

Urology action plan in a pandemic

INTRODUCTION

Since the first case of COVID-19 that was reported in Wuhan, China, in December 2019, the novel coronavirus has rapidly spread worldwide.^[1] On 30 January 2020, the World Health Organization declared the situation a public health emergency of international concern; on 12 March 2020, it was declared a pandemic.^[2]

Rapid measures have been implemented by governments worldwide in an attempt to curb the pandemic and minimise its impact on health services. In Singapore, with the first confirmed COVID-19 case on 23 January 2020, the Ministry of Health implemented wide-ranging multi-agency public health measures and raised national emergency alert levels based on a Disease Outbreak Response System Condition (DORSCON) system.^[3] Scale-down measures included safe social distancing, segregation of working teams, working from home, stay home notices for returning residents, school closures, virtual learning and a ‘circuit breaker’ that only allowed essential services to function, similar to a progressive lockdown [Figures 1 and 2, Table 1].^[4]

At our institution, Ng Teng Fong General Hospital, protocols for inpatient surgery and outpatient care were implemented swiftly according to the DORSCON status. A COVID-19 action

team was activated to optimise patient care. Department-level changes were implemented for inpatient and outpatient urology care, including reallocation of staff, team segregation, prioritisation of surgery, ambulatory procedures and outpatient clinic visits in a streamlined manner.

We herein provide a simple urology action plan that we developed for urology patient management during the pandemic. It has two categories: protocols for inpatient surgery and outpatient care, consisting of clinic visits and ambulatory procedures.

Table 1. Scale-down in hospitals based on level of emergency.

Location	Stage 1	Stage 2 scale-down	Stage 3 scale-down
Hospital	No Change	<ul style="list-style-type: none"> SOC reduced by 50% OT listed reduced by 25% 	<ul style="list-style-type: none"> SOC reduced by >70% OT listed reduced by >90%
Department	No Change	<ul style="list-style-type: none"> Team segregation implemented/phone consultations started Operations for Priority 1/2 and emergencies 	<ul style="list-style-type: none"> Only Priority 1 emergency operations performed Selected ambulatory procedures performed

OT operating theatre, SOC: specialist outpatient clinics

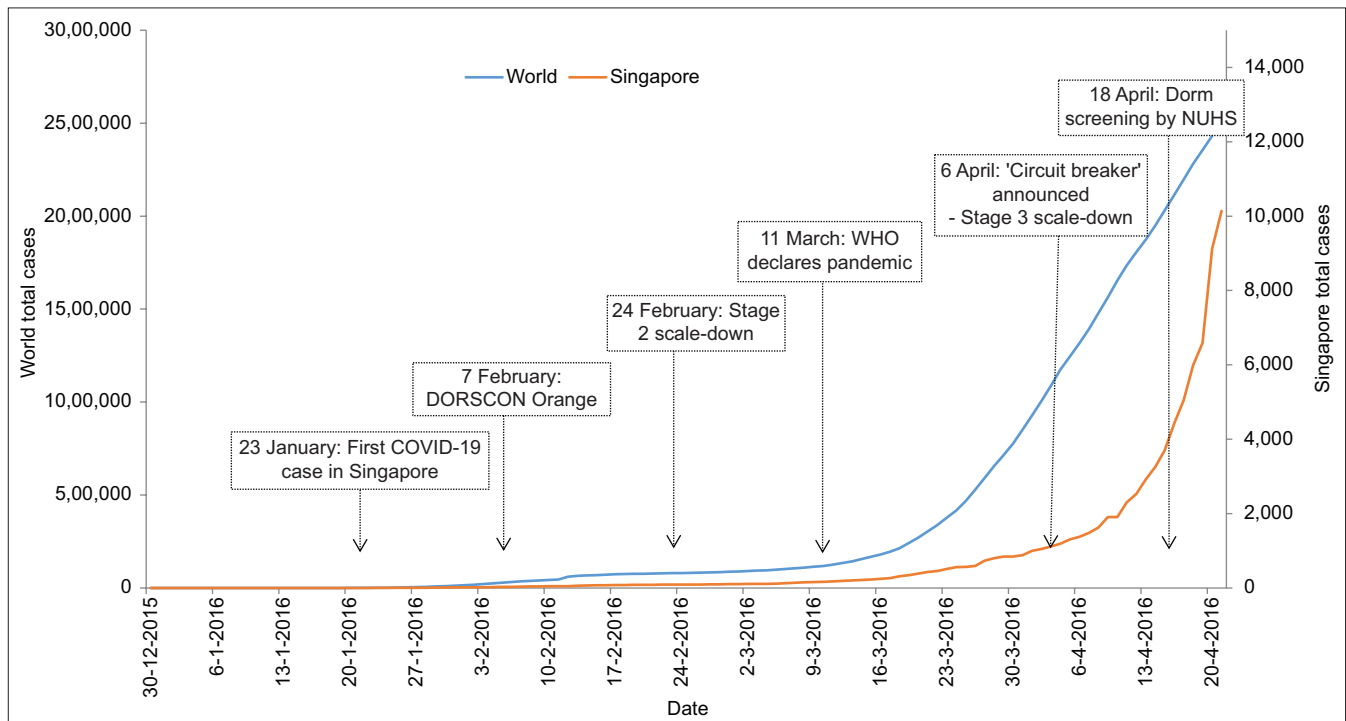


Figure 1: Graph shows the total number of COVID-19 cases in Singapore and the world as of April 2020. DORSCON: Disease Outbreak Response System Condition, NUHS: National University Health System, WHO: World Health Organization

METHODS

In order to formulate a comprehensive urology action plan, a literature review was performed, taking into consideration all the major guidelines (National Institute for Health and Care Excellence, British Association of Urological Surgeons and European Association of Urology [EAU] guidelines) and the recently released rapid response guidelines from the EAU.^[5-8] We incorporated suggestions from institutes such as the Cleveland Clinic, Royal College of Surgeons and Singapore's earliest responders to COVID-19, Tan Tock Seng Hospital.^[9-11] Additional focused literature review was done on the COVID-19 response in surgery and urology subspecialties, urologic oncology and endourology.^[12-15] This laid the foundation for our urology action plan.

To cater to our local and Southeast Asian population, we revised institutional protocols for inpatient surgery and outpatient care that were available on the National University Health System intranet. These were implemented swiftly to be aligned with evolving recommendations by the Ministry of Health [Figure 2].^[3]

PROTOCOLS FOR INPATIENT SURGERY

The COVID-19 pandemic has crippled healthcare systems even in developed countries in Europe and the United States.^[16,17]

Governments have had to redistribute their resources to support healthcare needs and prevent healthcare systems from being overwhelmed. Singapore, being one of the first ASEAN countries outside China to be affected by COVID-19, responded quickly with timely measures based on a DORSCON system. Having learnt from its experience with severe acute respiratory syndrome (SARS) in the past, decisive measures were taken to contain the spread of the virus.^[18]

In a pandemic, the aim of scaling down is to free up inpatient beds, healthcare personnel (surgeons, anaesthetist, nurses, ancillary staff), personal protective equipment (PPE) and operating rooms. Moreover, a reduction in elective surgery lowers the need for intensive care unit (ICU) stays postoperatively, allowing unstable COVID-19 patients to receive ventilator support. The degree to which scaling-down occurs directly correlates to the emergency status of the healthcare systems and needs of the respective urological departments. If implemented systematically, this reduces the burden on the healthcare systems, optimises preparedness and mitigates any chaotic response to the pandemic.

Our inpatient surgical protocol was developed based on rapid response EAU guidelines and was aligned with government policies based on DORSCON status,^[8] and considered both patient and disease factors and system factors in the institution or department [Figure 3].

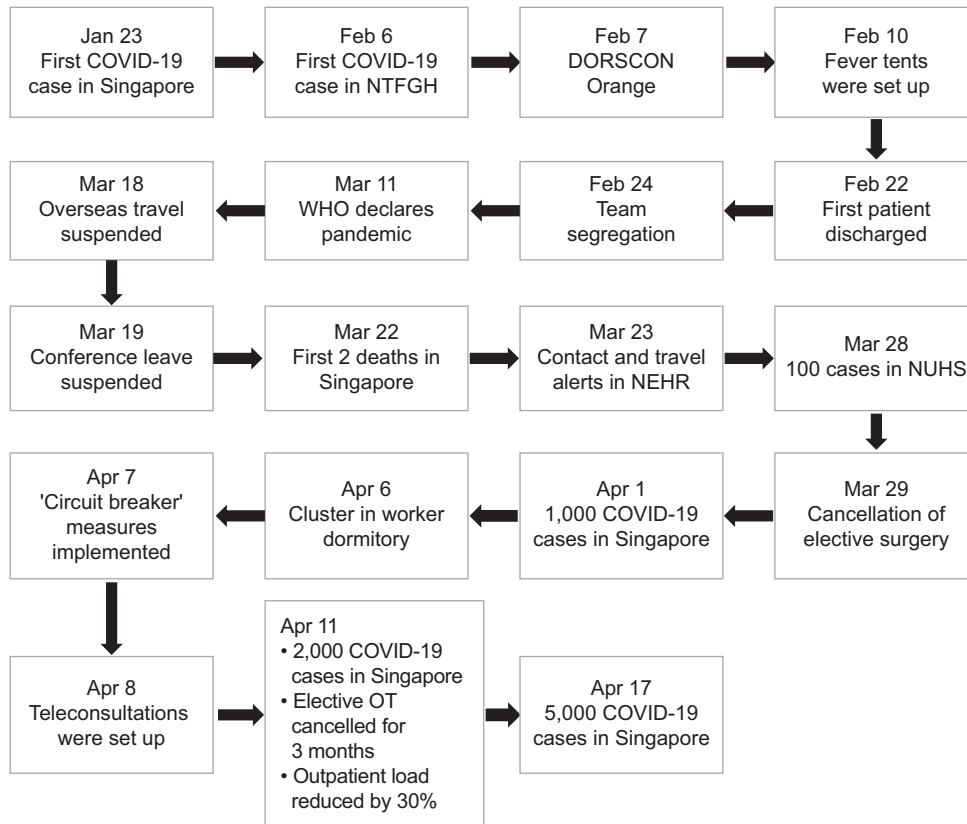


Figure 2: Flow diagram shows the timeline of the COVID-19 outbreak in Singapore as of April 2020. NEHR: National Electronic Health Record, NTFGH: Ng Teng Fong General Hospital, OT: operating theatre

Table 2. Surgical workflow based on DORSCON status.

Type	DORSCON status	Disease/procedure
Emergencies	Green/ Yellow, Orange, Red	<ul style="list-style-type: none"> • Urosepsis with obstruction (not amenable to PCN) • Abscess/Fournier’s gangrene • Testicular torsion • Priapism that failed initial treatment, requiring shunt procedures • Penile fracture/genitourinary trauma • Cystodiathermy (intractable haematuria from BPE, bladder cancer, radiation cystitis)
Priority 1	Green/ Yellow, Orange, Red	<ul style="list-style-type: none"> • Radical cystectomy • TURBT • Nephroureterectomy • Radical nephrectomy (> T2 renal tumours) • Radical inguinal orchidectomy (testicular tumours)
Priority 2	Green/ Yellow, Orange	<ul style="list-style-type: none"> • Radical prostatectomy • Obstructed kidney • Stented patients with obstructing ureteric stones • Nephron-sparing surgery for T1 renal tumours
Priority 3	Green/Yellow	<ul style="list-style-type: none"> • Varicocelectomy/hydrocoelelectomy • Elective andrology procedures • Nephrectomy (benign cause) • PCNL • BPE surgery • Reconstructive/functional urology surgery

DORSCON Yellow/Green: Priority 1, 2 and 3; DORSCON Orange: only Priority 1 and 2; DORSCON Red: only Priority 1 and emergencies. All procedures to follow institution-specific protocols for personal protective equipment. BPE: benign prostatic enlargement, DORSCON: Disease Outbreak Response System Condition, PCN: percutaneous nephrostomy, PCNL: percutaneous nephrolithotripsy, TURBT: transurethral resection of bladder tumour

Patient and disease factors

Patient-related factors included the need for blood transfusion, presence of comorbidities, possible need for a postoperative high-dependency bed, nature of the disease and urgency of treatment.

System factors

System factors consisted of the availability of: (a) resources (e.g. ICU beds, ventilators, blood bank, PPE); (b) manpower (e.g. anaesthetists, manpower in ICU/operating theatre/wards); and (c) non-COVID-19-designated wards.

We classified urological procedures based on the nature of the disease and urgency of intervention needed, as follows [Table 2]:

- (a) Priority 1 (high priority): cannot be delayed/urgent, includes patients with cancers that have high risk of progression, are likely to affect overall survival, and may lead to loss of renal function without early intervention.
- (b) Priority 2 (moderate priority): can proceed with precautions, second to be cancelled. This category

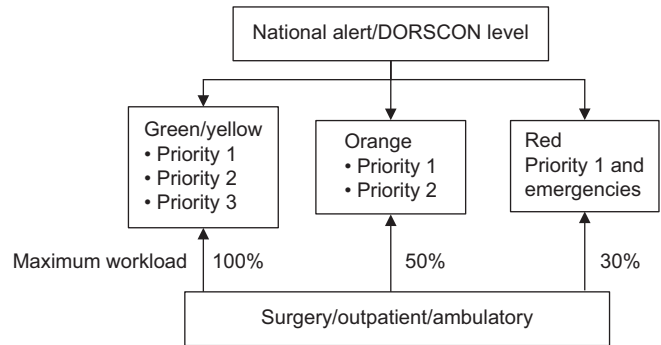


Figure 3: Summary of our urinary action plan during the COVID-19 pandemic. DORSCON: Disease Outbreak Response System Condition

involves less aggressive cancers such as prostate cancer and T1 renal tumours for which intervention is less time-sensitive and unlikely to affect oncological and survival outcomes. It also includes benign stone conditions such as obstructing ureteric calculi, for which there are alternate options for decompression of the kidney (e.g. image-guided percutaneous drainage of the kidney) while awaiting definitive stone surgery.

- (c) Priority 3 (low priority): non-urgent and should be deferred, first to be cancelled. This category includes all benign urological conditions for which the intervention is not time bound and does not affect survival.
- (d) Urological emergencies: to be done irrespective of DORSCON status. This category consists of urological conditions that are life- or organ-threatening and require immediate intervention.

OUTPATIENT CARE

The ability to deliver optimal outpatient care to urological patients is challenging during a pandemic. To minimise the risk of exposure (for patient and healthcare providers) to COVID-19 in the outpatient setting, we recognised that some factors play an important role. They are the ability to conduct virtual clinics via telecommunication/video conferencing and to prescribe/deliver medications, and the urgency of the patient’s condition. Most outpatient referrals in the urology department are non-urgent and can be managed virtually or delayed for review after relevant investigations or imaging, while most ambulatory procedures are non-urgent and easily postponed.

Clinics

Based on the rapid-response EAU guidelines, we devised the following guidelines to suit our local population [Table 3].

- (a) Priority 1 (high priority): urgent or see early. This includes patients with symptoms that need early diagnosis and treatment, which may affect survival or renal function.
- (b) Priority 2 (moderate priority): semi-urgent. Appropriate investigations should be arranged, if required, to enable planning of further treatment, with virtual clinics when

Table 3. Outpatient workflow in clinics based on DORSCON status.

Type	DORSCON status	Disease/procedure
Priority 1	Green/Yellow, Orange, Red	New referrals: <ul style="list-style-type: none"> Repeat visits to emergency room for ureteric colic Acute urinary retention/obstructive uropathy Gross haematuria (high risk of cancer) Follow-up: <ul style="list-style-type: none"> Metastatic prostate cancer requiring androgen deprivation therapy Obstructing ureteric calculi on CT Post-ureterorenoscopy strictures seen on intravenous urography/computed tomography urogram (CTU)
Priority 2	Green/Yellow, Orange	New referrals: <ul style="list-style-type: none"> Ureteric colic LUTS with moderate symptoms Gross hematuria (low risk for cancer) LUTS with abnormal prostate-specific antigen/digital rectal examination Follow-up: <ul style="list-style-type: none"> Significantly bothersome LUTS not responding to medical therapy Small renal mass on active surveillance Postoperative surveillance for renal cell carcinoma and upper tract urothelial carcinoma Prostate cancer on active surveillance
Priority 3	Green/Yellow	New referrals: <ul style="list-style-type: none"> Asymptomatic microscopic haematuria Andrology (erectile dysfunction, premature ejaculation) Mild LUTS Chronic pelvic pain syndrome Circumcision/vasectomy Repeat visits on follow-up: <ul style="list-style-type: none"> Benign prostatic enlargement on medication Overactive bladder on medication Erectile dysfunction on medication Angiomyolipoma, Bosniak 2/2F cysts on surveillance Chronic pelvic pain syndrome

DORSCON Yellow/Green: Priority 1, 2 and 3; DORSCON Orange: only Priority 1 and 2; DORSCON Red: only Priority 1 and emergencies. CT: computed tomography, LUTS: lower urinary tract symptoms

possible. This category includes patients with symptoms and conditions that need treatment, who are amenable to teleconsultation.

- (c) Priority 3 (low priority): non-urgent, can be delayed by more than six months or until after the pandemic. This includes patients with conditions that are considered non-urgent and where delays in diagnosis or treatment are unlikely to affect survival outcomes.

Outpatient ambulatory procedures

Based on the rapid-response EAU guidelines, we devised the following guidelines for outpatient ambulatory procedures [Table 4].

Table 4. Outpatient workflow for ambulatory procedures based on DORSCON status.

Type	DORSCON status	Disease/procedure
Priority 1	Green/Yellow, Orange, Red	<ul style="list-style-type: none"> Scope for high-grade UC surveillance Prostate biopsy (high-risk category) Intravesical instillation therapy for high-risk UC
Priority 2	Green/Yellow, Orange	<ul style="list-style-type: none"> Scope for low-grade UC surveillance Prostate biopsy (low-risk category) cancers Shock wave lithotripsy for non-obstructive ureteric and symptomatic renal calculi Intravesical instillation therapy for low/intermediate-risk UC
Priority 3	Green/Yellow	<ul style="list-style-type: none"> Scope for asymptomatic microscopic haematuria Scope for LUTS Shock wave lithotripsy for asymptomatic renal calculi

DORSCON Yellow/Green: Priority 1, 2 and 3; DORSCON Orange: only Priority 1 and 2; DORSCON Red: only Priority 1 and emergencies. LUTS: lower urinary tract symptoms, UC: urothelial cancer

- (a) Priority 1 (high priority): do not postpone. This includes patients on follow-up, treatment and surveillance of high-risk/-grade urothelial cancers. Recurrences detected during these procedures may need early intervention, affecting overall survival. This also includes patients with prostate cancer that is potentially high-risk and needs early histopathological diagnosis, staging and treatment.
- (b) Priority 2 (moderate priority): second to be cancelled, can be delayed by up to six months. This includes patients on follow-up, treatment and surveillance of low-grade urothelial cancers. It also includes patients with low-risk prostate cancer who need histopathological diagnosis. These are patients who are suitable for active surveillance and for whom treatment delays do not affect overall survival. Patients with non-obstructive, symptomatic renal and ureteric stones planned for shock wave lithotripsy are also included in this category.
- (c) Priority 3 (low priority): non-urgent, first to be cancelled (to be done after pandemic resolves). This includes patients with benign conditions or asymptomatic renal calculi, for whom treatment delays are unlikely to affect or alter the nature of the disease or condition.

CONCLUSION

Every disease outbreak has taught us lessons in preparedness, but a pandemic is a calamity of global scale that can overwhelm healthcare systems. Having an action plan will allow institutions to cope better and if followed in a similar manner across countries, a unified swift response can be established. We believe this first-of-its-kind proposed urology action plan from the ASEAN region can be an one-stop solution for urology units to effectively mitigate the pandemonium in crisis situations such as pandemics.

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Conflicts of interest

There are no conflicts of interest.

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