

Survey of Canadian urology residency programs: Perception of virtual education during the COVID-19 pandemic and beyond

CUA PRIZE ESSAY



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Abstract

Introduction: The COVID-19 pandemic has caused many residency programs to pivot from traditional face-to-face to virtual teaching. The objective of this study was to assess the state of virtual education in Canadian urology programs and gauge interest in a national virtual curriculum.

Methods: An electronic 15-item survey was distributed to all 13 Canadian urology programs' directors and administrative assistants for circulation to residents. Data collection took place over six weeks from September to November 2020. A mixed-methods approach was used, including descriptive statistics and an inductive thematic analysis of responses to open-ended questions.

Results: Eleven program directors and 32 residents from all four geographic areas (Atlantic, Ontario, Quebec, Western [MB, AB, BC]) responded to the survey. Overall, 95.3% of respondents indicated a role for virtual education in their program during the pandemic. Most respondents (74.4%) believe there is a significant or very significant role for a virtual national urology curriculum. All program directors indicated they are at least somewhat likely to require resident participation in such a curriculum. Most (90.6%) resident respondents indicated they believe such a curriculum will be at least somewhat important to their learning. Commonly described benefits include exposure to subspecialties, expertise at other institutions, and standardization of teaching. Commonly described barriers include difficulty with engagement, time zone differences, and lack of dedicated time for attendance.

Conclusions: During the COVID-19 pandemic, virtual education has become well-integrated in Canadian urology programs. This study highlights interest in the development of a national virtual urology curriculum and puts forth some key considerations to ensure its success.

Introduction

The COVID-19 pandemic has profoundly changed both the provision of medical care and the structure of medical

education. As of the beginning of 2022, the COVID-19 pandemic continues to unfold across Canada and the globe, and with this, a new series of curfews and lockdowns. Previous examples of pandemic effects on postgraduate medical education (PGME) pertain to HIV/AIDS, Ebola, and severe acute respiratory syndrome.¹⁻³ Similar to during previous pandemics, certain medical specialties are primarily charged with the care of patients with COVID-19, while other specialties, such as urology, experience the secondary effects. These secondary effects and associated challenges have been well-documented in the international literature.⁴⁻⁶ Urology training programs experienced a decrease in operative caseload, supervision, and in the epicenters of the pandemic, resident re-deployment. The widely adopted social distancing strategy for infection prevention forced a rapid shift away from in-person teaching. A silver-lining, however, is that in place of in-person didactics, virtual education has flourished.^{7,8}

The stage for virtual education had been set in the decade preceding the pandemic, with the rise of digital media and strides in communication technology. Free, open-access medical education (FOAMed), a culture of providing ready-access, no-cost medical education resources using web-based platforms, was already well-integrated in many medical specialties.^{9,10} Since the start of the pandemic, a few reports have been published on how urology training programs have pivoted to adapt their curricula. Smigelski et al describe the evolution of the EMPIRE (Educational Multi-institutional Program for Instructing REsidents) lecture series from a local resident-driven initiative into a national lecture series with the use of email listservs and social media.⁷ A survey of American program directors by the Society of Academic Urologists found all programs surveyed have adopted video technology for teaching and meetings, and the majority had plans to continue.¹¹

To date, there has been no nationwide assessment of changes to Canadian urology programs as it relates to the demands of COVID-19. The objective of this study was to evaluate the present state of virtual education in Canadian urology residency programs and gauge interest in development of a national virtual urology curriculum.

Methods

After Hamilton Integrated Research Ethics Board approval (no. 11219), two surveys were developed: one survey was targeted to program directors and another to urology residents. The final survey for program directors consisted of 15 items, including three open-ended questions allowing free-text response. The final survey for residents consisted of 14 items, including three open-ended questions. Survey items were designed to assess current virtual content usage, perceived utility, and interest in future usage. For several questions, respondents had to answer subjectively relative to before, during, and after the COVID-19 pandemic, as the timing of pandemic-related changes varied by region.¹² Demographic information was collected on Canadian geographic region, and for resident respondents, year of postgraduate training (PGY). Both surveys were distributed to the program directors and administrative assistants of all 13 Canadian urology programs. A request was made for circulation of the resident survey to an estimated 150 Canadian urology residents. Data collection took place over six weeks from September 23, 2020 to November 4, 2020. Two reminder emails were sent, three weeks prior to and one week prior to closure of the survey.

Study data was collected and managed using REDCap electronic data capture tools hosted at McMaster University.¹³ A mixed-methods approach was used for data analyses. Numerical and categorical data were analyzed using Microsoft Excel and descriptive statistics provided. For dichotomous comparison, responses rated on a five-point Likert scale (e.g., not at all likely to extremely likely) were collapsed into two categories. In these cases, a more conservative approach was used where responses ≤ 3 on the five-point scale (not at all likely, not very likely, somewhat likely) were collapsed into one category and responses ≥ 4 (very likely, extremely likely) were collapsed into another category. Paired t-test was used to compare adoption of virtual education before and after the pandemic. Chi-squared or Fischer's exact test were used to compare responses between residents and program directors. An alpha of 0.05 was considered the threshold for statistical significance. An inductive method of qualitative synthesis was used to identify patterns and themes from responses to open-ended questions.

Results

Eleven program directors and 32 residents from PGY1–5 across all four Canadian geographic areas (Atlantic, Ontario, Quebec, Western [MB, AB, BC]) responded to the survey during the six-week period from September to November 2020. The overall resident response rate was 21% (32/150); 47% (15/32) of resident respondents were from Ontario, proportional to the Canadian urology residents' geographic distribution (Figure 1).

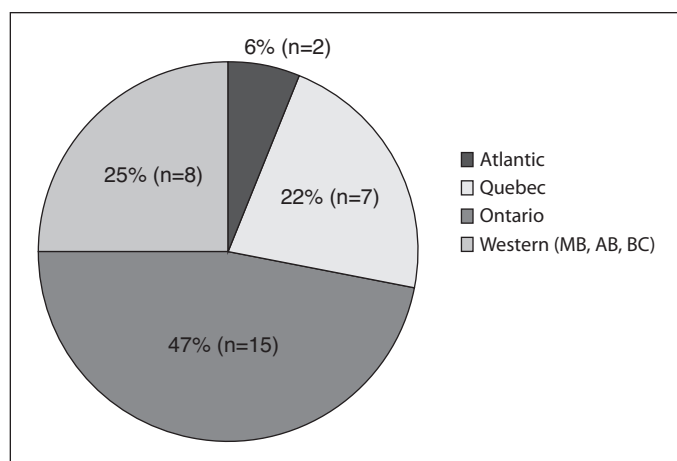


Figure 1. The geographic distribution of resident survey respondents is roughly proportional to the overall geographic distribution of urology residents across Canada. Note the Atlantic region is represented by one urology residency training program, Dalhousie University.

Uptake of virtual education

Prior to the pandemic, 0.0% of program directors and 16% (5/32) of resident respondents indicated a role for virtual education in their training programs. Conversely, all (11/11) program directors and 94% (30/32) of resident respondents indicated a role for virtual education in their program during the pandemic. Both (2/32) resident respondents who indicated no role for virtual education in their training program during the pandemic indicated their program is in the Quebec region. There was a statistically significant difference in usage of virtual education by residency programs before and during the pandemic ($p=0.001$). The most common ways virtual education has been incorporated in resident education during the pandemic are journal club, urology school, and grand rounds (Figure 2).

Most (91%, 10/11) program directors reported personally providing virtual teaching to residents in their programs. Residents reported an average of 6.9 ± 1.1 hours spent per week engaged in virtual learning. Sixteen percent (5/32) of resident respondents indicated participation in virtual education provided by sources other than their residency program before the pandemic, which increased to 75% (24/32) during the pandemic. There was a statistically significant difference in resident engagement in outside virtual education initiatives before and during the pandemic ($p=0.0009$). These other sources are primarily national urological and professional associations, as well as national and international collaborative virtual lecture series organized during the pandemic (Figure 3). The most highly used resource reported is the Canadian Urological Association (CUA) Summer and Night School programming, followed by the Urology Collaborative Online Virtual Didactics (COViD) Lecture Series and online conferences and meetings.

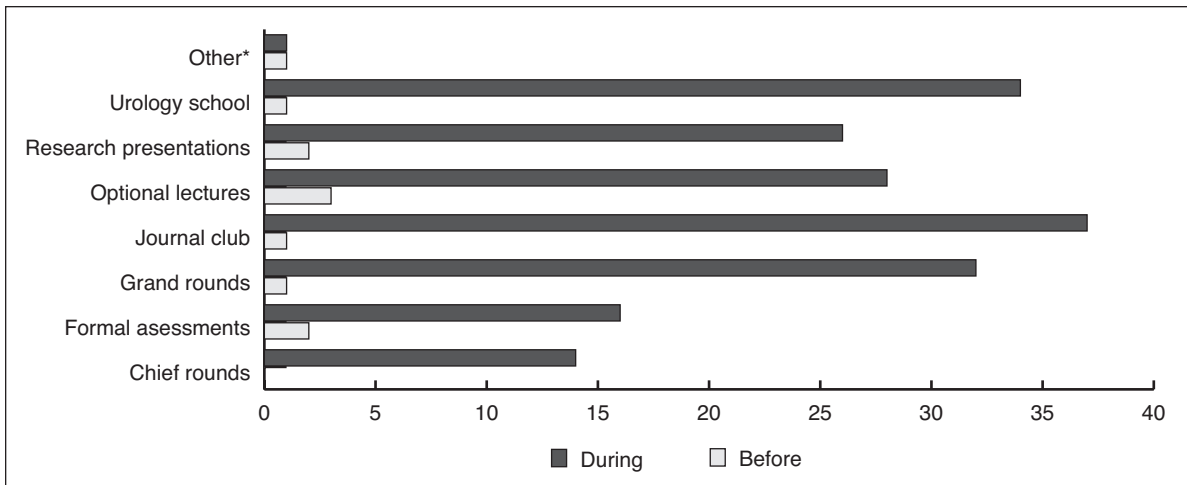


Figure 2. Aggregate responses from program directors and residents reporting how virtual education has been used before and during the COVID-19 pandemic by their residency program, reflecting the significant increase in usage during the pandemic. *Two “other” methods of virtual education usage reported are radiology rounds and surgical foundations.

Utility of virtual education

When asked to rate how useful virtual education is for resident learning and exam preparation, 82% (9/11) of program directors described it as very useful, and 31% (10/32) of residents described it as very or extremely useful, with 56% (18/32) of residents describing it as somewhat useful ($p>0.05$) (Figure 4). When asked about accessibility of virtual education, all (11/11) program directors and 91% (29/32) of resident respondents felt virtual education was more accessible than in-person teaching; however, only 64% (7/11) of program directors perceived the quality of virtual education as equivalent to in-person teaching, with the other 36% (4/11) rating it as lower in quality. Although residents were

not surveyed on this specific question, it may be postulated that a reason most residents responded virtual education is only somewhat useful for learning is due to limitations in quality of content. Eight-two percent (9/11) of program directors and 94% (30/32) of residents felt there was a role for virtual education post-pandemic ($p>0.05$).

National virtual urology curriculum

Regarding interest in a standardized national virtual urology program, 73% (8/11) of program directors and 91% (29/32) of residents felt there was a role for such a curriculum ($p>0.05$) (Figure 5). All (11/11) program directors indicated they are at least somewhat likely to require resident

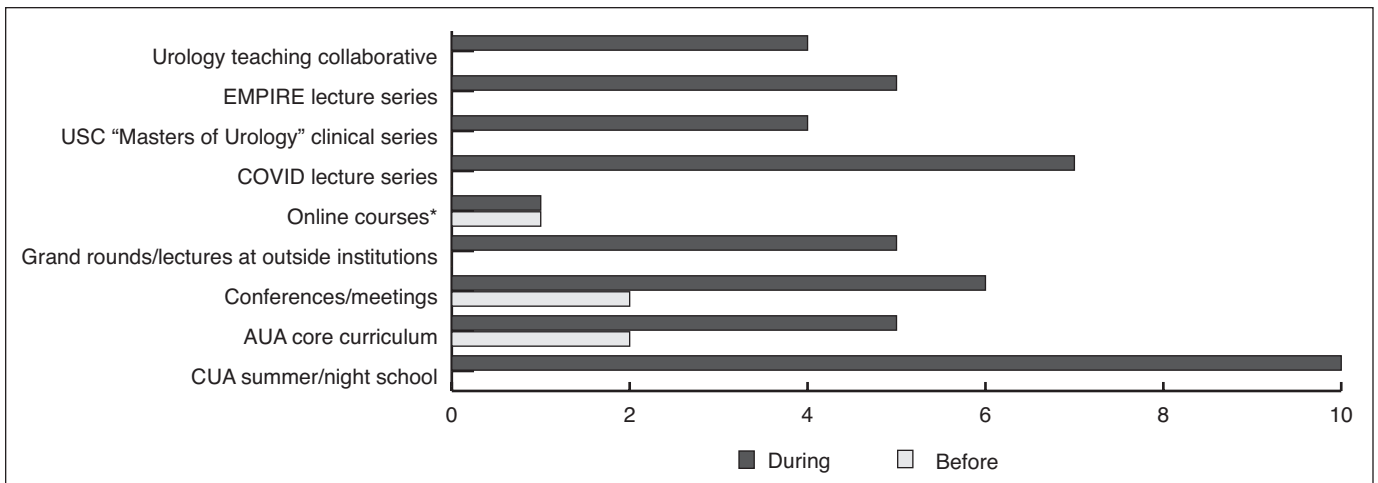


Figure 3. Aggregate responses from residents reporting how they engaged with virtual education provided by sources outside of their residency program before and during the COVID-19 pandemic. *Online courses in this category are those provided by any professional association other than CUA and AUA. AUA: American Urological Association; COViD: Urology Collaborative Online Virtual Didactics; CUA: Canadian Urological Association; EMPIRE: Educational Multi-institutional Program for Instructing Residents; USC: University of Southern California.

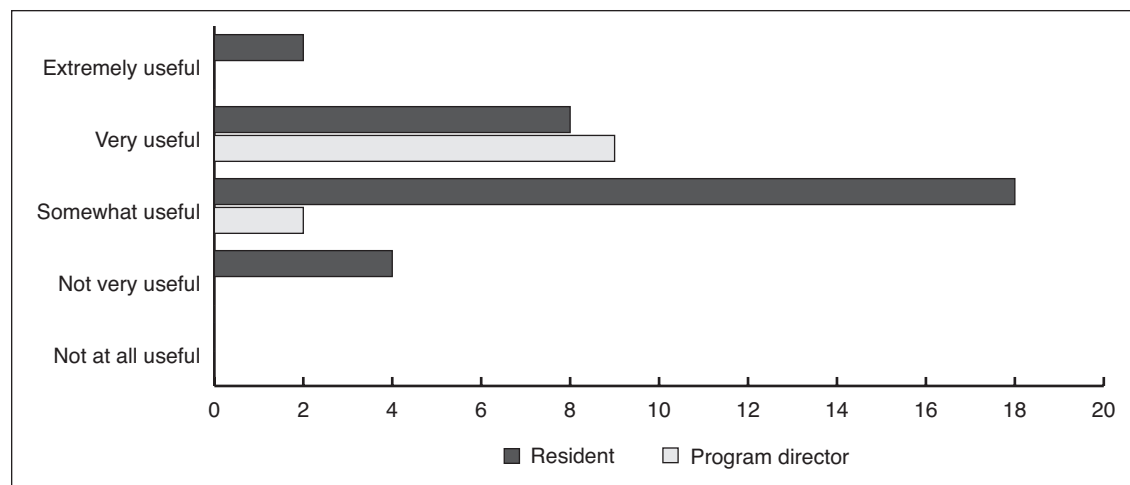


Figure 4. Perception of the utility of virtual education by resident and program director. Most residents and program director respondents perceived that virtual education is at least somewhat useful for learning and exam preparation.

participation in a national urology curriculum to supplement teaching at the local level. Most (91%, 29/32) resident respondents indicated they believe such a curriculum will be at least somewhat important to their learning. In the event attendance at the proposed virtual curriculum is not compulsory, 53% (17/32) of resident respondents indicated they will aim to attend 75–100% of sessions and another 38% (12/32) indicated they will aim to attend 50% of sessions.

From inductive thematic analysis of the open-ended responses, commonly described benefits of a national virtual curriculum include exposure to subspecialties, exposure to expertise or educators at other institutions, and standardization of teaching. Other themes supportive of a national curriculum include a means of cross-institutional collaboration, teaching niche urology topics, reviewing national guidelines, and preparing senior residents for the Royal College exams. The most described barriers include difficulty with engage-

ment over an online platform, time zone differences, and lack of dedicated time for attendance. Other themes against a national curriculum include technical issues, disproportionate representation by select institutions, and the inability to address surgical skills.

Discussion

Virtual education has become widely used and has been well-integrated in Canadian urology residency programs during the COVID-19 pandemic. In this survey of Canadian urology resident programs, all program director respondents indicated a role for virtual education in their program, with the majority indicating an interest in the continued use of virtual education post-pandemic.

The survey also highlights Canadian resident engagement with online resources developed outside of their residency

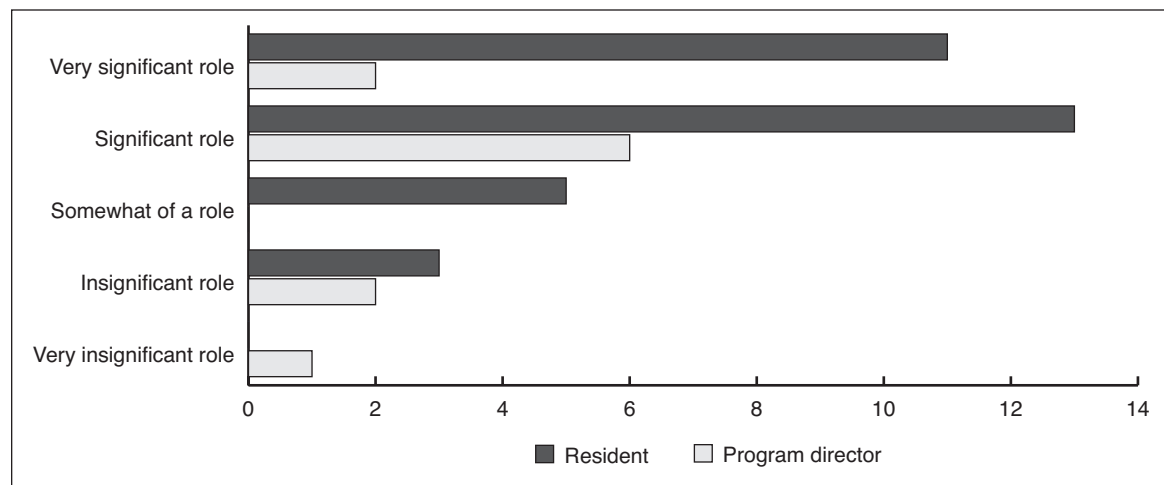


Figure 5. Perception of a national virtual urology curriculum by resident and program director. Most residents and program director respondents perceived a significant or very significant role for such a curriculum in resident education.

program. The rise of virtual education during the pandemic allowed geographically distant institutions to collaborate on innovative initiatives, ultimately leading to the development of many open-access lecture series targeted at urologists.^{14,15} The decentralization of teaching expertise brought by virtual education also empowered resident-led education initiatives, as residents had the same access to user-friendly video-conferencing software as staff and administrators.¹⁶ One example is the open-access, online resource, *urology-school.com*.¹⁷ Originally created by a graduating resident at the University of Toronto in 2020, this resource has now grown to include updates and contributions by many urology residents. In the past two years, there has also been a proliferation of educational podcasts targeted at practicing urologists and urology trainees spanning topic areas from guideline reviews to physician compensation models.¹⁸⁻²⁰

In this era of virtual education, our study demonstrates interest from Canadian urology program directors and residents in the development of a national curriculum. A recent survey of American residents demonstrated similar interest in a national, standardized, online curriculum.²¹ For researchers of medical education pedagogy, this finding is no surprise. Traditional teaching methods have well-described limitations. Scheduled in-person didactics often have variable attendance due to clinical obligations.⁹ Millennial learners, including residents, have demonstrated a preference for use of diverse mediums over lectures and textbooks alone.²² Didactic teaching may also be highly site-dependent on the preceptor and local patient pathology, risking a lack of diversity and consistency. A purposefully and rigorously designed virtual curriculum that is readily accessible has the potential to address these limitations and increase and spread the equity of expert knowledge to all training programs.

The start of the pandemic and increased interest in virtual education coincides with the Canadian urology residency programs' second year of implementation of the Royal College's Competence by Design (CBD) curriculum. CBD is an outcomes-based approach to training and assessment.²³ It necessitates a set of clearly articulated milestones and tasks all Canadian residents must meet to progress in their training. This presents a window of opportunity for the development of a centralized virtual curriculum for urological residents based on the national standards as determined by CBD.

Limitations

It is important to acknowledge the limitations in this study. Many of these limitations are inherent to a survey-based study of this scale. With only an estimated 21% resident response rate, the generalizability of our findings is limited. Statistically significant results from this work should only be interpreted as hypothesis-generating due to the sample size and a lack of correction for multiple hypotheses testing.

There is also a risk of response bias, where program directors and residents more interested in virtual education may be more likely to respond. There is risk of recall bias when asking respondents to report on their educational engagement before the pandemic. Subjective interpretation of "before" and "during" the pandemic may also impact results, as a time for pandemic onset was not clearly defined in the survey. There was no French translation of the questionnaire made available to residency programs. The two program directors who did not respond to our questionnaire both oversee Quebec training programs. In the future, targeted surveys of urologists and trainees in Canada, a bilingual country, should be available in both English and French.

Despite these limitations, this is the first study to provide a comprehensive assessment of virtual education for Canadian urology residents as it relates to the COVID-19 pandemic. To our knowledge, this is the first Canadian assessment of virtual education in PGME in any one specialty in any pandemic. It provides an important snapshot of how the pandemic has shaped resident education and insight into how it may continue to shape its future.

Conclusions

This is an exploratory analysis of the use of and attitudes toward virtual education by Canadian urology residency program directors and trainees during the COVID-19 pandemic. It also highlights interest from program directors and residents in the development of a national virtual urology curriculum to supplement local teaching. As the pandemic continues in flux, this may be a potential solution to the periodic decreases in in-person learning opportunities. Our qualitative analysis also provides some key insight on potential barriers to the implementation of such a national curriculum. Future efforts should be targeted at design of a standardized, national lecture series that considers these barriers in order to maximize its success and value to the Canadian urological community.

Competing interests: The authors do not report any competing personal or financial interests related to this work.

This paper has been peer-reviewed.

References

1. Hayward RA, Shapiro MF. A national study of AIDS and residency training: Experiences, concerns, and consequences. *Ann Intern Med* 1991;114:23-32. <https://doi.org/10.7326/0003-4819-114-1-23>
2. Bernstein SL, Shayne P. Ebola, physicians in training, and the duty to treat. *Acad Emerg Med* 2015;22:88-90. <https://doi.org/10.1111/acem.12562>
3. Clark J. Fear of SARS thwarts medical education in Toronto. *BMJ* 2003;326:784. <https://doi.org/10.1136/bmj.326.7393.784/c>

4. Fonseka T, Ellis R, Salem H, et al. The effects of COVID-19 on training within urology: Lessons learned in virtual learning, human factors, non-technical skills, and reflective practice. *J Clin Urol* 2021;14:29-35. <https://doi.org/10.1177/2051415820950109>
5. Tan YQ, Wang Z, Tiong HY, et al. The good, the bad, and the ugly of the COVID-19 pandemic in a urology residency program in Singapore. *Urology* 2020;142:244-5. <https://doi.org/10.1016/j.urology.2020.05.027>
6. Porpiglia F, Checucci E, Amparore D, et al. Slowdown of urology residents' learning curve during COVID-19 emergency. *BJU Int* 2020;125:E15-7. <https://doi.org/10.1111/bju.15076>
7. Smigelski M, Movassaghi M, Small A. Urology virtual education programs during the COVID-19 pandemic. *Curr Urol Rep* 2020;21:50. <https://doi.org/10.1007/s11934-020-01004-y>
8. Ding M, Wang Y, Braga LH, et al. Urology education in the time of COVID-19. *Can Urol Assoc J* 2020;14:E231-2. <https://doi.org/10.5489/auaj.6696>
9. Mehta NB, Hull AL, Young JB, et al. Just imagine: New paradigms for medical education. *Acad Med* 2013;88:1418-23. <https://doi.org/10.1097/ACM.0b013e3182a36a07>
10. Cadogan M. Free Open Access Medical Education. Life in the Fast Lane. Medical Blog. [updated 2020 Nov 3; cited 2022 Apr 30]. Available at: <https://litfl.com/foam-free-open-access-medical-education/>. Accessed April 1, 2022.
11. Rosen G, Murray K, Greene K, et al. Effect of COVID-19 on urology residency training: A nationwide survey of program directors by the Society of Academic Urologists. *J Urol* 2020; 204:1039-45. <https://doi.org/10.1097/JU.0000000000001155>
12. Dong E, Du H, Gardner L. An interactive web-based dashboard to track COVID-19 in real time. *Lancet Infect Dis* 2020;20:533-4. [https://doi.org/10.1016/S1473-3099\(20\)30120-1](https://doi.org/10.1016/S1473-3099(20)30120-1)
13. Harris PA, Taylor R, Thielke R, et al. Research electronic data capture (REDCap) — A metadata-driven methodology and workflow process for providing translational research informatics support. *J Biomed Inform* 2009;42:377-81. <https://doi.org/10.1016/j.jbi.2008.08.010>
14. McCarthy C, Carayannopoulos K, Walton M. COVID-19 and changes to postgraduate medical education in Canada. *CMAJ* 2020;192:E1018-20. <https://doi.org/10.1503/cmaj.200882>
15. Li Y, Chu C, de la Calle CM, et al. Multi-institutional collaborative resident education in the era of COVID-19. *Urol Pract* 2020;7:425-33. <https://doi.org/10.1097/UPI.0000000000000158>
16. Papapanou M, Routsis E, Tsamakis K, et al. Medical education challenges and innovations during COVID-19 pandemic. *Postgrad Med J* 2022;98:321-7. <https://doi.org/10.1136/postgradmedj-2021-140032>
17. Urologyschool. [updated 2021 Dec 9; cited 2022 Apr 30]. Available at: <https://www.urologyschool.com/>. Accessed April 20, 2022.
18. Saade K, Shelton T, Ernst M. The use of social media for medical education within urology: A journey still in progress. *Curr Urol Rep* 2021;22:57. <https://doi.org/10.1007/s11934-021-01077-3>
19. American Urological Association. AJA Inside Tract. [updated 2022 Apr 1; cited 2022 Apr 30]. Available at: <https://www.auanet.org/podcast>. Accessed April 20, 2022.
20. European Association of Urology. On-Demand Education. [updated 2022 Apr 25; cited 2022 Apr 30]. Available at: <https://uroweb.org/education-events/education>. Accessed April 30, 2022.
21. Blum K, Conroy L, Mehr J, et al. Demand for expanded virtual education evident among urology trainees two years into COVID-19. *J Urol* 2022;207:e314. <https://doi.org/10.1097/JU.0000000000002552.17>
22. Twenge JM. Generational changes and their impact in the classroom: Teaching Generation Me. *Med Educ* 2009;43:398-405. <https://doi.org/10.1111/j.1365-2923.2009.03310.x>
23. Royal College of Physicians and Surgeons of Canada. Urology Competencies. [updated 2018 Jul 1; cited 2022 Apr 30]. Available at: <https://www.schulich.uwo.ca/urology/docs/Final-ENG-Urology-CBD-Competencies-November-2017.pdf>. Accessed April 30, 2022.

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