Survey of COVID-19 impact on pediatric urology services

Sheila Mallenahalli, BS,[1] Matthew Fifolt, PhD,[2] Mohan Gundeti, MD,[3] Yegappan Lakshmanan, MD,[4] Patricio Gargollo, MD,[5] Michael C. Ost, MD,[6] Pankaj P. Dangle, MD[7]

[1]University of Alabama at Birmingham School of Medicine, Alabama, USA
[2]University of Alabama at Birmingham School of Public Health, Alabama, USA
[3]The University of Chicago Medicine Comer Children's Hospital and Pritzker School of Medicine Chicago, Illinois, USA
[4]Wayne State University School of Medicine, Detroit, Michigan, USA
[5]Mayo Clinic, Rochester, Minnesota, USA
[6]West Virginia School of Medicine, Morgantown, West Virginia, USA
[7]Department of Urology, University of Alabama at Birmingham, Alabama, USA

MALLENAHALLI S, FIFOLT M, GUNDETI M, LAKSHMANAN Y, GARGOLLO P, OST MC, DANGLE PP. Survey of COVID-19 impact on pediatric urology services. *Can J Urol* 2021;28(5):10834-10840.

Introduction: *To better understand how the COVID-19 pandemic has forced rapid operational changes in the global healthcare industry, changes implemented on an individual, institutional basis must be considered. There currently is not adequate literature about the overall impact COVID-19 has had on pediatric urology services worldwide. We believe that they have dramatically decreased during the COVID-19 crisis, but have adapted to accommodate changes. We hypothesize that patient care was widely variant due to inadequate standardized recommendations or crisis planning.*

Materials and methods: *A web-based survey was deployed to 377 pediatric urologists globally via email to analyze COVID-19's impact on various types of pediatric urology practices. Key categories included impacts on elective services, telemedicine use, finances, and recovery operations. A total of 114 responses were collected between April 29th – May 22nd, 2020.*

Results: *The widespread cancellation of elective surgical procedures caused significant disturbances in the field. There was a uniform, significant increase (75%) in telemedicine use across practices. The pandemic has created many changes in care provision for physicians, institutions, and patients themselves. Furthermore, the sudden economic burden on healthcare facilities could lead to cost-cutting measures, creating further strain within institutions. Though telemedicine has its limitations, it is a very viable option when traditional services are unavailable.*

Conclusions: *Immediate steps should be taken to ensure that the recovery phases of pediatric urology practices are as efficient as possible. Institutions should develop task forces to develop critical workflow processes in the event of health crises, while still maintaining patient-centered care. This will be essential in maximizing appropriate care allocation.*

Key Words: survey, COVID-19, pediatric urology, financial impact, telemedicine

Introduction

The COVID-19 pandemic has forced the healthcare industry to implement operational changes rapidly out of necessity. These changes have occurred at almost every level of care, impacting hospital administration, practicing physicians, patients, and the health care economy. For example, the need to conserve resources and address capacity shortfalls has contributed to the reduction of elective care services provided by medical facilities.[1] This, coupled with the goal of reducing viral transmission, was often addressed by limiting many elective procedures and non-essential care.[2] There has also been a marked rise in patient desire for

Accepted for publication July 2021

Address correspondence to: Dr. Pankaj P. Dangle, Children's Hospital Of Alabama, 1600 7th Avenue South, Suite 318 Lowder Building, Birmingham, AL 35233 USA

telemedicine care, which has placed further pressure on the need to reorganize or expand existing resources.[3]

Different regions have also operated with different timelines in implementing changes – all of which create great variability in care provision and expected outcomes.[4,5] This is also true for the field of pediatric urology as it consists of a combination of medical and procedural management options – the distribution of which could significantly change due to care restrictions.[6] Many urologists have even been deployed to help treat COVID-19 patients.[7]

Scores of care guidelines have been proposed to mitigate the pandemic's impact. For instance, urological surgical recommendations have been made for triage, preoperative, intraoperative, and postoperative workflows to minimize disease spread.[8,9] Some guidelines have also proposed different pathways of operative care dependent on the initial diagnosis[10] or different approaches on prioritizing specific procedures.[11]

Many of these changes are being implemented on an individual and institutional basis. However, there is paucity of literature about the overall impact COVID-19 has had on pediatric urology practices globally. This paper outlines the results of a survey distributed to pediatric urologists and surgeons with interest in pediatric urology around the world to better understand how COVID-19 has impacted their delivery of care, the financial and operational conditions of the institutions in which they practice, and the potential future of their services.

Our hypothesis was that the care of pediatric urology was fragmented and widely variant during COVID-19 crisis with no standardized recommendations or reliance on crisis planning.

Materials and methods

A web-based survey was developed by The University of Alabama at Birmingham School of Public Health and an epidemiology expert through a modified Delphi process designed to investigate the global impact of COVID-19 on pediatric urology services. Survey questions were developed with five senior members in the field to cover all aspects of the pandemic. The survey questionnaire included Likert-item responses framed as either a categorical or multiple-choice response. For multiple choice questions allowing more than once response, we also included "Other" as a response and allowed free-text. Based on survey logic and responses, the survey ranged between 23 and 27 questions. We included one open-ended question at the end of the survey to collect free-text comments. The initial survey draft was reviewed by the research team including an institutional survey expert, and an edited version was integrated into an online platform, Qualtrics (2018).

Once the questions were finalized, an epidemiologist worded and formatted them in order to avoid any bias. The survey was taken and internally pre-tested, underwent item reduction, formatting and composition, then internally validated by all authors to assess simplicity and time taken to complete the survey. Each expert performed an in-depth review, discussed their findings with the team, and agreed to the finalized survey questionnaire. Given the time sensitive setting, the survey was initiated and not subject to clinical sensitivity testing.

A total of 28 questions were formatted, encompassing demographic details, changes in elective care, patient care, telemedicine use, financial impacts, supply chain limitations, etc. These questions were designed to encompass potential large-scale impacts on the pediatric urology field.

After an institutional review board approval (300005314), a survey link was sent to a de-identified email sever list maintained by UAB Department of Urology which includes both pediatric urologists and surgeons across the globe. The list is open to any member to participate, it was created with intention of an open forum to discuss both common and complex pediatric urologic problems and share information and knowledge.

The survey was optional with estimated time to complete the survey being under 5 minutes. A total of 377 participants are on the server list, 114 of which responded to the request to complete the survey. Responses were collected between April 29th – May 22nd, 2020 – a timeframe much after lockdowns were initiated in many countries around the world. It was specifically chosen to be close to the global impact to avoid any significant recall bias and guess work when answering the survey.

Due to the time sensitive nature of COVID-19 research, descriptive statistics were used to analyze and compile results. Since the impact of the pandemic was variable, assessing its impact on patient care was judged by assessing overall impact on a categorical level rather than analyzing patient level data.

Results

As seen in Figure 1, 114 (30%) respondents participated in the survey. The physicians surveyed practiced in many different institution types and were part of many professional organizations.

Specialty	Pracitce Setting	Professional Organizations	Country of Practice	Length of Practice
Pediatric Urologist (88.68%)	Private (15.04%)	AAP (40.35%)	Australia (1.04%)	0-5 yrs (18.10%)
Pediatric Surgeon (0.94%)	Academic (40.60%)	AAPU (22.81%)	Brazil (1.04%)	6-15 yrs (30.48%)
Both (10.38%)	Combination (15.04%)	ESPU (27.19%)	Canada (2.08%)	16-25 yrs (24.76%)
	Stand-alone Children's Hospital (20.30%)	SFU (40.35%)	Chile (1.04%)	>25 yrs (26.67%)
	Hospital in Hospital set up (9.02%)	SIUP (9.65%)	Columbia (2.08%)	
		SPU (63.04%)	Croatia (1.04%)	
			India (3.03%)	
			Israel (2.08%)	
			Italy (1.04%)	
			Lithuania (1.04%)	
			Mexico (1.04%)	
			Philippines (1.04%)	
			Qatar (1.04%)	
			Saudi (1.04%)	
			Spain (1.04%)	
			Sweden (1.04%)	
			Switzerland (1.04%)	
			Thailand (1.04%)	
			Turkey (9.38%)	
			USA (66.67%)	

Figure 1. Demographic and geographic distribution of survey responders.

The COVID-19 pandemic forced healthcare facilities to drastically shift from their traditional workflows. Seventy-five percent of survey participants practiced in areas that issued a "shelter in place" order after March 15th, 2020 (in USA). Furthermore, 75% of participants' health care facilities had been limited to urgent or emergent care for at least 4 weeks.

The majority of physicians surveyed had 75%-100% of their routine elective surgical cases (86%) or clinic/daily visits (62%) cancelled or postponed. All practice types also saw a 75%-100% reduction in elective clinic visits and surgical cases. Fifty-one percent said their operating room followed local guidelines when determining the percent reduction of cases over time.

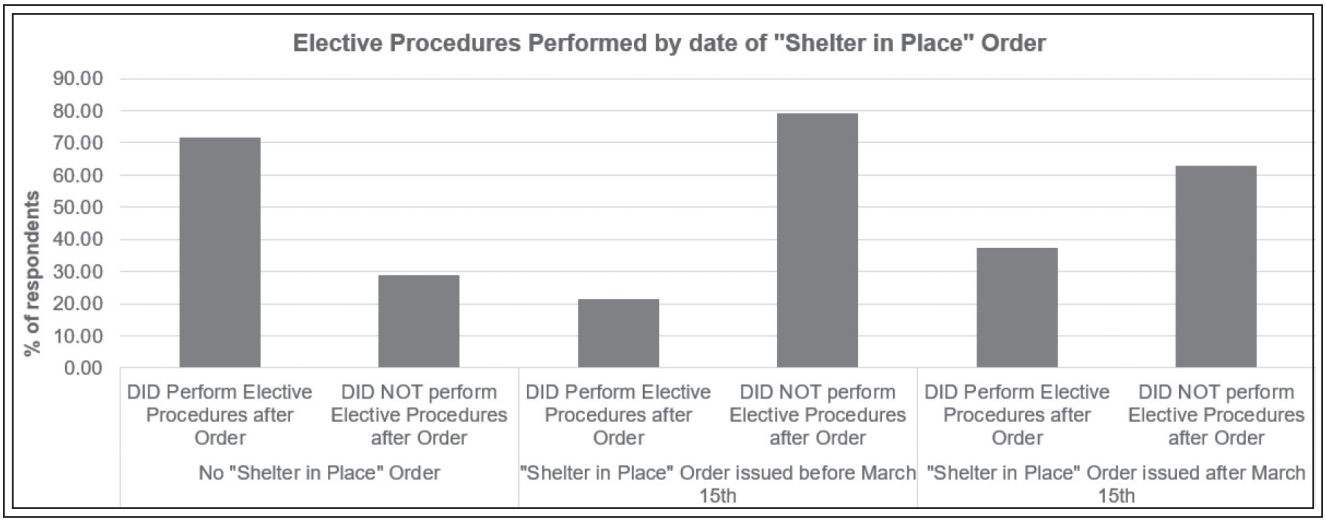

Figure 2. Elective surgeries performed by date of shelter in place order.

Since the time facilities began shifting away from regular workloads, only 36% of physicians performed any non-urgent surgical procedures. Elective surgery volume varied based on the lockdown order, as depicted in Figure 2. However, this was at a lesser rate than before, with most physicians performing non-urgent surgical procedures at less than 25% of their pre-COVID rate. Of these procedures, 59% were outpatient while 42% were inpatient. The majority of participants were only operating at 25% of their normal, weekly capacity. The decisions to perform these non-urgent surgeries were mainly made by the surgeon (38%) and the patient's parents (19%), but were also influenced by institutional guidelines or phased reopening plans. About 12% of respondents also provided service to another domain, such as re-allocation to the ICU for dialysis, general surgery, or adult urology.

COVID-19 also had dramatic financial impacts on healthcare. Seventy percent of physicians surveyed estimated at least a 50% decrease in revenue. The most common revenue impact was between 50%-75% in private, academic, combination, and free-standing children's hospitals, but 75%-100% in hospital-in-hospital settings.

All practice types indicated they would likely need between 1-6 months to resume fully functioning operations. Sixty-one percent of respondents also indicated their practices would take at least 3 months to regain normal operations.

TABLE 1. **Guidelines issued by professional societies**

	American Association of Pediatrics (AAP)	**British Association for Pediatric Urology (BAPU)**	**European Society for Pediatric Urology (ESPU)**
PPE		Use per local and national guidelines	All surgical team should wear PPE; minimize aerosol dispersal during minimally invasive procedures
Well care	Well care should occur in person when possible; Separate locations/days for sick and well care visits	Limit face to face clinics unless urgently required	
Telehealth	Use when possible, but some elements of exam may need in person visit	Use for routine, outpatient clinics	Use to avoid losing patients to follow up; use for multidisciplinary meetings
General management		Medically manage when possible; suspend routine surgery and radiology	Medically manage when possible
COVID-19 patients			Test all preop patients for COVID-19; treat all untested patients as positive cases
Inpatient Triage		Urgency classification: 5. Surgically urgent 4. Clinically urgent (assess week by week) 3. Ongoing treatments needed 2. Wait for 2 months, but conduct virtual check 1. Wait 2 months	Do not differ certain urogenital tumors, unstable trauma, dialysis access creation, severe urinary tract obstructions, scrotal exploration for testicular torsion

PPE = personal protective equipment

TABLE 2. **Survey comments**

Restarted elective procedures	Impacts on practice	Telemedicine	Evolution of care
Restarted mid-May, after better protocols were put in place	No revenue impacts for one Canadian physician, maybe 5%-10% at most	Saw increase in telemedicine visits when only seeing urgent patients. After beginning to see non-urgent patients, saw decrease in telemedicine	Drastic measures taken due to COVID-19 may have significant adverse effects on the economy
Restarted after 6 week hiatus on non-urgent surgeries	One practice only providing circumcisions for baby boys born outside of a hospital setting saw no impacts	Predict telemedicine to become a part of the normal post-op checkups, especially pediatric urology	Pediatric OR facilities were transferred to urgent and vital surgeries
After restarting, have begun to see effects of delayed care			Starting to see effects of delayed care in clinic
Surgery being done for pain, infection, or risk to organ			

Delivery of care also changed dramatically – prior to the COVID-19 outbreak, only 44% of respondents used telemedicine in their practice. Now, 47% of respondents are seeing at least a 75% increase in volume of telemedicine – implementation of which took place 1-2 weeks after the outbreak (61%). Hospital-in-Hospital setups also saw the greatest increase in telemedicine use. Sixty-one percent of respondents indicated plans to use telemedicine as an integral part of their practice after the pandemic ceases. The primary platforms used were Zoom (34%) and EPIC (24%).

There were also differences in diagnoses that were considered most suited to be seen virtually – 41% physicians were comfortable seeing postoperative cases, 30% were comfortable with new cases, and 14.5% were adhering to AAP or ESPU guidelines as seen in Table 1.[12-14]

Another important factor when considering future care impacts is with respect to patients wanting to be seen in a healthcare facility – 84% of physicians opined that 90% of their patients would take at least 3 months to become comfortable coming back to a hospital setting.

The last question of the survey also allowed for respondents to express their general thoughts about the COVID-19 pandemic. These results have been detailed in Table 2.

Discussion

The COVID-19 pandemic has clearly had a significant impact on the medical community, including pediatric urology services across the world. Physicians themselves saw some of the greatest changes in their daily workflow. The majority of respondents practiced in healthcare facilities that were limited to urgent or emergent care for at least 1 month, which significantly reduced the patient load of physicians. However, 36% still did perform non-urgent surgical procedures after their practice closed for regular work. More physicians in areas with no "shelter in place" order or orders issued by their respective federal governments after March 15th performed elective surgeries after this date than physicians in areas with a "shelter in place" order issued before March 15th. This can be presumed to be due to a decreased COVID-19 burden in those areas.

As a consequence, healthcare institutions also face a dramatic economic burden. This could lead to cost cutting measures in other areas such as staff shortages or budget reductions, which would create further strain within an institution.

This also directly affects the level of care provided to patients. According to the physicians surveyed, patients themselves may be wary about receiving care in a healthcare facility for a significant amount of

time. This could create more problems in the future if a patient's condition is worsened by delaying treatment.[15] Not only would this be unfortunate from a medical standpoint, but it significantly impacts caregivers to children needing urologic care. Caregivers are thus placed in a more difficult position if they are not equipped to handle a higher level of care. This could also place a higher financial burden on patient's family if a higher level of care is needed for a longer time. It is thus imperative that clear and effective directives be developed to determine which procedures and at what severity can be safely postponed, and those that need to be treated emergently.[16]

During times as turbulent as these, proper infrastructure is critical for the effective management of care. With the restrictions of only seeing urgent cases in the hospital, telemedicine has emerged as a strong substitute for routine, non-emergent visits. However, survey respondents reported a wide variety of comfort levels when using virtual platform. Furthermore, the loss of the physical visit component is significant. A patient history may be more difficulty to elicit due to the detached nature of a virtual consultation; however, its importance dramatically increases with the absence of a physical examination, vital signs, or laboratory results. Parents may need to be encouraged and guided to perform some basic physical examinations to elicit the information needed.

Despite its limitations, telemedicine may prove to be a useful tool even after the pandemic subsides. It could help to reach patient populations with limited access to care, create more flexible time slots for those who may be otherwise unable to come in for a physical visit, or reduce the daily in-person volume of patients by converting routine follow ups to virtual visits. Incorporating these into daily clinics once normal operations resume would also help to prepare practices for another potential halt in elective care. This would also help to conserve in-person resources. Furthermore, having an established telemedicine workflow would help to streamline the process if demand increases.

There also seemed to be many factors influencing when to resume elective procedures. With institutions, states, and countries often issuing differing recommendations, it creates great variability in the standardization of care as shown by the many differing survey responses. This also creates difficulty in navigating the many guidelines issued. Several categories of guidelines issued by various professional organizations are outlined in Table 1.[12-14] In addition to treatment plans on a case-by-case basis, established workflows are also interrupted by the continual shortages of PPE and medical supply chain limitations.

This shows the need for institutions to develop a task force dedicated to crisis planning. The task force should first work to preserve a standard level of patient care. This could involve developing health crisis drills that could be practiced on regular basis including processes to prioritize specific services, personnel and place limits on resources. Furthermore, clear communication between hospital and physicians must exist to ensure effective reporting of any workflow changes. This is especially true when aspects like increased wait times or limited resources may make it difficult to adhere to guidelines issued.[17] Lastly, the task force should develop a process to consolidate various government and professional society guidelines that are issued into a standardized protocol that is specific to their institution. It must be well-defined enough to provide clear workflows, but simultaneously leave room for adjustments as needed.

It is also imperative to keep an ethical, patient-centered focus. Personnel shortages, changes in normal care operations, and the detached nature of telemedicine could contribute to increased anxiety levels of patients, especially in pediatrics. It is thus important to incorporate the understanding of a new patient-doctor relationship and yet still deliver personalized patient care.

This study has several limitations due to its design and deployment. Not all respondents answered every question of the survey. Thus, the percentages represent the percent of answers for that particular question, not compared to the overall number of respondents. Furthermore, some guess work and recall bias may be present due to the nature of this study being based on a survey. The responses were collected over a period of 25 days during which there was continual changes to healthcare guidelines and recommendations issues – the time at which a respondent completed the survey would have influenced the level of care they were providing. The goal of this survey was simply to assess to overall impact on pediatric urological care. Thus, specific changes in case numbers, percentages of telemedicine visits, revenue loss and their impacts may be underestimated. Furthermore, most responses were from physicians practicing in the United States, but different areas of the world encountered different severities of COVID-19 at different times. This influences the care they were providing at the time of their response, and thus would influence the survey results. This should be considered a snapshot in time but nevertheless provides a framework to understand issues faced by this specialty and help better prepare for the future.

Conclusion

The COVID- 19 pandemic has disrupted the healthcare system for all involved parties; better preparedness for anticipated future crises is needed. Other modalities of medical care are critical in similar situations including telemedicine. The exact approach to scaling down surgical care in pediatric urology and reimplementing such care during recovery is indeterminate but an opportunity for standardization to better prepare for global health care crisis. Institutions should also develop task forces that are dedicated to developing critical workflow processes in the event of a health crisis. With rise in number of cases again, this information is critical for planning and optimizing healthcare resources. □

References

1. Bartsch SM, Ferguson MC, McKinnell JA et al. The potential health care costs and resource use associated with COVID-19 in the United States. *Health Aff (Millwood)* 2020;39(6):927-935.
2. Puliatti S, Eissa A, Eissa R et al. COVID-19 and urology: a comprehensive review of the literature. *BJU Int* 2020;125(6): E7-E14.
3. Boehm K, Ziewers S, Brandt MP et al. Telemedicine online visits in urology during the COVID-19 pandemic-potential, risk factors, and patients' perspective. *Eur Urol* 2020;78(1):16-20.
4. Kaye K, Paprottka F, Escudero R et al. Elective, non-urgent procedures and aesthetic surgery in the wake of SARS-COVID-19: considerations regarding safety, feasibility and impact on clinical management. *Aesthetic Plast Surg* 2020;44(3):1014-1042.
5. Stedman M, Lunt M, Davies M, Gibson M, Heald A. COVID-19: generate and apply local modelled transmission and morbidity effects to provide an estimate of the variation in overall relative healthcare resource impact at general practice granularity. *Int J Clin Pract* 2020;74(9):e13533.
6. Borchert A, Baumgarten L, Dalela D et al. Managing urology consultations during COVID-19 pandemic: application of a structured care pathway. *Urology* 2020;141:7-11.
7. Teoh JY, Ong WLK, Gonzalez-Padilla D et al. A global survey on the impact of COVID-19 on urological services [published online ahead of print, 2020 May 26]. *Eur Urol* 2020;78(2):265-275.
8. Steward JE, Kitley WR, Schmidt CM, Sundaram CP. Urologic surgery and COVID-19: how the pandemic is changing the way we operate. *J Endourol* 2020;34(5):541-549.
9. Simonato A, Giannarini G, Abrate A et al; Members of the Research Urology Network (RUN). Pathways for urology patients during the COVID-19 pandemic. *Minerva Urol Nefrol* 2020;72(3):376-383.
10. Ficarra V, Novara G, Abrate A et al; Members of the Research Urology Network (RUN). Urology practice during COVID-19 pandemic. *Minerva Urol Nefrol* 2020;72(3):369-375.
11. Ho HC, Hughes T, Bozlu M, Kadıoğlu A, Somani BK. What do urologists need to know: diagnosis, treatment, and follow-up during COVID-19 pandemic. *Turk J Urol* 2020;46(3):169-177.
12. https://services.aap.org/en/pages/2019-novel-coronavirus-covid-19-infections/clinical-guidance/
13. https://www.bapu.org.uk/news-and-events/news/recommendations-for-paediatric-urology-practice-during-covid-19-epidemic
14. https://www.espu.org/members/publications/380-changes-in-paediatric-urology-practice-in-the-context-of-the-covid-19-outbreak
15. Cini C, Bortot G, Sforza S et al. Paediatric urology practice during COVID-19 pandemic. *J Pediatr Urol* 2020;16(3):295-296.
16. Slidell MB, Kandel JJ, Prachand V et al. Pediatric modification of the medically necessary, time-sensitive scoring system for operating room procedure prioritization during the COVID-19 pandemic. *J Am Coll Surg* 2020;231(2):205-215.
17. Fernandez N, Caicedo JI. Impact of COVID-19 on the future of pediatric urology practice. Do guidelines apply to medical practice worldwide? *J Pediatr Urol* 2020;16(3):291-292.