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Review – Education– Editor's Choice

The Impact of the COVID-19 Pandemic on Genitourinary Cancer Care: Re-envisioning the Future

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Abstract

Context: The coronavirus disease 2019 (COVID-19) pandemic necessitated rapid changes in medical practice. Many of these changes may add value to care, creating opportunities going forward.

Objective: To provide an evidence-informed, expert-derived review of genitourinary cancer care moving forward following the initial COVID-19 pandemic.

Evidence acquisition: A collaborative narrative review was conducted using literature published through May 2020 (PubMed), which comprised three main topics: reduced in-person interactions arguing for increasing virtual and image-based care, optimisation of the delivery of care, and the effect of COVID-19 in health care facilities on decision-making by patients and their families.

Evidence synthesis: Patterns of care will evolve following the COVID-19 pandemic. Telemedicine, virtual care, and telemonitoring will increase and could offer broader access to multidisciplinary expertise without increasing costs. Comprehensive and integrative telehealth solutions will be necessary, and should consider patients' mental health and access differences due to socioeconomic status. Investigations and treatments will need to maximise efficiency and minimise health care interactions. Solutions such as one stop clinics, day case surgery, hypofractionated radiotherapy, and oral or less frequent drug dosing will be preferred. The pandemic necessitated a triage of those patients whose treatment should be expedited, delayed, or avoided, and may persist with severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) in circulation. Patients whose demographic characteristics are at the highest risk of complications

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from COVID-19 may re-evaluate the benefit of intervention for less aggressive cancers. Clinical research will need to accommodate virtual care and trial participation. Research dissemination and medical education will increasingly utilise virtual platforms, limiting in-person professional engagement; ensure data dissemination; and aim to enhance patient engagement.

Conclusions: The COVID-19 pandemic will have lasting effects on the delivery of health care. These changes offer opportunities to improve access, delivery, and the value of care for patients with genitourinary cancers but raise concerns that physicians and health administrators must consider in order to ensure equitable access to care.

Patient summary: The coronavirus disease 2019 (COVID-19) pandemic has dramatically changed the care provided to many patients with genitourinary cancers. This has necessitated a transition to telemedicine, changes in threshold or delays in many treatments, and an opportunity to reimagine patient care to maintain safety and improve value moving forward.

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1. Introduction

The rapid spread of coronavirus disease 2019 (COVID-19) caused by the novel severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) has had dramatic effects on individuals and health care systems [1]. Patients with cancer have been impacted directly by the virus, felt the consequences of COVID-19-focused health care, and have often experienced treatment [2,3]. Among patients with COVID-19, those with a history of cancer have a significantly increased risk of severe outcomes [4]. COVID-19 triage guidelines have often recommended reductions in the use of systemic chemotherapies and approaches that may compromise an individual's immunity [5,6]. A severe SARS-CoV-2 phenotype is seen more commonly in men and those of advanced age or comorbid conditions [1,7–10]. To a large extent, these demographics mirror the patient population at risk for genitourinary cancers.

Medical and economic consequences of COVID-19 necessitate urgent changes in the delivery of health care to reallocate or redeploy staff. Furthermore, the large financial loss to various institutions has necessitated reductions in workforce. COVID-related policies and recommendations have been put in place surrounding social distancing, which have further reduced patients entering the health care system. This has resulted in deferral of cancer diagnosis, work-up, treatment, and in-person contact. Basic as well as clinical research has been curtailed significantly. The net effect has resulted in a financial downfall in the global economy and health care systems. The true impact of the pandemic has yet to be realised fully, and will include the impact of delays in diagnosis and treatment for many cancers, which may influence cancer-related quality of life.

The solutions adopted to navigate the COVID-19 pandemic include temporisation (to defer medical care until health care capacity recovers) and more lasting changes. It is unlikely that medical practice will return to pre-COVID-19 patterns in the near future. We should anticipate persistent community-level viral spread and intermittent exacerbations. Here, we highlight changes in the care of patients with genitourinary cancers as a result of the COVID-19 pandemic and opportunities to reimagine care delivery.

2. Evidence acquisition

The first and senior authors proposed a framework that was iteratively revised by all coauthors. A search of PubMed from inception until May 1, 2020 was performed for each topic using MeSH subject headings along with free-text, related, derivative, and exploded terms.

The available data were synthesised qualitatively. Where available, we relied on previously published systematic reviews and meta-analyses, supplemented by narrative review of key studies. The first and senior authors drafted this narrative review, which was critically revised by all coauthors. The final manuscript represents the consensus of the authors.

Acknowledging an expected paucity of high-quality data for many included topics within the scope of this review, we offer an expert opinion where relevant and feasible.

3. Evidence synthesis

Several themes emerged during the COVID-19 pandemic that would be critical or beneficial to genitourinary cancer care in the future (Fig. 1): first, reduced in-person interactions argued for increasing virtual and image-based care; second, optimising the delivery of care to include better triage, understanding and addressing mental health implications due to less in-person care, and maintaining high-quality research and education endeavours are necessary; and third, the presence of SARS-CoV-2 in health care facilities may affect decision-making by patients and their families.

3.1. Remote interactions

Social distancing has formed the backbone of public health responses to the COVID-19 pandemic. Although office visits have been supplanted by telemedicine, e-consults, virtual care, hospital-at-home approaches with early discharge and remote monitoring, and virtual conferences/tumour boards [11], these approaches offer improved access to expert care and reduced travel burdens for patients [12,13].

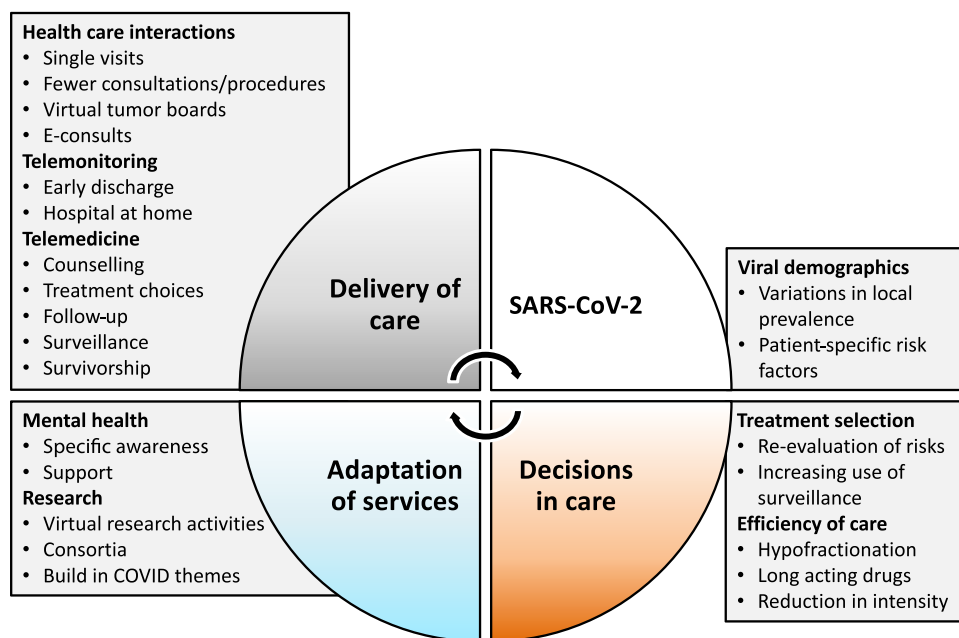


Fig. 1 – Elements of post-COVID-19 pandemic care. COVID-19 = coronavirus disease 2019; SARS-CoV-2 = severe acute respiratory syndrome coronavirus-2.

3.1.1. Telemedicine

Prior to COVID-19, telemedicine was uncommon in urology and most studies focused on prostate cancer [14,15]. Telemedicine was used to supplement rather than replace in-person interactions. Schaffert et al [16] developed an online tutorial to assist and prepare patients in treatment decision-making. A similar approach utilised the Personal Patient Profile–Prostate (P3P) in a multicentre randomised trial [17]. When compared with “usual care”, the P3P intervention was associated with less decision conflict. In a randomised trial, a telephone-based intervention was better than written materials in modifying dietary behaviour [18]. Each of these studies demonstrates the added value of remote interactions.

Telemedicine has also been used in survivorship. Skolarus and colleagues [19] randomised 556 patients, 1–10yr following treatment, to a personally tailored, automated telephone symptom management intervention or usual care. Patients receiving the tailored intervention had nonsignificant improvements in EPIC scores (all domains). In contrast, Viers et al [20] reported little difference in a randomised comparison of telemedicine and traditional office-based consultations after radical prostatectomy, although those receiving telemedicine reported lower travel costs and less time off work. Leahy et al [21] showed similar satisfaction after radiotherapy for nurse-led telephone consultations to standard office visits. Recently, Belarmino and colleagues [22] demonstrated a smartphone app for monitoring of postoperative recovery and Kegel teaching following prostatectomy. Lange et al [23] offered some cautionary data demonstrating poorer psychological outcomes for patients utilising an online peer chat group compared with usual care. A number of other studies have assessed the feasibility of behavioural interventions

(predominantly in activity/exercise engagement) in patients with prostate cancer [24,25]. Taken together, these studies demonstrate that remote virtual care can feasibly replace part (but not all) of in-person clinician interactions.

Clinical examination is an important component of medicine. During the COVID pandemic, many consultations became virtual and we expect some of these to persist in the future. While for some patients, including those with advanced cancers on systemic therapy, physical examination has an important role, for many, including those with early-stage malignancies, treatment decisions are based on history, laboratory, and imaging results. Digital rectal examination (DRE) is a common component of prostate cancer management, but has an uncertain value. In the context of multiparametric magnetic resonance imaging (mpMRI), incremental benefit of DRE is unknown. Philip and colleagues [26] demonstrated little correlation between DRE and biopsy findings/pathological stage. Others have demonstrated low sensitivity/specificity of DRE in cancer screening [27], and few patients are reclassified or receive intervention for DRE findings alone within active surveillance (AS; 0.8% in Toronto [28]). Following local therapy, oncological recurrence is determined primarily based on prostate-specific antigen (PSA) results. Thus, omission of DRE in patients with prostate cancer may be reasonable, within the context of virtual care. For kidney cancer, initial treatment decisions and surveillance are primarily predicated on imaging results rather than on physical examination. Similarly, in the initial consultation and on-going surveillance for bladder cancer, in-office physical examination is rarely contributory to disease management. However, in-office cystoscopy is likely to be influential in treatment decisions and long-term surveillance for those with bladder cancer, though emerging data suggest that

biomarker-based surveillance may be changing this [29]. In contrast, physical examination is important for penile and testis cancers and is likely to remain influential, at least in the short term.

Telemedicine offers benefits over standard care [13]. The primary care literature has identified younger patient age, ethnic minorities, full-time employment, and long commutes to work as barriers to patient access [30]. Telemedicine may obviate these [20,31]. Telemedicine is also less time consuming (for the patient and the physician) and facilitates visits outside of normal daytime clinic hours, expanding access to care for patients unable to take time off work. Telemedicine may allow tertiary level care to patients in remote regions, potentially reducing geographic disparities in care. Additionally, virtual care has the potential to positively impact carbon emissions. Consultation at virtual multidisciplinary clinics facilitates high-value prostate cancer care, including better targeting of interventions to disease risk [32–35]. This approach can easily be expanded, so all patients benefit without the physical barriers or need for multiple appointments [36].

However, reliance on telemedicine is not without risk [37]. Conveying information on adverse prognosis through a telemedicine portal may inadequately guard the sensitive nature of these challenging conversations [38]. The original SPIKES protocol for breaking bad news stressed the importance of a proper setting for disclosing serious news, even highlighting the importance of eye contact and physician contact [38]. A virtual visit may lose nonverbal clues to emphasise human connection. Although telemedicine can reduce current barriers to care, it may exacerbate a digital divide if tools are not sensitive to patient health literacy, language, and technological capabilities. Patients need sufficient technology and expertise, and many tools are available only in English. These may be barriers for economically disadvantaged and older patients. Privacy concerns are less prevalent, given that many platforms are compliant with privacy standards and regulations. There may be a widening disparity between health care systems that can invest/maintain telehealth solutions and smaller practices that cannot. The economic impact of telemedicine is currently unclear [39,40]. There has been little study of patient comprehension or engagement during video visits. In addition to these patient-facing barriers and risks, there are pragmatic limitations from the provider and health system perspective, including the availability of telemedicine platforms that are compliant with jurisdictional privacy requirements and the question of billing or remuneration for these interactions. For physicians who are salaried, this is less of a concern; however, the on-going acceptance of telemedicine billings from payers will clearly influence the viability of this approach going forward.

Finally, the role of trainees and advanced practice providers in telehealth remains uncertain. This may have implications for both trainees' educational exposure and clinic workflow. It can be challenging to oversee a trainee or other care providers in a virtual setting, and provide real-time teaching. In the experience of some of this article's

authors, trainees may be integrated into the telemedicine consultation process, though with a loss of fluidity.

As experience has evolved, utilisation of telemedicine approaches appears to vary across jurisdictions, with traditional, in-person interactions returning to prominence in some regions, while others remain nearly exclusively virtual.

3.1.2. *Telemonitoring*

Telemonitoring is defined as the digital transmission of physiological data. Systematic reviews have found that early hospital discharge with home-based postoperative care may reduce pressure on acute hospital beds [41], increase the time from discharge to readmission, reduce costs, and improve health-related quality of life [42]. Treatment at home is associated with improved functional outcomes for older patients deemed at need for hospital admission [43] and significant cost savings, particularly for the most advanced cancers [44]. This approach may offer the greatest benefit in patients following radical cystectomy who typically have prolonged hospitalisations and are at risk of readmission [45,46]. Initial pilot work has demonstrated the feasibility of using remote monitoring applications, such as personal activity trackers, wearables, and smartphone applications for perioperative monitoring [47–49]. Further work is needed to clarify the sensitivity, intensity, and balance of telemonitoring/in-person visits [50,51]. Such approaches may decrease the need for postdischarge nursing homes [52]. Although “hospital-at-home” approaches have been described in the literature for well over 20 yr [53], on-going advances in technology, including wearable devices that can track physiological parameters including most vital signs, have recently improved the level of care that may be provided at home [54,55].

3.1.3. *Other applications of virtual care*

Many centres have transitioned to remote multidisciplinary tumour boards. These allow access to the improvements in care derived from such boards [56–59], without logistical barriers [60]. On-going use of this approach would allow involvement of clinicians in geographically remote locations, thus facilitating community providers (who know their patients best of all) who cannot interrupt their practice to physically attend a university board. Electronic consults (e-consults) allow for asynchronous interactions between two physicians (consulter and consultee) and improve access to specialty expertise without the need for face-to-face visits [61–63]. This approach allows timely access to expertise, is well received by primary care providers [64], and can overcome physical space limitations, while allowing flexible scheduling of outpatient care (not restricted by clinic space availability, outside traditional hours, and interspersed during operating day downtimes). Although clinical decision support systems can provide real-time recommendations, an automated digital patient engagement platform can help patients manage acute, chronic, or periprocedural care, while also automating simple workflows (such as verifying undetectable postprostatectomy PSA at specified intervals) [65–67].

3.1.4. *Effects of telemedicine on education*

Social distancing has changed education dramatically [68]. The transition to virtual teaching for educational seminars has allowed wider dissemination of expertise, including in formats such as the Urology Collaborative Online Video Didactics (COViD; <http://Urologycovid.ucsf.edu>) and Educational Multi-Institutional Program for Instructing Residents (EMPIRE), which can be viewed both live or as a previously recorded content, and create a valuable library of content. Whereas this type of content was previously expensive to view and managed by medical publishers, this open publishing model has democratised access to expert content. The 2020 annual meetings for European Association of Urology (EAU), European Society for Medical Oncology, American Association for Cancer Research, American Society of Clinical Oncology, American Urological Association, Radiological Society of North America, and American Society for Radiation Oncology have all been converted to a virtual format [69]. The virtual format will reduce costs of travel and housing, and allow for more convenient interaction of the various contents provided. A continuation of these collaborative efforts offers the opportunity to enrich training and education moving forward.

The loss of in-person interactions may have significant implications from less social networking (may be particularly important for trainees and junior faculty seeking to make connections beyond their institution), fewer ad hoc discussions and resultant collaborations, a potential decrease in interactivity and engagement, and the loss of the social component of conference participation.

Finally, on-going technological innovations may facilitate spread of evidence-based medicine and knowledge sharing about genitourinary malignancy. For example, a Twitter-based journal club about prostate cancer (#prostatejc) has been shown to foster global multidisciplinary discussions about important new research [70]. Unlike traditional journal clubs that are typically limited to a single specialty and institution, use of social media enables participation from different types of providers from many institutions and countries, as well as other stakeholders (eg, patients and advocacy groups). Social media have also been used for successful dissemination of the EAU clinical guidelines [70]. Despite the great potential for digital platforms to facilitate evidence-based practices in genitourinary care, there are also risks including a potential for spread of biased and/or misinformative content [71]. Moving forward, it is important for health care providers in genitourinary oncology to direct patients to high-quality online resources and to participate actively in public dissemination of evidence-based information.

3.1.5. *Summary of remote interactions including telemedicine*

The COVID-19 pandemic has forced a rapid transition to telemedicine and teleconferencing. Inevitably, some physicians and patients will prefer in-person consultations. However, a thoughtful and targeted increase in telemedicine and teleconferencing offers the potential to decrease the time and financial burden of physician visits, reduce

geographic barriers to tertiary and quaternary care expertise for patients with genitourinary cancer, and free up valuable clinic space. Further investigation is required to ensure that these approaches do not raise new barriers to care, compromise patient safety, impede education of trainees, or lead to inferior disease control outcomes. The educational- and service-based role of trainees in telemedicine remains to be resolved.

Where in-person interactions remain necessary or desirable, the on-going influence of COVID-19 is likely to persist. Moving forward, in addition to current changes including limits on individuals accompanying or visiting patients and preinteraction screening, architectural redesign of clinics, hospitals, and other treatment facilities to reduce close personal contact may be prudent.

3.2. *Optimising treatment selection*

The COVID-19 pandemic necessitated a review of what care we provide for genitourinary cancers [72–75], patients for whom treatment should be expedited, those who can have treatment safely delayed, and those who should have expectant noninterventional management. This refocus offers the potential to increase the value of care for both virtual and in-person delivery.

3.2.1. *Expectant management approaches: AS*

Surveillance strategies rely on understanding competing risks (morbidity of treatment vs mortality from cancer) and other influences (age and comorbidity) [76]. COVID-19 has focused attention on noncancer morbidity/mortality in patients whose demographic characteristics are those at the highest risk of complications from SARS-CoV-2 [7,8]. Consequently, such patients may re-evaluate the risk/benefits of hospital interventions for low- to moderate-risk cancers.

AS is widely accepted for patients with low/favourable intermediate-risk prostate cancer [77], small renal masses [78,79], and low-grade non-muscle-invasive bladder cancer (NMIBC) [80]. Data will be produced in coming years that analyse the impact of treatment delays on early-stage cancers. If significant delays in treatment or surveillance do not impact long-term outcomes adversely, it will provide evidence for expanding the use of surveillance and potentially de-escalating the intensity of the surveillance regimens themselves.

3.2.2. *Optimising treatment administration*

The COVID-19 pandemic focused attention on ways to maximise the efficiency of treatment and minimise health care interactions [81]. Going forward, patient care must simultaneously be of high quality while minimising the risks of COVID-19. Patients with advanced cancer and those on chemotherapy are at a higher risk of adverse outcomes from SARS-CoV-2 [4]. Treatment decisions are complex and will need to be tailor made for the current rate of infection, the risk of cancer, and the potential benefit/risk of treatment.

For prostate cancer radiotherapy, hypofractionation has demonstrated equivalent oncological (metastasis-free, dis-

ease-specific, and overall survival) and functional outcomes as longer regimens [82]. While utilisation of hypofractionation is limited [83], often for nonclinical reasons (eg, reimbursement), its use should be encouraged. Similarly, the use of long-duration formulations of androgen-deprivation therapy (3, 4, or 6 monthly) should be recommended [74,82] to minimise visits and patients' burden of care.

For patients with NMIBC, the COVID-19 pandemic has prompted re-evaluation of bacillus Calmette-Guérin (BCG) and intravesical schedules [84]. Prioritisation of resources and visits to the induction and early maintenance courses [74] may offer an opportunity to decrease patient burden and cost. A recently published cost-effectiveness analysis demonstrated that, even in the absence of COVID-19, maintenance BCG is not cost effective [85].

In patients undergoing surgery, the question of minimally invasive (laparoscopic or robotic) approaches compared with open surgery was a concern early in the COVID-19 pandemic, as such an approach was initially considered an aerosol-generating procedure [86]. However, subsequent guidance from the Society of American Gastrointestinal and Endoscopic Surgeons (SAGES) clarified that there was no evidence of aerosolisation of blood-borne COVID-19 particles. SAGES recommended the use of filtration for CO₂ released from laparoscopy, as well as minimisation of port incision size and insufflation pressure, but highlighted that many advantages of a minimally invasive approach, including reduced length of stay and decreased complication rates, may be particularly advantageous in the setting of strained health care resources due to the pandemic [87].

Multiple health organisations have developed guidelines that aid in patient selection and management (Table 1). While pragmatic, these are rarely evidence based due to the lack of data and rely on contributions from key opinion leaders in the field. These guidelines should not necessarily be adhered to strictly and are often not contemporary as the health care environment and SARS-CoV-2 prevalence change rapidly. Overall, the goal is to treat cancer patients with as close to standard therapies as possible once the risk/benefit ratio has been considered.

3.2.3. Deintensification of follow-up—protecting patients and maintaining quality of care

There are multiple clinical scenarios where less intensive medical care may be oncologically equivalent (or marginally worse) but involves far fewer health care interactions. For example, AS for low-risk prostate cancer places a high burden on patients/their providers (frequent consultations, repeat biopsies, and mpMRI), with multiple hospital visits over many years. If selected accurately, few men leave AS and many avoid any intervention. The PROTECT trial offered a low-intensity approach (regular PSA tests, but neither confirmatory biopsy nor mpMRI) without demonstrable differences in mortality with radical treatments at 10 yr [88], suggesting that less intensive AS may not compromise survival.

The follow-up postradical treatment for prostate cancer is grounded in patient-reported outcomes and PSA measurements. In an era of virtual care, automated algorithms

Table 1 – Principles for consideration when deciding on systemic cancer treatments.

The following principles require careful consideration when deciding on systemic cancer treatments [5]:
Prioritise patients receiving treatment with curative intent (eg, testis cancer). These patients should remain on an uninterrupted treatment pathway, starting unaltered treatment regimens with negligible delays.
Consider any impact of delaying treatment on primary outcomes (eg, overall survival, cancer-specific survival, risk of progression of disease, and quality of life).
Assuming that the pandemic will continue until the end of 2020–2021, administering treatment in the noncurative setting, where existing treatment regimens provide an absolute survival benefit of <6 mo, is associated with risks and should be decided on a case by case basis.
Treatment regimens with a high risk of febrile neutropenia should be optimised by dose reduction and by the use of granulocyte-colony stimulating factors or prophylactic antibiotics where appropriate.
Treatments with important risk of toxicity (high-dose chemotherapy and immune checkpoint inhibitors) should be started only if local health services are able to manage treatment-emergent side effects.
Neoadjuvant and adjuvant regimens require careful attention and should be administered only if they provide proven survival benefits. They should be omitted in scenarios with insufficient data for survival benefit (adjuvant therapy in urothelial cancer).
In all cases, the health status of the patient and risks associated with COVID-19 (age, presence of comorbidities, and increased risk of complications) should be taken into account when deciding on treatment.
There will be patients whose diagnosis or treatment initiation was compromised due to the pandemic and thus they experience upstaging or disease progression, compromising their chances of survival. The psychological burden caused by this should be addressed.
PCR testing and/or antibody testing should be performed before starting therapy where possible.
COVID-19 = coronavirus disease 2019; PCR = polymerase chain reaction.

can provide recommendations for patients with good quality of life and no evidence of disease recurrence, and those who do not feel the need for follow-up. These solutions will reduce unnecessary visits, increase compliance with follow-up, and potentially provide triggers for further assessment (eg, meaningful changes in quality of life or PSA).

Guidelines suggest that it may be safe to discharge patients with low-grade NMIBC as early as 12 mo if they remain recurrence free [89,90]. Even with high-risk NMIBC, patients who underwent low-intensity cystoscopic surveillance (below that recommended in guidelines) had no increased risk of progression or bladder cancer-related mortality while undergoing fewer transurethral resections [91]. While these data remain to be validated prospectively, they certainly suggest that surveillance may be de-escalated compared with current practices.

Finally, among patients with surgically treated kidney cancer and muscle-invasive bladder cancer, an algorithm has been developed for individualised risk-stratified post-operative surveillance with optimised imaging intervals by considering the interplay between the competing risks of recurrence and other-cause mortality [92,93].

3.2.4. Summary of optimising treatment selection

The COVID-19 pandemic offers long-term improvements in the value of care for patients with genitourinary cancer. Clinicians and patients should become more attuned to

competing (noncancer) causes of morbidity and mortality. Consideration of these may identify cases where expectant approaches are preferable. Decreasing health care resources for patients at a low risk of morbidity/mortality due to their genitourinary cancers (low-value care) offers the opportunity to increase resources available to deliver high-value care. Among patients who require treatment, there are approaches that may reduce patient and health system burden while offering equivalent outcomes. Patients, providers, and health systems will need to reimagine cancer care, understanding that this is not “rationing” but higher value for all stakeholders.

3.3. *Mental health effects*

Social distancing has contributed to significant mental health issues including stress, loss of motivation, loss of meaning, and loss of self-worth [94,95]. This may exacerbate known effects of cancer diagnosis, including significant emotional distress manifest as anxiety, depression, or anger [96,97]. Women and younger patients may be particularly susceptible [97]. In an era in which social supports are stretched or broken, this effect may be magnified, particularly in the context of telemedicine that can be impersonal [98] and in which physicians may not read body language to identify those struggling to cope.

For patients with expectant strategies, the concept of forgoing treatment of a cancer may be associated with an added psychological burden. In the context of AS for prostate cancer, there is a mixed literature assessing the mental health burden of this treatment approach [99,100]. Some studies suggest increased rates of anxiety and depression [100], while others suggest that these rates diminish over time [101]. Similar effects are noted within surveillance for small renal masses and biopsy-proven renal malignancies [102,103]. Research and tools are needed to understand how best to address psychological and behavioural issues resulting from a transition to a “less is more” approach. An example of this is the REASSUREME study (NCT02871752), a randomised controlled trial evaluating the psychological impact of mindfulness-based stress reduction in prostate cancer patients (and their partners) under AS.

The active treatment of genitourinary cancers is associated with mental health effects, particularly from incontinence and erectile dysfunction after prostate cancer and the body-changing effects of radical cystectomy [104–106], though similar effects have been seen following surgery for kidney cancer, particularly among women [103]. A loss of perceived support from treating physicians because of decreased in-person interaction may exacerbate these.

Finally, patients with pre-existing psychiatric disorders have been shown to have worse cancer-related outcomes [107,108]. This highlights that these patients require physicians to be more engaged than usual following diagnosis and treatment.

Given that social distancing and telemedicine may increase barriers to care for patients with psychiatric disease and may weaken the coping mechanisms of those

without pre-existing psychiatric disease due to loss of social networks, consideration of the mental health implications of the changes in medical practice warrant careful consideration. Conversely, telehealth approaches may be used to address mental health issues and remediate disparities in access to these critical services [109].

3.4. *Research endeavours*

The need for repeated in-person interactions has hampered on-going accrual and conduct of prospective research during the COVID-19 pandemic. In many regions, accrual has entirely stopped, and research-related personnel/resources have been redirected into COVID-related care and research. However, this pandemic has allowed a refocusing of research priorities.

First, the pandemic has highlighted the critical role of biomedical research in society and within everyday care of our patients. For cancer patients, including those within bench research, clinical trials, observational studies, real-world effectiveness of agents, and randomised trials, support is derived from research staff and well-being from knowledge that you are helping other patients [110].

Second, the rapid emergence of consortia, such as the COVID-19 and Cancer Consortium (CCC19) and the COVID-Surg Collaborative [111], has demonstrated that modes of research may change and it is feasible to recruit large numbers of patients quickly.

Third, the social distancing required because of COVID-19 has mandated changes to research conduct, including the use of electronic consent, telemonitoring, and digital survey tools. In 2017, Galsky and colleagues [112] reported the feasibility of a telemedicine-based interventional oncology trial. Following a single, in-person enrolment visit, the investigators utilised telehealth interactions using a smartphone-based platform for on-going follow-up in their trial of metformin in patients with biochemically recurrent prostate cancer. Combined with laboratory monitoring closer to home, such an approach offers the potential to reduce many currently mandated monitoring visits. In addition to the implications for the patient-facing portion of research, a move to teleinteractions offers the opportunity for research coordinators to work remotely, reducing the geographic footprint required. Together, these changes can increase the efficiency of a research enterprise.

Fourth, the pandemic and associated contraction of research enterprises offer the potential to examine how we prioritise research efforts and funding.

3.5. *SARS-CoV-2 in the evolving COVID-19 pandemic*

The emergence from the current COVID-19 pandemic is uncertain. Numerous potential outcomes have been postulated regarding the natural history of this disease, including annual waves, similar to influenza, to waxing and waning courses due to social distancing and travel restrictions. Barring a highly efficacious vaccine, it seems unlikely that COVID-19 will disappear, and thus, moving forward, it is likely that the risks of viral transmission will continue to

affect the practice of medicine and biomedical research. Within the constraints imposed by managing COVID-19, it is important to consider how we may best optimise the care of patients with genitourinary cancer.

4. Conclusions

The COVID-19 pandemic has dramatically altered the social structure of our society and the care of patients across the world. There has been a rapid transition to telemedicine and a triage reprioritisation of care. Owing to resource requirements, health care changes as a result of the COVID-19 pandemic have disproportionately affected patients receiving surgical care [113]. As these changes may result in care delivery models that differ dramatically from previous approaches, consideration of the mental health impacts on patients and clinical teams, and the potential to magnify health care disparities is critical. Finally, social distancing has necessitated changes in the conduct and presentation of research. From a physician's perspective, the medicolegal implications of an abrupt change in practice patterns (from in-person interactions to telemedicine) and potentially in treatment recommendations, including delaying recommended cancer treatments, are unclear and require a societal-level consideration of the social contract between physicians and patients. This will likely differ significantly between countries and requires a considered approach.

As we anticipate health care in the post-COVID era, lessons learned from this experience may improve care for patients with genitourinary cancers moving forward if we choose to act upon them. First, careful adoption and implementation of telemedicine may reduce the time and cost burden on patients associated with physicians' visits, while also reducing geographic barriers to expertise and environmental impact. However, it is important to understand the new barriers and disparities that a transition to telemedicine may cause. Second, an increased focus on the role of expectant management approaches to patients with genitourinary cancers offers the potential to reduce low-value care, which, in turn, may increase available resources for high-value interventions. However, we need to be cognizant that, in utilising approaches that reduce contact between patients and physicians, we do not leave patients feeling abandoned, with associated mental health implications.

Moving forward, rather than complete resolution of the COVID-19 pandemic, it is likely that we will reach a steady state with an on-going lower prevalence of infection in the community, punctuated by intermittent periods of strained health care resources and urgency. During these calm periods, it will be important to prioritise the care of patients who are most likely to suffer harm if they are unable to receive treatment during the periods of health care strain [74]. Initial barriers to care, including a lack of personal protective equipment and an inability to provide large-scale testing for both patients and health care personnel, will, for the most part, be mitigated during these relatively "calm periods". Further, utilisation of routine preoperative testing should obviate the need to delay surgical care due to

concerns of perioperative COVID-related morbidity or mortality. However, as experience in the USA continues to show, severe outbreaks that threaten health care systems' capacity continue to be a threat moving forward. Restructuring of health care networks (including the use of hub-spoke models) may allow for maintenance of "COVID-19-free" health care facilities to provide on-going treatment during times of COVID-19-related health care pressure, as well as providing a model for on-going care in the face of future pandemics with novel pathogens.

Anecdotal evidence is emerging that many patients have delayed care both in a primary care setting and in the emergency department as a result of the COVID-19 pandemic [114]. These delays may arise due to fear of patients from health care interaction (which may or may not dissipate over time), physician reassignments (which are expected to improve over time, but at the peak affected one-quarter of urologists surveyed [115]), and institutional and government policies limiting diagnostic procedures such as cystoscopy and biopsy [115] (which again would be expected to improve over time). In the short term, as we emerge from this initial wave of the pandemic, numerous authors of this review have noted decreased referrals. This may reflect patients deferring presentation for symptoms that lead to new cancer diagnoses (eg, abdominal pain leading to diagnosis of kidney cancer or haematuria leading to diagnosis of bladder cancer) and decreased routine health care (eg, PSA screening during routine health maintenance examinations) or simply prioritisation of health care resources to the care of patients with COVID-19. Modelling studies from the UK suggest that delaying cancer surgery by 6 mo for patients with incident diagnoses would mitigate between 43% and 62% of the benefits of hospitalisation for an equivalent number of patients with COVID-19 [116]. Consideration of how to care for this expected surge in new referrals and new diagnoses will be important to ensure that health care systems are not overwhelmed by these demands and to ensure that the pressures on the health care system as a result of COVID-19 do not translate into increased morbidity and mortality for patients with genitourinary cancers.

It is necessary to highlight that the evidentiary base to guide treatment of patients with COVID-19 and health care decision-making in the midst of the pandemic is evolving rapidly. Thus, many of the recommendations discussed herein may no longer be relevant in the future. However, the overarching principles offer a framework to approach the treatment of patients with genitourinary cancers as we move forward.

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Acquisition of data: Wallis.

Analysis and interpretation of data: Wallis, Catto, Finelli, Glaser, Gore, Loeb, Morgan, Morgans, Mottet, Neal, O'Brien, Odisho, Powles, Skolarus, Smith, Szabados, Klaassen, Spratt.

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