possible, although the authors note that testing capabilities remain	**Evidence of effectiveness** *Italy* The number of imaging studies has been reduced by 20%. The authors report that so far none of the staff had been infected, but one staff member, living in a red area zone, was quarantined. *Germany* The authors reported that they did not observe transmissions in their department up to the time of writing. *US (California)* At the time of writing, the authors reported that one staff member had tested positive for SARS-CoV-2.	

		woefully limited. Attempts were made to have backup teams off-site who could take over if on-site staff fell ill. Imaging studies were limited to those that were essential and urgent. Patients were screened for flu-like symptoms during reminder calls and on arrival in the clinic. Administrative staff worked remotely as much as possible. Overall, the authors summarise the measures reported from the various clinics as: • Screen patients on arrival. • Use increased hygiene, including face masks (if available), personal protection device (PPD) (if confirmed). • Perform no elective scans or procedures. • Implement, if possible, separate teams. • Secure on-site radiotracer production (if appropriate and feasible). • Use physical distancing (at work and in private life). • Use telephone or video conferencing whenever possible.		
Guerci 2020[12] **Italy** https://doi.org/10.1016/j.surg.2020.03.012	**Care setting/type** General surgery unit **Pandemic** COVID-19	**Description of measures** *Dedicated pathways* Dedicated pathways were arranged to separate "clean" areas, including wards, stairs, elevators, changing rooms, and showers, from those defined as "contaminated." In this way, the operating room remained a "clean" area with dedicated staff. If necessary, an OR located at the end of the operative complex, with a separate entrance, was available for all suspected or confirmed COVID-19 cases. A separate pathway and elevator were prepared in case of a COVID-19 surgical urgency, with dedicated surgical staff on call. *Prioritisation of care* Patients were divided into 3 groups, those who should undergo surgical procedures within 2 weeks, 2 months, or delayed beyond 2 months. *Patient screening* All patients were screened before admission with home screening and evaluation through phone calls to identify	**Evidence of effectiveness** Between March 2 and March 20, 20 elective surgical operations on oncological patients were safely performed. No infected patients were identified in the General Surgery Unit and no patient developed COVID-19 after surgery.	The length of follow-up and testing procedures are not clear, although the authors mention that in addition to not developing COVID-19 (although assessment thereof is unclear), no surgical patients had respiratory symptoms or positive X-rays.

		fever or respiratory symptoms and, when admitted, with blood tests (unspecified) and lung X-rays. *PPE* To avoid nosocomial transmission of the virus, the medical and nursing staff always wore personal protective equipment (PPE). *Visitor policies* All patients could only have 1 visitor at a time and each visitor was expected to wear a surgical mask during the entire stay.		
Han 2020[5] **China** https://doi.org/10.1016/j.gie.2020.03.3855	**Care setting/ type** Restoration of non-urgent endoscopy services **Pandemic** COVID-19	**Description of measure** Triage, confirmation of a patient's COVID-19 negative status, PPE for staff. For patients with fever or respiratory symptoms, chest CT scans and routine blood tests are required. Patients from overseas who are in 14-day quarantine but have no infectious symptoms also undergo triage in the emergency department. After appointments are made, throat swabs must be collected for PCR testing. Emergency patients undergo 3-hour rapid testing on the day of endoscopy. Non-emergency patients require a PCR test within 3 days before endoscopy. Patients complete screening questionnaires, which include questions regarding body temperature, travel history, and PCR results. Only after complete evaluation are patients admitted to the endoscopy centre. During the examination, medical workers wear PPE including surgical masks, face shields or goggles, disposable hats and shoe covers, gowns, and gloves.	The authors report that over a period of 19 days, the number of endoscopic cases increased gradually reaching 70 cases per day, which is 35% of the full capacity, with total case numbers of 1,361 since March 2, 2020. **Evidence of effectiveness** No endoscopy-related COVID-19 nosocomial infections have been reported.	Strict screening procedures may prevent the spread of COVID-19 during digestive endoscopy during the resuming period.
Lee 2020[13] **Taiwan** https://doi.org/10.1016/j.jhin.2020.02.022	**Care setting/type** General Hospital **Pandemic** COVID-19	**Description of measures** *Patient and visitor screening* Infrared thermal camera scanning was introduced at hospital entrances and in the emergency department to recognise any persons, including visitors, with fever at first point of entry. Raised temperatures were confirmed using a tympanic thermometer, and a travel and contact history was taken by healthcare workers using a standard checklist. A person having fever, regardless of respiratory illness, and	**Evidence of effectiveness** The authors reported that while 147 suspected cases of COVID-19 were isolated at the hospital, no nosocomial cases occurred.	The length of follow-up or efforts made to identify asymptomatic cases are not reported.

		who had a history of traveling to China or Hong Kong/Macau in 14 days prior to symptom onset, or close contact with a confirmed COVID-19 case, was prohibited from entering the hospital, and was directed to the emergency department for isolation in a negatively pressurised room or an outdoor quarantine station for evaluation and management. All inpatients were carefully assessed, and any travel history to China or Hong Kong/Macau, or history of close contact with laboratory-confirmed COVID-19 in the preceding 14 days, was ascertained. *Visitor policies* A visitor policy, including maintaining a visitor log and limiting visitor numbers, was implemented. *Physical distancing and control of overcrowding* In order to avoid overcrowding, only those hospital entrances essential to the effective movement of personnel were kept open. Furthermore, to reduce the density of patients in outpatient departments, an outdoor pharmacy service was established for the regular maintenance prescription of chronic conditions.		
Loke 2020[14] **Singapore** https://doi.org/10.1007/s12350-020-02117-0	**Care setting/type** Nuclear Cardiology Services across a number of hospitals and centres within one hospital group network. **Pandemic** COVID-19	**Description of measures** *Infection control* Proper degrees of masking (surgical mask, N95 mask, eye protection) and other personal protective equipment (gowns, gloves) were quickly identified for doctors and staff handling different risk groups of patients and different categories of procedures. Training sessions were conducted for staff on the proper use of surgical or N95 masks and various personal protective equipment. Hand hygiene was emphasised and frequent sanitisation of hands and work surfaces were reinforced. Regular audits and management walkabouts helped quickly identify lapses in infection control practices. *Screening of patients and visitors* Screening included recording personal details to facilitate contact tracing, taking a targeted history of travel, detailed contact history with any known clusters of disease,	**Evidence of effectiveness** The authors report that there has not been any patient to physician transmission of COVID-19 within the local nuclear cardiology departments to date.	The length of follow-up is not reported. CT scans were reviewed in an effort to identify asymptomatic cases.

		screening of electronic medical records as well as any flu-like respiratory symptoms. Temperature taking at entrances using mass screening thermal imaging devices was the first line to identify suspect patients, although not all infected patients are symptomatic. In an attempt to further reduce risks, the number of caregivers allowed to accompany patients was limited to 1 per patient and physical distancing was practiced in the waiting areas by ensuring that every other seat was left empty. An isolation room was designated to temporarily hold any suspect cases of the infection who may have arrived at the department inadvertently. *Segregation of risk groups* Physical segregation, involving the definition of boundaries to dichotomise the clinical area into high and low-risk zones where patients are strictly confined to their appropriate risk levels, as well as temporal separation, where patients were separated in terms of time, were adopted. Outpatient and inpatient referrals were separated and where possible, conducted at separate facilities within the hospital network, or batched into groups (inpatient/outpatient), with selected days in the week allocated to either group without overlap and terminal cleaning in between. Exercise stress testing for myocardial perfusion imaging was identified as a high-risk procedure for droplet production. As such, treadmill exercise stress was discouraged in favour of pharmacological stress and medical/nursing staff who attended to suspect patients were required to don N95 masks with appropriate PPE. The authors also instituted a new requirement for the CT (acquired for attenuation correction or as part of the PET/CT scan) images to be screened before allowing patients to leave the department, providing an opportunity to promptly identify asymptomatic patients with CT changes suspicious for COVID-19. *Segregation of staff* Clinical staff were segregated into 2 teams, who worked and rested in alternate shifts of 2 or more weeks, so that in the event of any contact with an unexpected case, the affected team could stand down while the other team took over. Staff were mandated to monitor and log their		

		temperature and location twice daily as a surveillance for early signs of potential infection and were encouraged to practice physical distancing.		
National University Cancer Institute 2020[6] **Singapore** https://doi.org/10.1016/j.annonc.2020.03.306	**Care setting/type** Oncology service **Pandemic** COVID-19	**Description of measures** Team segregation and careful allocation of resources. *Segregated-team work flow* To minimise the loss of workforce, all staff (clinical and non-clinical) were segregated into 2 teams to ensure that whole departments were not quarantined in the event of an infection. Physician sub-teams were further geographically confined to specific ward, outpatient, and office areas to minimise exposure and cross-contamination. Each outpatient sector had its own registration counter, triage, venipuncture service, consultation rooms, isolation rooms, and lavatories, to facilitate contact tracing. Each team at the radiotherapy treatment centre comprised radiation oncologists, radiation therapists, physicists, nurses, and administrative staff. Cross-hospital transfer of staff was prohibited. Community cancer services (e.g. home chemotherapy and nursing) were discontinued to consolidate manpower. Face-to-face meetings were cancelled, and all department meetings, including multidisciplinary tumour boards, were conducted on a secure video conferencing platform. *Resource conservation and allocation* In outpatients, non-resident referrals were stopped and appointments for patients on cancer surveillance were deferred. Telemedicine consults, home delivery of medications, and online payment was encouraged. In the inpatient setting, cancer surgeries were allowed to proceed as planned but all non-cancer surgeries were postponed by 3 months. *Management of suspect cases and PPE conservation* In the outpatient setting, thermal scanner and questionnaire screening was carried out on all patients and visitors at two checkpoints within the hospital/medical centre. All cancer patients admitted with confirmed or high-risk suspected COVID-19 were managed in a designated ward by the pandemic team, staffed by internal medicine	Over a 1-month period during team segregation, the average monthly outpatient clinic load dropped by 20%, mostly due to deferment of non-urgent visits. The utilisation rate of chemotherapy chairs, average waiting time for new consults and to start treatment were similar. The total number of admissions decreased by 30%. **Evidence of effectiveness** No staff members were infected with COVID-19. The authors report one confirmed COVID-19 infection in one of their patients, but the source of the infection is not reported.	Despite COVID-19 community transmission, the segregated team model allowed the continuation of cancer care. However, the authors note that the long-term feasibility of these workflows is unknown. A nationwide blood product shortage resulted from physical distancing practices, cancellation of mobile blood drives, and stringent donor screening.

		physicians, with telemedicine support from haematology-oncology.		
Patel 2020[7] **United States** https://doi.org/10.1093/jamia/ocaa065	**Care setting/ type** Telehealth for paediatric patients **Pandemic** COVID-19	**Description of measures** Rapid expansion of remote child and adolescent patient enrolment for telehealth visits in order to comply with governmental guidelines on physical distancing and executive orders to reduce non-urgent, in-person healthcare visits and elective scheduled procedures (Prior to this, enrolment for new patients was through an in-person clinic visit)	Weekly enrolment increased 10-fold for children (age 0-12 years) and 1.2-fold for adolescents (age 13-17 years). Weekly telehealth visits increased 200-fold for children and 90-fold for adolescents.	The authors described a pathway for rapidly increasing capacity of remote paediatric and adolescent patient portal enrolment that fulfils privacy, security, and convenience concerns.
Prachand et al.[16] **US** https://doi.org/10.1016/j.jamcollsurg.2020.04.011	**Care setting/ type** General surgery **Pandemic** COVID-19	**Description of measures** Development of a scoring system that systematically integrates factors to facilitate decision-making and triage for elective or Medically-Necessary, Time-Sensitive (MeNTS) procedures and weighs individual patient risks with the ethical necessity of optimising public health concerns. (The authors suggest that it may be more appropriate to describe elective operations as Medically-Necessary, Time-Sensitive (MeNTS) procedures). 21 factors in three categories (procedure, disease, and patient) were identified as significant contributors to MeNTS procedure triage and prioritisation in the setting of the COVID-19 pandemic. As such, the resulting cumulative MeNTS score range was 21-105 points. *Procedure factors:* Operating Room time, estimated length of stay, anticipated blood loss, surgical team size, intubation probability and surgical site. *Disease factors:* Non-operative treatment option effectiveness, Non-operative treatment option resource/exposure risk, impact of 2 week delay in disease outcome, impact of 2 week delay in surgical difficulty/risk, impact of 6 week delay in disease outcome, impact of 6 week delay in surgical difficulty/risk. *Patient Factors:*	**Evidence of effectiveness** Limited to proof of concept of the scoring process. In an effort to assess relative concordance of the ad hoc review process of MeNTS cases permitted during the cessation of "elective" surgery to the MeNTS Scoring system, the cumulative MeNTS scores of a sample of MeNTS procedures performed during the week of March 20, 2020 to March 26, 2020 were calculated by faculty members of the departmental Quality committee. The MeNTS cases that were performed generally had relatively low MeNTS scores, while the cancelled procedures had somewhat higher scores, suggestive of relative concordance with the ad hoc decisions made prior to the creation of the MeNTS scoring system	

		Age, lung disease, obstructive sleep apnoea, cardiovascular disease, diabetes, immunocompromised, influenza-like illness, exposure to known COVID-19 positive persons in past 14 days. A higher cumulative MeNTS score was hypothesised to be associated with poorer perioperative patient outcome, increased risk of COVID-19 transmission to the health care team, and/or increased hospital resource utilisation. Given the need to maintain OR capacity for trauma, emergency, and highly urgent cases, the authors suggest that an upper threshold MeNTS score can be designated by surgical and perioperative leadership based on the immediately anticipated conditions and resources at each institution. Performing a MeNTS procedure whose score exceeds this upper threshold at that particular point in time is unlikely to be justifiable given the associated risks, though sound clinical judgement always takes precedent		
Shen et al.[17] **China** https://doi.org/10.1007/s00270-020-02474-w	**Care setting/ type** General hospital **Pandemic** COVID-19	**Description of measures** *Phase I: January 16 to January 23* Emergency Leadership Committee and advanced IPC and MDT establishment; PPE and medical consumables reservation and preparation; representative protocols for COVID-19 cases and regular medical services; COVID-19 education and training for physicians, nurses and hospital staffs; infrastructure modifications including the ward, fever clinic, quarantine unit and operating theatre. *Phase II: January 24 to February 14* Strict in-hospital flow control, temperature and COVID-19 RT-PCR screening for visitors and patients, enhanced personnel support to the Fever Clinic, emergency and respiratory department; temporary suspension of elective surgeries, and special arrangement for emergency operation; attempts of online medical services and consultation. *Phase III: February 15 – time of writing* All measures above continued in force; resumption of elective services under full monitoring; surgical and	Regular clinical services and surgeries maintained in Phase I had a remarkable decrease due to the clinical and elective surgery restrictions in Phase II and gradually increased in Phase III. **Evidence of effectiveness**. Since January 16, three cases were confirmed in the hospital and no healthcare-associated infection was found. There was no case of hospital-acquired COVID-19 infection for those who received medical care in either inpatient or outpatient settings. Shortages in staff and medical consumables, and limitation in space were the obstacles we encountered.	Phase III is the resumption of elective services under full monitoring – More detail in paper – only measures relating to elective care were included here in detail.

		hospitalisation workflow was individualised upon MDT evaluation and committee approval. From February 14, consultant clinics gradually reopened, and elective operations were permitted only for COVID-19-negative patients, with all previous protocols still in effect. Administrative Response: establishment of an Emergency Leadership Committee as well as an Emergency Response Plan to clarify the responsibilities of each department to deal with potential internal and external emergencies. Infrastructure Modifications: Quarantine Unit—Any individual with fever, chest CT abnormalities, or epidemic contact with COVID-19 were guided to a remote quarantined unit. Inpatient Ward—Prominent description of COVID-19 with infection indications and notice for mask wearing and hand hygiene were posted. For cases for semi-elective surgeries such as malignant tumours, an isolation section with single-bed rooms was prepared. Post-operational quarantine was granted until SARS-CoV-2 tested negative. All inpatients went through the SARS-CoV-2 screening process to eliminate in-hospital transmission. Contaminated (meeting patients), buffer corridor (donning and removing PPE) and hygiene (resting) blocks were separated. Two single-way inter-block paths were clapboarded, in such a way as to efficiently avoid the spread of pathogens. Operating Room—One out of 17 operating rooms in the main block was a negative pressure theatre, which was the priority choice for all emergent surgeries without RT-PCR nucleic acid tests. Regular positive pressure theatres were available for elective surgeries, with full personal protection equipped for all staff. An isolated CT room near the Fever Clinic and Emergency was assigned, in such a way to control the in-hospital transfer and thus reduce transmission risks. Air sterilisation with ultraviolet light for 10 minutes and medical sheets were replaced after each scanning.		

Wang 2020[8] **China** https://doi.org/10.1001/jamaoncol.2020.1198	**Care setting/ type** Oncology service **Pandemic** COVID-19	**Description of measures** *Screening of outpatients* Multiple on-site temperature tests are performed at the entrances of the hospital, the outpatient clinic, and the wards. Also, the contact and travel histories. Recording of contact and travel histories of all individuals. *Online appointment management* An appointment scheduling system is available for outpatients, which allows both online appointment scheduling and on-site registration. *PPE* For admitted patients, essential personal protective measures are required (such as wearing a mask and bringing their own disinfectant). *Online consultation channels* To help instruct patients on medication taking and cancer-related symptom management. *Pre-admission screening* Recording of symptoms. Mandatory routine blood tests and high resolution CT scans of the lungs. COVID-19 virus nucleic acid tests carried out if suspected pneumonia found on CT imaging. *Changes to treatment delivery* Some anti-cancer drugs conventionally administered through infusion were changed to orally administered drugs if available. For adjuvant chemotherapy or maintenance chemotherapy, the infusion intervals were appropriately prolonged depending on patients' conditions.	The appointment system substantially reduced the flow of people in the hospital. From 12 February 2020 to 2 March 2020, the Department of Medical Oncology received a total of 2,944 patients for clinic consultation and treatment, including 2,795 outpatients and 149 inpatients. **Evidence of effectiveness** Under the strict protective measures, the authors noted that no patient or staff member had been diagnosed with COVID-19 infection as of March 3, 2020.	The follow-up time may be too short to rule out COVID-19 infections.
Wu 2020[9] **China** https://doi.org/10.1016/j.adro.2020.03.004	**Care setting/type** Radiotherapy, Hubei Cancer Hospital **Pandemic** COVID-19	**Description of measures** *Patient screening* All patients receiving radiotherapy were screened for COVID-19. Only patients for whom COVID-19 was ruled out received treatment. *Health education for patients* An informed consent form was developed specifically for the COVID-19 period. Before receiving radiotherapy, the patient is informed of the risk of cross-contamination during	Service has been maintained since introduction of measures, the authors highlight other centres have had to discontinue services after resuming due to infection rates. Over 100 patients treated with radiotherapy since measures established, with no incidence of on-site COVID-19 transmission between patients and health care workers.	The authors suggest that the absence of on-site transmission indicates that these practices are effective.

		treatments. The patient is also informed of the zoning design of the radiotherapy centre, the radiotherapy workflow during the outbreak, and the necessary personal protection for the patient. *Health care worker screening* According to the COVID-19 diagnosis guidelines, the staff returning to work must be screened for the disease. Only those who cleared the screening could return to posts. *Staff training* Before returning to posts, staff receive training to learn about COVID-19 prevention and protection. Staff learn the protection level of their corresponding role and the appropriate PPE for their role. *Zoning* The radiotherapy centre is zoned into different contamination levels (Clean Zone; Semi-Soiled/Semi-Contaminated Zone; and Soiled/Contaminated Zone) and is periodically disinfected following corresponding frequencies and protocols. The protection level needed for each zone level is clearly defined. *Special considerations for immobilisation devices* Special modifications were put in place for certain immobilisation devices during the outbreak such as surgical masks under thermoplastic masks for cranial or head-and-neck patients and single-use clear wrap applied to immobilisation devices. A special radiotherapy treatment workflow is designed to avoid patient-patient contacts and minimise patient-staff interaction time.		
Xu 2020[10] **China** https://doi.org/10.1016/j.ijnss.2020.04.003	**Care setting/type** General hospital **Pandemic** COVID-19	**Description of measures** *Management at the hospital entrances* Infrared temperature screening was performed on all personnel, including patients, families, and staff, at the 9 major entrances to the hospital. The wearing of masks was checked for all personnel and masks would be issued if necessary. Rapid hand sanitiser stations were installed to encourage hand hygiene. Individuals with an infrared body temperature >38C or ear temperature >37.5C were accompanied by staff to the fever outpatient clinic.	**Evidence of effectiveness** There were no hospital-acquired COVID-19 infections among staff in the hospital. Audit results indicated that the rates of mask-wearing (206/206), epidemiological history screening (368/382 for outpatients and 904/908 for inpatients), and medical supplies disinfection (62/62) were all close to 100% in the hospital. The accuracy rate of the wearing of masks by patients and their families was	Refined management strategies for the prevention and control of COVID-19 infection in non-isolated areas of the general hospital are effective.

		Management of outpatient clinics Outpatient appointments were scheduled to control the flow of patients. Nosocomial infection control was strengthened, including triage management and disinfection before and after each contact with patients. Triage nurses checked whether patients and their families wore masks correctly. Patients were screened for epidemiological history of COVID-19 and fever/respiratory/ gastrointestinal symptoms. Patients with an epidemiological history and symptoms, or fever alone, were escorted to the fever outpatient clinic for further examination. Patients with an epidemiological history, but without symptoms went to designated clinics, and maintained a distance of at least 1 metre from each other. Medical equipment was disinfected following each use. Surfaces and the floors were wiped and disinfected with 1000 mg/L chlorine-containing disinfectant once every four hours. *Management of inpatient department* Education related to prevention and control of COVID-19: Emphasis was placed on informing patients to reduce and control the number of visitors, practice proper hand hygiene and wear their mask correctly. A screening form was used to screen inpatients epidemiological history of COVID-19, and respiratory or gastrointestinal symptoms. Patients with an epidemiological history, accompanied by fever/respiratory/ gastrointestinal symptoms were transferred to the fever outpatient clinic. Patients with a positive epidemiological history but without symptoms underwent proper droplet isolation. Visitors were not allowed to enter wards. The distance between the beds of admitted patients was more than 1 metre. *Management of emergency department* A screening station was set up at the entrance to the ED. Nurses checked and guided patients and their families on the proper wearing of masks and recorded their epidemiological history. Triage nurses evaluated whether patients had fever/respiratory/gastrointestinal symptoms. *Management of hospital administrative offices*	74% and the compliance rate of their hand hygiene was 41%.	

		All hospital staff were screened and completed an epidemiological history related to COVID-19. Staff with contact history were quarantined. Twice daily checking of symptoms. *Systematic implementation of prevention and control of COVID-19 and grid-based audits* The hospital was divided into 108 units based on geographical area grids. Each unit was assigned a person in charge such that there were no blind spots in the hospital and no omissions in personnel management. Daily audits and daily on-site spot checks to ensure the prevention and control measures were being implemented by personnel in the gridded areas. Systematic training on knowledge regarding COVID-19 for all hospital staff; Multi-modal education of patients and accompanying persons; Effective communication via information technology; Quality improvement based on digitised feedback.		
Yeo 2020[15] **Singapore** https://doi.org/10.1097/sla.0000000000003957	**Care setting/type** General surgical department **Pandemic** COVID-19	**Description of measures** *Managing surgical workload* In order to cope with the decrease in manpower as a result of staff redeployment, a 40% decrease in outpatient clinic visits was instituted. 40% of non-urgent elective surgical cases were postponed. Ongoing elective surgical cases were limited to life, limb and organ-preserving operations – e.g. malignancies, limb salvage and aortic aneurysm surgery. Each surgical sub-specialty team was divided into 2 or more sub-teams, which functioned separately and did not come into contact with one another, ensuring service continuity if one sub-team is infected or quarantined. Inter-hospital rotation of surgical residents was also halted. *Protocols for surgery* Patients undergoing essential elective surgery were screened on arrival to the hospital for fever, upper respiratory tract (URTI) symptoms and contact/travel history. Patients with symptoms were turned away from surgery and sent to the emergency department for further investigations. Full, tier 2, PPE is mandatory for HCWs involved in potentially aerosolising procedures such as	**Evidence of effectiveness** The authors report no instances of HCW transmission to date.	The length of follow-up or efforts made to identify asymptomatic cases are not reported.

		intubation. For all surgeries, the anaesthesia team intubates all patients in full PPE, while the surgical team waits outside the operating theatre (OT) for 3 minutes before entering. Essential elective surgery for non-suspect cases are performed in a conventional OT with positive pressure ventilation. *Care of patients on the wards* All patients were screened on admission for risk factors such as fever, URTI and contact/travel history. Patients deemed to be high risk for COVID-19, and patients with possible pneumonia on chest X-ray were admitted to an isolation ward. All other patients were admitted to the general ward. All HCWs were mandated to wear a surgical mask when in contact with patients, such as in clinics and during rounds in the general ward. All HCWs were issued a Real-time Location System tag for contact-tracing. Upon confirmation of COVID-19 in a patient, all HCWs in contact with the patient and not in full PPE protection were swabbed and sent home to quarantine until negative swabs were confirmed. *Reduction of non-essential gatherings* All non-essential department meetings such as journal clubs and educational plenaries were cancelled. Important clinical decision-making meetings were continued either on electronic platforms such as Zoom, or in small groups with physical distancing observed and with everyone wearing a surgical mask.		

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