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Authors

Li, Yi
Chu, Carissa
de la Calle, Claire M
et al.

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Multi-Institutional Collaborative Resident Education in the Era of COVID-19

Yi Li, Carissa Chu, Claire M. de la Calle, Caitlin Baussan, Sapan N. Ambani, Michael S. Borofsky, Benjamin N. Breyer, Simon L. Conti, Judith C. Hagedorn, Joshua A. Halpern, Nora G. Kern, Stephanie J. Kielb, Noah S. Schenkman, Mathew D. Sorensen, Jennifer H. Yang and Lindsay A. Hampson*

From the Department of Urology, University of California San Francisco (YL, CC, CMdlC, CB, BNB, LAH), Division of Urology, Department of Veterans Affairs Medical Center (LAH), San Francisco, Department of Urologic Surgery, University of California Davis (JHY), Davis, Department of Urology, Stanford University, Stanford (SLC), California, Department of Urology, University of Michigan, Michigan (SNA), Department of Urology, University of Minnesota, Minnesota (MSB), Department of Urology, University of Washington School of Medicine (JCH, MDS), Division of Urology, Department of Veterans Affairs Medical Center (MDS), Washington, Department of Urology, Northwestern University, Illinois (JAH, SJK), Department of Urology, University of Virginia, Virginia (NGK, NSS)

Abstract

Introduction: The 2019–2020 coronavirus pandemic has had a significant impact on all aspects of health care. Decrease in clinical and operative volume and limitations for conferences has drastically decreased educational opportunities for resident trainees. We describe the formation and initial success of the Collaborative Online Video Didactics lecture series, a multi-institutional online video didactics collaboration.

Methods: Zoom data extraction and postlecture evaluation surveys were used to collect data on the impact of the pandemic on local educational activities as well as feedback about the lecture series. Lectures are being given by faculty from 35 institutions. The twice daily, hour-long webinar averages more than 470 live viewers per session with an average of 33.5 questions per session and has over 7,000 YouTube views of the recordings after the first 2 weeks.

Results: Viewers reported significant decreases in outpatient (75.2%), inpatient (64.9%) and operating room (77.7%) volumes at local programs, and only half (52.7%) of the survey responders indicated an increase in didactics locally. The lectures have been well-received, with over 90% of respondents giving the lecturers and series above average or excellent ratings. A significant majority of responders indicated that the lecture series has allowed for ongoing education opportunities during the pandemic (95.0%), helped to access faculty experts from other institutions (92.3%) and provided a sense of community connectedness during this period of social isolation (81.7%).

Conclusions: We strongly encourage other institutions and trainees to participate in the didactic series and hope that this series can continue to evolve and be of benefit beyond the pandemic.

Key Words: internship and residency; education, medical; coronavirus; education, distance; intersectoral collaboration

Abbreviations and Acronyms

ACGME = Accreditation Council for Graduate Medical Education

AUA = American Urological Association

COViD = Collaborative Online Video Didactics

COVID-19 = the novel coronavirus SARS-CoV-2 and associated pandemic

Q&A = question and answer

UCSF = University of California, San Francisco

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* Correspondence: Department of Urology, University of California, San Francisco, 400 Parnassus Avenue, Box 0738 San Francisco, California 94143

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The 2019–2020 coronavirus pandemic has had a drastic impact on all aspects of health care. States, municipalities and institutions have instituted shelter in place orders to limit the spread of the virus and to protect patients and health care workers alike. The Centers for Disease Control and Prevention has issued recommendations against gatherings of more than 10 people.¹ The Surgeon General and the American College of Surgeons have placed recommendations to perform surgery on urgent and emergent cases only.^{2,3} Many clinic visits have been curtailed and when possible transitioned to telemedicine. In areas impacted the most physicians have been redeployed from other specialties to manage COVID-19 cases and the additional workload.⁴ As a result, there has been a drastic decline in clinical care at academic institutions.

Urology programs have had their own challenges to manage, focusing on providing necessary patient care while adhering to ever evolving pandemic recommendations.⁵ With regard to resident training, urology residency programs like many other surgical subspecialties have taken steps to protect residents and trainees from unnecessary COVID-19 exposures by reducing inpatient care teams to skeleton crews and limiting resident participation in urgent or emergent cases. While all of these necessary steps have been taken with safety in mind an unfortunate consequence for urology residents is a significant decrease in hands on surgical and clinical experience.⁶ Although the ACGME and American Board of Medical Specialties have released a statement allowing program directors in conjunction with the program's Clinical Competency Committee to determine readiness for unsupervised practice and eligibility for initial board certification,⁷ the true impact of the COVID-19 outbreak on graduate medical education is still unknown. Undoubtedly, the clinical learning environment emphasized by the ACGME for providing safe and effective clinical education for residents and fellows has been significantly disrupted.⁸

Many residency programs have taken steps to address this educational void. Innovative techniques for remote teaching include flipped virtual classrooms, online practice questions, academic meetings via teleconference, telehealth clinics with resident involvement and analysis of surgical videos.⁹ E-learning with surgical videos has already been shown to be a useful tool for teaching case based scenarios, guidelines and theoretical knowledge, and surgical skills.^{10,11} However, a challenge that individual institutions face when attempting to use these techniques can be the availability and bandwidth of their faculty educators. When attempting to expand didactics offerings individual training programs are constrained by the limited ability of faculty to produce new educational content in a time when many are engulfed with remote patient care, development of new work flows and

processes, or caring for patients with COVID-19 directly in COVID-19 hotspot areas.

A silver lining to the pandemic has been the ability for training programs to adapt and evolve with these unprecedented times and rally to continue to support resident training. To our knowledge otolaryngology was the first surgical subspecialty to address the decrease in resident learning opportunities through collaborative online didactics using the pooling of collective faculty resources, time and expertise to provide cross institutional didactic lectures. Following otolaryngology's example residency educators at UCSF, University of Washington, University of California–Davis, Stanford University, University of Minnesota, University of Michigan, Northwestern University and University of Virginia quickly designed and implemented a urology specific collaborative didactic series.

We aim to describe our multi-institutional approach to address the unprecedented decrease in hands on resident education due to the COVID-19 pandemic. We hypothesize that this educational format is an effective way to provide ongoing resident education during this pandemic, and that it further serves to bring together the academic urology community and allows residents and other trainees access to faculty experts across the country.

Methods

Collaborative Online Video Didactics Lecture Series Creation

The concept for COViD began in late March 2020 at UCSF. An initial outreach email was sent on March 22, 2020, and from there a coalition was quickly formed between various faculty members and resident program directors with 8 academic training programs, including UCSF, the University of Washington, the University of California–Davis, Stanford University, the University of Minnesota, the University of Michigan, Northwestern University and the University of Virginia. Within a few days the UCSF team had created a website (urologycovid.ucsf.edu, supplementary fig. 1, <https://www.urologypracticejournal.com>) and faculty volunteers from these initial programs began signing up for lectures. Organizers encouraged faculty to choose topics that aligned with the American Urological Association Core Curriculum or AUA Guidelines. The first week of lectures featured a single lecture per day.

Immediately following the start of the lecture series there was a significant influx of collaborating programs from across the country. Participating programs were encouraged to have faculty contribute by giving a lecture if they were able. However, programs were also offered the opportunity

for resident participation without the need for providing lectures given the varying levels of burden in highly impacted areas. In particular, all of the programs in New York were contacted directly and advised that the resource would be available to their trainees without any expectation of their faculty to contribute to the lecture series given the high burden of COVID-19 cases they were experiencing at the time. Due to the large number of faculty volunteers the program was expanded to 2 lectures per day starting the second week. The session format was a 45-minute lecture followed by a 15-minute Q&A session. Volunteer faculty filled all 84 lecture slots through the end of May 2020 within 1 week of the first lecture and a month-long waiting list was populated within the next week. The lecture schedule was posted online (supplementary fig. 2, <https://www.urologypracticejournal.com>). Lectures were delivered by Zoom.us (v4.6.10) using webinar format with polling, chat and Q&A features. Senior residents and fellows were involved with moderating Q&A. All lectures were recorded and all unanswered Q&A questions, lecture slides and videos were subsequently posted on the website.

Data Collection/Analysis

Information on lecturers was self reported through the lecturer feedback evaluation or found online (faculty position, AUA section). The number of unique participants watching live lectures was tracked through Zoom webinar attendee reports using the “Unique Viewer” variable. YouTube video view data were collected from the website as of April 12, 2020, immediately following 2 weeks of lectures. Participant demographics and evaluations were obtained prospectively (supplementary fig. 3, <https://www.urologypracticejournal.com>). Baseline demographics including stage of training, AUA region and institution were gathered. Pertinent information about the impact of COVID-19 on inpatient, outpatient and operative volume was also included, and data on whether home institutions have increased local didactics were collected. On a Likert scale from 1 to 5 (1=poor, 2=below average, 3=average, 4=above average, 5=excellent) participants were asked to review

relevance of subject area, instructor effectiveness, usefulness to learning and education, and the COVID series overall. Lastly, participants were asked to select the benefits of the lecture series. Open response fields for general feedback were provided. Initial data were collected after completion of the first 2 weeks of the program in order to give early feedback and evaluate the state of the lecture series. Descriptive statistics were performed using GraphPad Prism and Microsoft Excel®. ANOVA and Student’s t-test were used to compare survey responses by AUA section. The institutional review board at UCSF granted exempt status due to the educational nature of the study and minimal risk to participants studied.

Results

Lecturer and Lecture Formation, and Demographics

The first COVID lecture was broadcast at 9 a.m. Pacific Standard Time on March 3, 2020. The online webinar had 473 live views, and the subsequently uploaded YouTube video has had 1,300 views as of April 12, 2020. Within the first week 81 attending urologists from 35 different institutions had signed up for 84 hour-long sessions through the end of May 2020. The list of volunteer speakers includes 12 residency program directors, 21 subspecialty chiefs and 4 department chairs/division chiefs. Every AUA section and each subspecialty was represented. The breakdown of lecturer faculty position, AUA section and lecture topic is shown in figure 1. To date, a total of 71 programs have officially reached out to work with the collaboration with many others participating in viewership and offering support.

Viewers and Demographics, Effect of Pandemic on Programs

After the first 2 weeks of lectures there have been a total of 7,097 unique live webinar viewers and 6,916 YouTube views of the 15 COVID lectures as of April 12, 2020. Figure 2 shows the trend of live Zoom webinar views and YouTube views at the time the data were collected. Viewer submitted questions were also recorded and tracked via Zoom, and there was an average of 33.5 questions from the

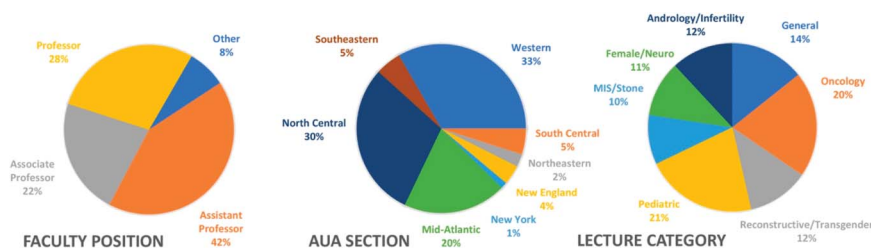


Figure 1. Demographic information on COVID lecture series volunteer speakers by faculty position, AUA section and lecture topic category/subspecialty.

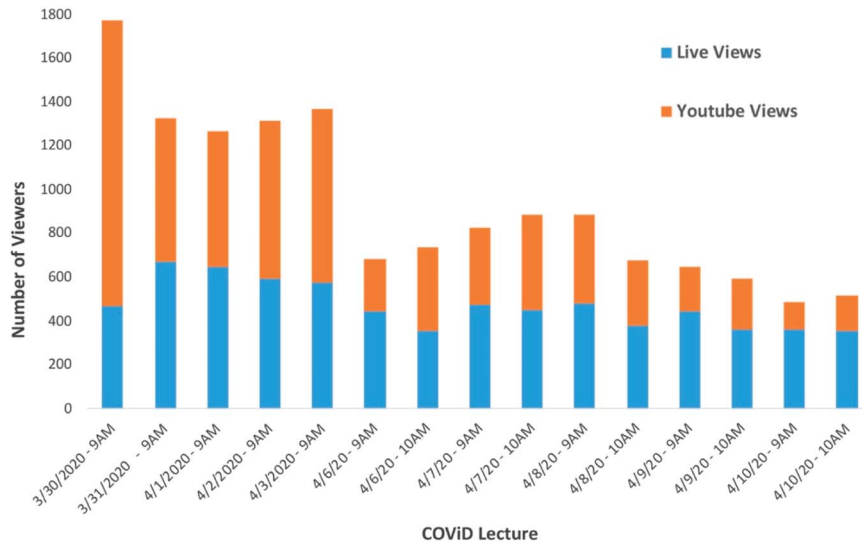


Figure 2. Unique live and YouTube views of 2 weeks of COVID Lectures

audience per webinar (SD=23.6), with 1 lecture reaching a maximum of 94 questions by the end of the hour.

At the time of data collection 989 individual evaluations had been collected. The demographic information collected from these surveys, namely AUA section and level of training, can be seen in figure 3. Survey participants responded from 108 different institutions including 14 international programs. All AUA sections are represented with a component of international participants as well. Participants are mostly trainees with 6.7% medical students, 46.6% junior residents, 32.9% senior residents and 3.4% fellows. There is some participation from other providers such as midlevel providers (2.2%), academic faculty (5.8%), community practitioners (1.7%) and retired/inactive providers (0.3%).

In addition to demographic information the impact of COVID-19 on viewer institutions was queried. Figure 4 shows the rate of clinical experience changes due to the pandemic according to survey responders. Respondents overall noted large decreases in clinical volume with across the board significant decreases in outpatient (75.2%), inpatient (64.9%) and operative (77.7%) urology specific volume.

No difference was noted when these responses were grouped by AUA section (data not shown, p=0.514).

First time viewers were also queried on changes in their home urology program didactics or lecture based education as a result of decreased clinical volume. Out of 329 responses 52.7% responded that there has been an increase in didactics and 47.3% responded that there has not been an increase in lectures. These data varied by geographic region when categorized by reported AUA section of the responders, as shown in figure 5 (p=0.73).

Evaluation of Lecture Series

Of 1,162 individual lecture evaluations there was an average of 77.2 evaluations per lecture (SD=75.5). Of all responders 965 (85.4%) reported evaluating the lectures after watching live and 165 (14.6%) reported evaluating the lectures after watching a recording. Feedback from the lecture series is presented in figure 6. Feedback on the lectures was overwhelmingly positive with the vast majority of respondents giving an above average or excellent rating for the relevance of

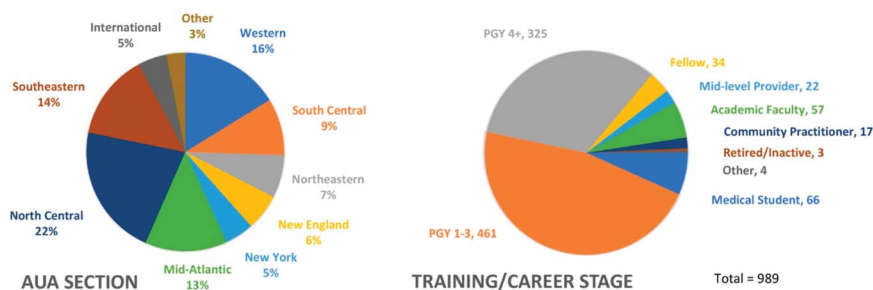


Figure 3. Demographics of COVID viewers from postlecture evaluation data featuring self reported AUA section and training/career stage of viewers.

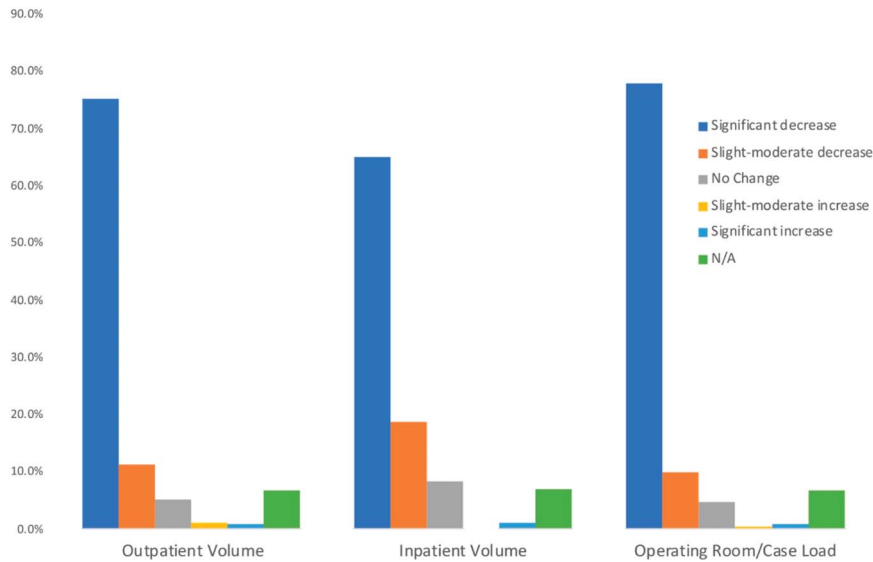


Figure 4. Reported changes in clinical experience due to COVID-19 pandemic at urology programs based on survey data. No differences were noted when data were analyzed by AUA section.

the subject area (96.7%), instructor knowledge of the content area (98.3%), instructor efficacy in teaching the material (93.4%) and the didactics session being useful to learning and education (93.7%). In addition, 97.5% of respondents gave the COVID series as a whole an above average or excellent rating.

When queried on the benefits of the COVID series 95.0% of responders felt that the series helped with continuing education, 92.3% felt that the series allowed for access to leaders in the field and 81.7% felt more connected to the academic urology community. Additionally, 99.4% of responders

indicated that they would want access to the videos in the future, and 100% of responders indicated that they would like to see the series continue. Respondents were given an opportunity for open comments (“Please feel free to give us any other feedback on the Urology COVID Lecture Series”) and the positive response was overwhelming in these comments (fig. 7). Constructive feedback included recommendations for more formalized scheduling, breakout group discussion, multiple choice questions at the end of each lecture and other ideas for improving the series.

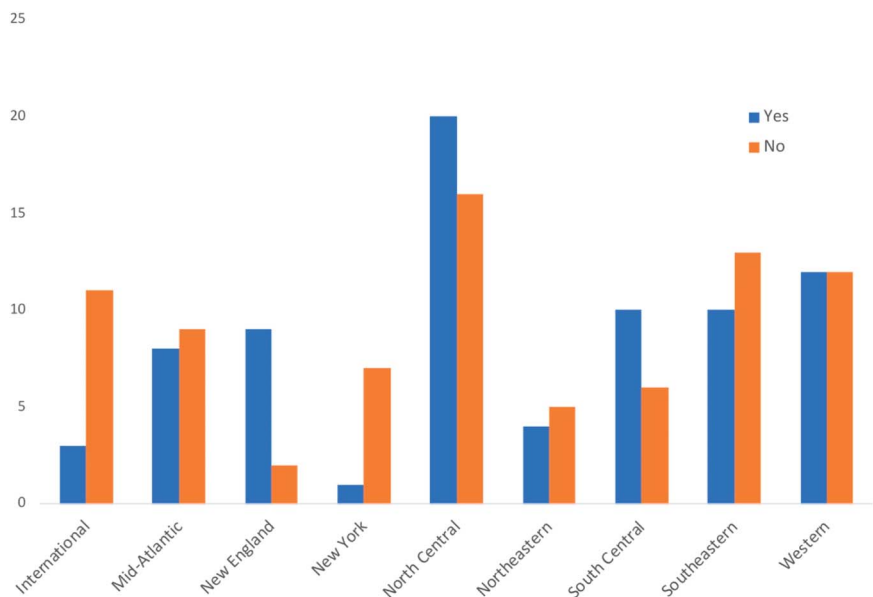


Figure 5. Survey response to increase in home institution didactics or lecture based education as response to decreased resident education during COVID-19 pandemic. Results broken down by AUA section.

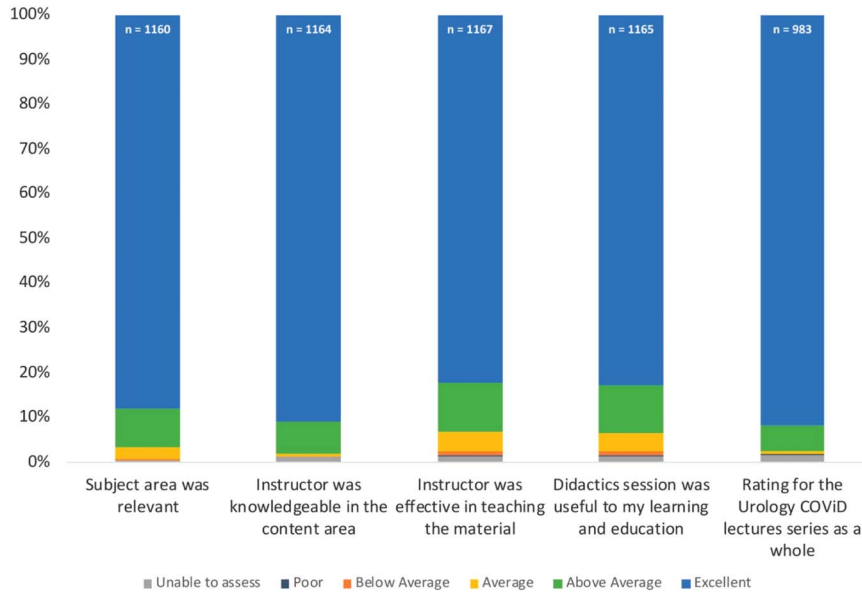


Figure 6. Postlecture evaluation data from viewers of COVID lectures as collected via online survey

Discussion

The initial purpose of the COVID series was to provide collaborative learning opportunities for residents borne out of an increased need for continued education during the pandemic. In order to assess the relevance of this program and the presumption that the pandemic has impacted resident learning experience, the evaluations queried viewers on the

changes to their clinical experience as a result of the outbreak. The majority of responders reported significant decrease in outpatient, inpatient and operating room volume due to COVID-19 (fig. 4). While these changes have already been reported and analyzed as a response to the pandemic⁵ these survey responses indicate that this impact has had an acute impact on trainees. More interestingly, only half of the responders reported that their home institutions have increased



Figure 7. Wordcloud of free text feedback on response to COVID lecture series

didactics or other education endeavors as a result of the changes in clinical volume. This finding indicates a gap in resident education that can benefit from the COVID lecture series. Local program changes to didactics and teaching did vary by region, and notably survey responders from New York had the highest rate (88%) of “no change” in didactics (fig. 5). This may be reflective of the impact of the pandemic on New York in particular,¹² although there are not currently enough responses to confidently make that correlation.

The enthusiasm from faculty, first from the organizing institutions and then nationwide for this project, demonstrates the passion for teaching and education within the field as 84 lecture spots were filled within 2 weeks of planning the program and within 1 week of the first broadcast. Figure 1 illustrates the heterogeneity of the career stages and subspecialties of the volunteer speakers. The majority of the faculty are from the Western, North Central, and Mid-Atlantic AUA sections, which likely reflects that the organizing committee for the lecture series are within these geographic regions. The smaller number of faculty speakers from the New York, Northeastern and New England sections may be related to the increased burden on urology faculty due to higher impact of the pandemic in those regions, specifically New York.¹² At the time the schedule was created New York programs in particular were encouraged to have their residents participate without a need for faculty to contribute to the lectures themselves given that they were at the front lines of the outbreak.

The postlecture surveys have been useful in revealing the demographic of the viewers, as well as elucidating some of the impact of the COVID pandemic on resident learning. A total of 989 total evaluations were collected following the first 2 weeks of lectures, providing an interesting glimpse into what is happening nationwide during the pandemic. While the majority of volunteer speakers are from the 3 initial AUA sections (fig. 1) the viewers appear to be more heterogeneous, tuning in from every AUA section as well as from international institutions (fig. 3). The majority of the viewers were resident trainees as expected since this was the target demographic for the program. However, other viewers included medical students, midlevel providers, fellows and practicing urologists. There was a relatively even split between junior and senior residents as well (fig. 3). These numbers demonstrate the broad reach of the program, and the potential impact nationally and internationally on resident learning.

The evaluation of the lectures themselves for content were overwhelmingly positive, with greater than 90% of survey responders rating the lecture or lecturer as either “above average” or “excellent” in every category including subjected area relevance, instructor knowledge, instructor effectiveness and usefulness to viewer education (fig. 6). The COVID

series overall was rated “excellent” by 91.7% of responders. While the educational benefits of the lecture series are self-evident, in the setting of cancelled national and international academic meetings the additional benefits of bringing together the academic urology community and giving trainees access to leaders and educators from across the country cannot be overstated.

With the increasing presence of academic urology in social media¹³ the lecture series was advertised on Twitter and open to any viewer who registered on the website. The number of viewers for the program has been significantly higher than expected, and subsequent YouTube views of recorded lectures has also remained consistently high (fig. 2). The number of live viewers has remained consistently in the 300–600 range, and YouTube views are in the triple digits a day after posting with the lectures from 1 week prior all hitting more than 600 views. We attribute the higher YouTube views for the first week of lectures as likely due to lag time, as more trainees will likely view recorded lectures at their leisure and may not have viewed the second week’s lectures yet at the time the data were collected.

YouTube and other sources of video didactics are well-established sources of surgical resident learning.¹⁴ AUAUniversity is arguably the most prolific and commonly accessed source of open access online video learning with material directed specifically toward trainees.¹⁵ In their on-line video library of 85 videos less than half of the videos have more than 100 views. This demonstrates the impact that the COVID lecture recordings have had on trainee learning. The engagement and interactivity of the lectures with the viewers can be reflected in the varied number of questions submitted during the talks to the speaker, which is an added benefit for the live webinar format.

Limitations to this study include the reliance on survey response for feedback. If calculated based on the evaluations completed after watching the lecture live, surveys were completed for 13.8% of lectures watched. Only approximately 2% of evaluations were completed after watching a recording of the lecture. There certainly can be selection bias towards those who are willing to participate in lecture evaluations. Despite the percentage of completed surveys the total number of surveys completed is significant and provides a sample of the overall viewership. Additionally, reliance on YouTube views is likely an overestimate of actual views as this counter increases each time the website is accessed. There is currently no better way to evaluate video recording views. Another limitation of this study is that we are not currently measuring educational impact of these lectures. We have no pretest or posttest knowledge assessment and therefore cannot comment on the true educational impact. Given the quick design and implementation of the program

the collection of these data was not possible but certainly can be considered in the future if the series were to continue.

Finally, these data only represent the first 2 weeks of the program, which is currently scheduled through 9 weeks with additional programming being scheduled through the end of June. The decision was made to publish these early data to encourage participation in the program as well as to initiate the discussion on how to continue this beneficial program beyond the pandemic given its positive influence so far. Data collection will continue as the lecture series continues and additional analysis and evaluation of the program is planned for when the data become more mature.

All (100%) of the viewers surveyed in this study indicated that they would like to see the series continue into the future. Other programs within AUA sections and subspecialties are already recognizing the benefits of this collaborative algorithm and creating similar independent teaching series (eg Pediatric Urology Fellowship Lectures Online, EMPIRE Urology Lecture Series), which is highly encouraging.^{16,17} With the initial enthusiasm and apparent success of the program so far, discussions have already begun on how to effectively continue this program beyond the pandemic. Within the pandemic timeline we will reach a point where clinical volume will begin to increase again. This series can remain a valuable educational resource that draws from national rather than just local expertise and serves to fill in gaps for programs that may be lacking in experts in certain subspecialty areas and reduce the need to reinvent the wheel for each educational topic. This recorded lecture series also provides an opportunity to create a central repository of lectures and slides to supplement resident didactics across the country. It will be important to closely review the topics covered and reference the Core Curriculum to determine what other areas can benefit from lectures and updates. Another area where this series can contribute is the discussion of the newly required Section VI of the ACGME Common Program Requirements, which includes emphasis on wellness, fatigue and burnout.¹⁸ It will be important to continue to review the evaluations as the pandemic timeline progresses and to solicit new speakers and contributors to ensure the effectiveness and applicability of the lecture series to resident education in the future.

Conclusion

Despite the unfortunate backdrop of the global pandemic that spurred the creation of this program the collaboration has given us a unique opportunity to break down the institutional silos of residency training and share the vast wealth of knowledge and experience that our academic faculty across the country possess. The overwhelmingly positive feedback from residents,

fellows and practicing urologists alike to the first 2 weeks of lectures is an indication of the high quality and effectiveness of this format so far. We strongly encourage training programs to take advantage of the COVID program and will continue to make lectures and education materials available to all who wish to attend. There will be a time in the future when we are back in the operating rooms, clinics and lecture halls. We hope that this series can evolve and persist so that these new collaborative educational efforts can outlast the pandemic and continue to provide a source of shared knowledge, resident teaching and community building for our diverse field.

Acknowledgments

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Editorial Commentary

This collaboration is a bright spot and an innovative solution for all residency programs during this pandemic and moving forward. This type of cooperation across the nation to unselfishly share information and educate all residents is one of the things that makes our specialty great. While this is not an innovative translational scientific paper it demonstrates real time trends in resident education due to the pandemic and describes a novel solution to the problem of educating our residents when we are not allowed to group or practice urology at normal levels. What is most exciting about this collaboration is that it will hopefully transform the way we educate residents and will continue so that small programs, busy clinical programs or

programs that lack talented teachers can still expose residents to the best lectures. This levels the playing field for residents because they are now exposed to a wider range of teachers, topics, lectures and potential mentors than ever before. More importantly, residents can view these lectures at the time of their choosing rather than trying to pay attention when they are tired, distracted or unprepared. In my opinion, this is the next step forward in resident education in urology.

Kirsten L. Greene
*University of Virginia
 Charlottesville, Virginia*