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Changing the Status Quo: Developing a Virtual Sub-Internship in the Era of COVID-19

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PROBLEM: Subinternships are integral to medical education as tools for teaching and assessing fourth-year medical students. Social distancing due to COVID-19 has precluded the ability to offer in-person subinternships — negatively impacting medical education and creating uncertainty surrounding the residency match. With no precedent for the development and implementation of virtual subinternships, the Society of Academic Urologists (SAU) developed an innovative and standardized curriculum for the Virtual Subinternship in Urology (vSIU).

METHODS: The vSIU committee’s mandate was to create a standardized curriculum for teaching foundational urology and assessing student performance. Thirty-three members from 23 institutions were divided into working groups and given 3 weeks to develop 10 modules based on urologic subspecialties, Accreditation Council for Graduate Medical Education core competencies, technical skills training and student assessment. Working groups were encouraged to develop innovative learning approaches. The final curriculum was assembled into the “vSIU Guidebook.”

RESULTS: The vSIU Guidebook contains 212 pages — 64 pages core content and 2 appendices (patient cases and evaluations). It outlines a detailed 4-week curriculum with a sufficient volume of resources to offer a completely adaptable virtual course with the same rigor as a traditional subinternship. Modules contain curated teaching resources including journal articles, lectures, surgical videos and simulated clinical scenarios. Innovative learning tools include reflective writing, mentorship guidelines, videoconference-based didactics, surgical simulcasting and virtual technical skills training. The guidebook was disseminated to program directors nationally.

NEXT STEPS: The vSIU is the first virtual subinternship in any specialty to be standardized and offered nationally, and it was implemented by at least 19 urology programs. This curriculum serves as a template for other specialties looking to develop virtual programs and feedback from educators and students will allow the curriculum to evolve. As the pandemic continues to challenge our paradigm, this rapid and innovative response exemplifies that the medical community will continue to meet the needs of an ever-changing educational landscape. (J Surg Ed 78:1544–1555. © 2021 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

ABBREVIATIONS: COVID-19, Coronavirus disease 2019 caused by SARS-CoV-2 virus AUA, American Urologic Association SAU, Society of Academic Urologists AAMC, American Association of Medical Colleges vSIU, Virtual Subinternship in Urology MS4, Fourth year medical student ACGME Accreditation Council for Graduate Medical Education PICS

KEY WORDS: Virtual Subinternships, Medical Education, Electives, Virtual Electives, COVID-19, Education During Pandemics, Virtual Education, Curriculum Development

COMPETENCIES: Professionalism, Interpersonal and Communication Skills, Practice-Based Learning and Improvement

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INTRODUCTION

The subinternship has long served as one of the cornerstones of medical education, especially within surgical specialties. Fourth-year medical student subinterns participate in an intensive experience over several weeks working closely with a team of resident and attending physicians in a specialty of their choice, either at their home institutions or at other institutions (so-called "away rotations"). Typically guided by the students’ future career interests, the subinternship aims to teach the students foundational knowledge and skills that will prepare them for the demanding experience of residency. Furthermore, the subinternship allows students to explore career options, to evaluate potential interest in a specific residency program, to prioritize geographic preferences, and to strengthen their residency applications with a letter of recommendation. Residency programs use subinternships to assess a student’s capabilities and potential to succeed as a resident, as well as to highlight the program’s unique strengths. By allowing students and programs to get to know each other, subinternships allow programs to better predict the performance of their future residents, serving as “auditions” to facilitate matching students with residency programs.1-4

The COVID-19 pandemic has fundamentally altered the landscape of medical education, with a particularly profound impact on away rotations. As a result of restrictions on travel, limitations on personal spacing, and other constraints imposed by the pandemic, the Coalition for Physician Accountability, a cross-organizational group whose members include the Association of American Medical Colleges and the Accreditation Council for Graduate Medical Education (ACGME), released recommendations that discouraged away rotations for the 2020-2021 academic year, with rare exceptions.5 The Coalition for Physician Accountability also recommended that all residency interviews be conducted virtually for the entire application cycle, further complicating the match process.6 In accordance with these recommendations, the Society of Academic Urologists (SAU) and American Urological Association (AUA) have canceled away urology subinternships almost universally across North American medical schools, except for those medical students who do not have a urology residency program at their home institution.

Visiting subinternships play a major role in surgical specialty education – with approximately 95% of urology applicants completing at least one away rotation (80% at least 2).7,8 Therefore, the disruption of away rotations has led to considerable concern among medical students and residency programs in the field of urology. A recent survey of 238 medical students planning to apply to urology residencies found that 82% reported decreased opportunities for exposure to urology.10 The majority of students in this study were “very concerned” that the lack of away rotations would make it more difficult to learn about different programs (73%) and would lead to fewer opportunities to obtain meaningful letters of recommendation (68%). This is also concern from the residency program perspective, as away rotations are among the most important considerations for urology program directors during the residency selection process.11,12

Virtual educational tools offer a potential solution to the loss of in-person away rotations. Although there is no way to fully replicate the experience of in-person medical and surgical education, there is a variety of virtual tools available that can achieve the majority of the objectives of an in-person subinternship. These include remote conferences, surgical videos, online modules, and “point-of-view” videos of clinical encounters.13 Indeed, the ability to teach foundational knowledge virtually has been established in a variety of health care settings,13 and it is conceivable that proper student performance assessment and evaluation of compatibility between students and programs can also be achieved virtually. Despite the challenges to medical education that the pandemic has presented, these objectives remain very important, and the audition aspect is perhaps made more essential by the lack of in-person residency interviews during this application cycle.

Foreseeing the inability to offer away subinternships early during the COVID-19 pandemic, the SAU and AUA investigated alternate approaches to meet the objectives of traditional away subinternships. The result was the innovative idea of creating “virtual subinternships,” which have yet to be described in the literature. With support from the Association of American Medical Colleges, the SAU formed a committee of academic urologists from across the country to develop a standardized curriculum for the first Virtual Sub-internship in Urology (vSIU). While virtual subinternships are unprecedented, particularly in a surgical specialty that emphasizes hands-on learning, this initiative has the potential to fill the void created by the loss of in-person subinternships and to serve as a model for other specialties hoping to develop similar programs. Further, this initiative offers new opportunities for virtual learning that will hopefully have a role in the future of medical education and will last beyond the pandemic era. In this paper, we describe the approach for developing the vSIU, the resulting vSIU guidebook, and the plans for implementation and future evaluation.

METHODS

The SAU and AUA explored options to continue educating fourth year medical students regarding foundational urologic knowledge structured around ACGME core
competencies and to develop an effective way to evaluate potential incoming residents. Given the inability to safely offer in-person away subinternships, and with the hope of meeting many of the same objectives met by in-person electives, the SAU and AUA decided to develop a standardized curriculum for the first virtual subinternship program (vSIU). Using this curriculum, individual programs would build their own versions of the vSIU that could allow them to teach students the foundations of urology, while simultaneously serving as a platform for students and programs to showcase their own strengths and evaluate one another as a potential match for residency. Objectives of the vSIU initiative were developed by group consensus of the SAU Executive Committee, consisting of 9 fellowship-trained academic urologists.

The objectives of the vSIU were 3-fold:

1. Create a virtual platform to aid in the education of medical students regarding foundational urologic knowledge structured around ACGME core competencies.15
2. Set a “guideline” for programs to decrease the burden of creating such materials de novo, while allowing individual programs freedom to express their unique personalities.
3. Provide a standardized approach to subinternship assessment, including the letter of recommendation, so that programs can have a consistent method of student evaluation.

With the support of the ACGME, the SAU Executive Committee used the structure of the ACGME core competencies as the framework for assembling the vSIU working group. The working group was constructed to have sub-committees dedicated to the 6 core competencies: Medical Knowledge (MK), Patient Care (PC), Professionalism (P), Interpersonal & Communication Skills (ICS), Practice-Based Learning & Improvement (PBLI), and Systems-Based Practice (SBP). The MK and PC competencies were divided into 5 sub-committees to encompass the major subspecialty areas in urology including Pediatrics and/or Embryology and/or Anatomy, Urolithiasis, Andrology, Oncology and/or Minimally Invasive Surgery, and Voiding Dysfunction. Three additional sub-committees were dedicated to the remaining core competencies of P/ICS (combined into a single sub-committee), PBLI, and SBP. Finally, 2 sub-committees were dedicated to Technical Skills Training (a component of PC) and Student Assessments.

The resulting working group consisted of 35 residency program directors and academic urologists who are experts in their subspecialties and are experienced medical educators. Individuals were assigned to sub-committees based on expertise and interests. The group first met on May 6, 2020, at which time sub-committees were instructed to create educational modules for their dedicated topics, thereby forming a curriculum of 10 modules (Table 1).

Modules were created using an iterative process over the course of the 4 weeks following the initial meeting of the working group. Sub-committees were given one week to create the first draft of the module, after which they presented their drafts to the entire working group for feedback and discussion. Following this presentation, sub-committees were given an additional 2 weeks to modify their modules, after which they again presented their modules to the working group. At this time, all modules were compiled into a shared online draft of the complete vSIU guidebook, which was available for further editing by the working group for one additional week. The guidebook integrated the modules into a 4-week schedule that also included virtual involvement in resident teaching, rounds, clinical sessions, and surgical simulcasts (Diagram 1).

To aid in module development, each sub-committee was given a guideline for module structure and content (Diagram 2). Each module had its own learning objectives, based on the ACGME Urology Milestones, which were created in 2013 and were recently updated.16,17 For knowledge-based modules, this incorporated content focused on MK (readings, didactic lectures, high-impact articles) and PC (surgical videos and simulated patient cases/scenarios). Core competencies, skills, and assessments modules were left at the discretion of the sub-committees but generally contained a combination of readings, videos, validated external resources/modules and contemplations. Creativity was encouraged — for example, our SBP sub-committee put together narrated presentations reviewing nuances of the practice of urology and the American healthcare system in detail, which will be available through the SAU website and

| Knowledge-Based Modules | Core Competencies, Skills & Assessments |
|--------------------------|----------------------------------------|
| Pediatrics/Embryology/Anatomy/Urolithiasis | Practice-Based Learning and Improvement (PBLI) |
| Andrology | Professionalism, Interpersonal and Communication Skills (PICS) |
| Oncology/Minimally Invasive Surgery | Systems-Based Practice (SBP) |
| Voiding Dysfunction | Technical Skills Training |

We suggest similar breakdowns of modules when a virtual internship is being developed for any specialty.
can be adapted for almost any specialty. Similarly, the PICS and PBLI sub-committees curated free, readily available and high-quality resources, videos and modules that are valuable to all medical trainees for teaching skills such as proper hand-offs, implicit bias, self-reflection, and evidence-based medicine (Diagram 3).

Development of these modules required each expert sub-committee take a coordinated approach to thoroughly review the literature and available resources. Two modules in particular posed a unique challenge to transition virtually: Technical Skills Training and Student Assessments. The concept of evaluating technical skills for resident selection has been previously explored by the SAU and other surgical specialties. There has been significant success incorporating surgical simulation, procedural skills training and even some skills competition in pre-clinical years of medical school, but these have not been done virtually and students will be coming into subinternships with very different past experiences. The ability to practice skills such as suturing has been shown to improve medical student comfort in clinical situations, and we felt it a key part of a surgical rotation that students have the opportunity to improve technical skills. Although the lack of in-person teaching could be perceived as a challenge, studies have shown that video feedback is effective in the development of basic surgical skills, such as suturing.

Rather than redeveloping our own videos and modules, we decided to incorporate the Surgery Resident Skills Curriculum and the Medical Student Simulation-Based Surgical Skills Curriculum, which were developed and validated by the American College of Surgeon (ACS),
the Association of Program Directors in Surgery (APDS), and the Association for Surgical Education (ASE). These surgical modules were developed over a few years following a thorough needs assessment. They have validated evaluation and scoring methods and have been used by general surgery programs, however, not in a virtual setting. All modules at the medical student and junior resident level were reviewed by the vSIU technical skills sub-committee. The sub-committee selected 5 modules from the ACS and/or ASE curriculum for medical students (digital rectal exam, female pelvic exam, male groin and genital exam, surgical drains/care and removal, and wounds – basic principles), as well as 3 modules from the ACS and/or APDS curriculum for residents (knot tying, suturing, urethral catheterization) based on their relevance to urology residency. These 8 modules were included as part of the vSIU “Technical Skills Training” module. With videoconferencing platforms being used for teaching, interviews, and clinical teaching during the pandemic, these same platforms could be used for live expert instruction, evaluation and feedback.

The final challenge was tools and material acquisition for medical students to have the means of practicing. A simple internet search yields several surgical skills training options (i.e., Sim*Suture, Sim-Vivo, Willsboro, NY) at moderate prices of $50 USD or less which could be purchased by the students directly or by the program. Alternatively, the ACS website does describe using a penrose drain and home-made kit. The vSIU Technical Skills Training module is summarized in Diagram 4.

The second module that was challenging and required significant innovation was the Student Assessments module. Several competencies are considered important in selection of surgical residents, including communication, leadership, judgement, professionalism, integrity and resilience. Although at least 2 of the modules (PICS and PBLI) focused on developing these skills, we anticipated that it would be difficult to evaluate medical students in these domains without in-person clinical interaction. Our group of educational experts, mostly current or previous residency program directors, put together assessments that are meant to give a standardized approach to evaluating medical students based on these competencies and medical knowledge through 4 assessment tools: Reflective Writing Assessment, Grand Rounds Presentation Assessment, Patient Encounter Evaluation, and Surgical Case/Video Preparedness Assessment (for case simulcasting and surgical videos) (Diagram 5). Furthermore, a standardized “Letter of Recommendation of Virtual Subinterns” was developed. These, along with the ACS technical skills evaluations, can be incorporated into a single evaluation package for medical students.
Core Competencies, Skills & Assessments Modules

| Systems-Based Practice (SBP) |
|-------------------------------|
| I. Healthcare System, Organized Urology and Leadership |
| II. Workforce and Population Health |
| III. Quality and Patient Safety |
| IV. Healthcare Finance and Operations |

| Professionalism, Interpersonal & Communication Skills (PICS) |
|-------------------------------------------------------------|
| Communication Skills                                       |
| • ‘TeamSTEPPS’ modules                                      |
| • ‘Vital Talk’ videos                                       |
| • AUA Core Curriculum on Communication Skills and Ethics    |
| Feedback                                                    |
| • ‘ADAPT’ Model training                                   |
| Effective Handoffs                                          |
| • ‘iPass’ videos                                            |
| Implicit Bias Modules                                       |
| • AAMC Implicit Bias Module                                |
| Situational Judgement                                       |
| • University of Minnesota Healthcare Professionalism Situational Judgement Assessment |

| Practice-Based Learning and Improvement (PBLI) |
|-----------------------------------------------|
| Self-Reflection                               |
| Incorporating Feedback into Clinical Practice |
| Evidence-based Medicine                       |
| • Grand Rounds                               |
| • Journal Clubs                              |
| Educating: Subintern as a Teacher             |

DIAGRAM 3. Core competencies, skills & assessments modules can be easily adapted for any specialty, as they are broadly applicable any health care system and medical skill set. They establish a framework for similar programs to be developed for other health care systems and medical education competencies in other countries.

OUTCOME

With the guidance of the SAU and AUA, our distinguished group of 33 urologists from across the country developed the 212-page “Virtual Subinternship in Urology Guidebook” for urology programs over a one month period. This manual contains a thorough collection of resources, links, agendas, evaluations and objectives that can be used by any program to tailor an institution-specific virtual subinternship with minimal effort, without having to invest the significant labor required from faculty and educators. This national collaboration of experts allows virtual subinterns to get exposure to topics and expertise they might not have through traditional subinternships, while simultaneously lightening the huge burden of curriculum development on residency programs. The vSIU guidebook was distributed via email to all 142 SAU member programs on June 3, 2020 — 4 weeks after the initial working group meeting. Further minor modifications were made based on feedback from the community, and a second version was distributed one month later. The SAU working group held webinars for program directors and medical students to present the final guidebook and to discuss the vSIU initiative.

The guidebook contains a detailed 4-week curriculum that can be adapted to shorter timeframes at the discretion of individual programs (Diagram 1). With the volume of resources available, this guidebook is designed to allow programs to offer a complete virtual course of the same duration and rigor as a traditional subinternship. Each knowledge-based module contains recommended reading, links to pre-recorded lectures, links to surgical videos, cases for simulated clinical encounters, and a curated selection of seminal articles in the field. The core competency modules contain instructions for interactive exercises, as well as links to pre-existing and original resources related to that competency.
In the guidebook, the 5 knowledge-based modules (Pediatrics/Embryology/Anatomy, Urolithiasis, Andrology, Oncology/Minimally Invasive Surgery, and Voiding Dysfunction) included a total of 45 links to recorded lectures, 49 links to surgical videos, 29 original simulated patient scenarios, and 109 peer-reviewed articles - in addition to a selection of chapters from the AUA core curriculum and a variety of society guidelines. Modules are organized into sub-categories such that programs can easily scan this large volume of resources to find the ones that meet their specific needs. For example, the Oncology and/or Minimally Invasive Surgery module has subcategories on prostate cancer, kidney cancer, bladder cancer, testicular cancer, and upper tract urothelial cancer. Similarly, the Voiding Dysfunction module has subcategories on benign prostatic hyperplasia, urodynamics, neurogenic bladder, stress urinary incontinence, overactive bladder, pelvic organ prolapse, genitourinary fistula, urethral diverticulum, gender affirmation, infections, bladder pain syndrome, and

| Diagram 4. Technical Skills Training module summary with instructions for video conferencing, scheduling, independent learning and suggested materials. Medical students should have baseline and final evaluations to aid their self-evaluation of improvement.

- **Suggested Schedule:**
  - **Week 1 – Virtual Expert Instruction and Assessment‡**
    - 60-90 minute session; possibly recorded
    - Experts could be senior residents or faculty
    - Experts should prepare by watching ACS modules (below)
    - Expert demonstration
    - Baseline Skills Assessment – 2 attempts
      - Knot tying
      - Suturing
      - Scoring sheet from ACS Curriculum
    - Expert ‘Tips and Tricks’
  - **Weeks 2/3 – ACS Modules (Independent Learning) and Skills Practice**
  - **Week 4 – Virtual Expert Assessment‡**
    - Skills Assessment – 1 attempt
      - Knot tying (3 types)
      - Suturing (3 types)

- **ACS Modules Selected*:**
  - **Medical Student Modules – Year 1**
    - Digital Rectal Exam (Module 5)
    - Female Pelvic Exam (Module 6)
    - Male Genital Exam (Module 7)
  - **Medical Student Modules – Year 2**
    - Surgical drains – care and removal (Module 7)
    - Wounds – Basic Principles (Module 8)
  - **Resident Modules –**
    - Knot Tying (Module 2)
      - Two-handed square knot
      - One-handed square knot
      - Instrument tie
    - Suturing (Module 3)
      - Simple interrupted
      - Horizontal mattress
      - Vertical mattress
    - Urethral Catheterization (Module 6)

- **Equipment needed‡:**
  - **Homemade kits** –
    - 3/4 or 1-inch penrose drains with inked targets – hospital or online
    - 30 cm of 3-0 undyed polysorb suture on tapered needle
  - **Forceps**
  - **Needle driver**
  - **Suture scissor**
  - **Timer**

\*Validated ACS Assessments are available for these skills
\*Modules here based on urologic skills – should differ based on specialty
\‡Suturing kits could be provided by programs or purchased online (i.e. SimSuture by SimVivo)
female sexual dysfunction. The lectures and articles are intended to fulfill the core competency of Medical Knowledge, while the videos and scenarios are intended to fulfill the core competency of Patient Care.

The 3 core competency based modules (PICS, PBLI, and SBP) are intended to ensure a well-rounded educational experience that includes skills and abilities not limited to urology. The PICS module includes resources dedicated to 6 subtopics within these competencies: communication, feedback, handoffs, implicit bias, situational judgment, and professionalism. The PBLI module is divided into subtopics of self-reflection, feedback, evidence-based medicine, and education. For each subtopic, there are informative resources and instructions for interactive exercises that can be done with the students. The SBP module includes 4 original narrated presentations reviewing healthcare systems, population health, quality and/or patient safety, and healthcare finance and/or operations.

The 2 remaining modules were Technical Skills Training and Student Assessments. The Technical Skills Training module includes 5 clinical and 2 surgical modules from the ACS and/or APDS Surgery Resident Skill Curriculum (Diagram 4). Students are encouraged to create a free online ACS account and to complete the surgical modules of knot tying and suturing, with expert instruction and assessment using video conferencing. They may also complete clinical modules on the digital rectal exam, female pelvic exam, male genital exam, surgical drains, and wounds, though technical application of these clinical skills will not be possible in the virtual subinternship. The Student Assessments module includes a Reflective Writing Assessment, a Grand Rounds Presentation Assessment, a Patient Encounter Evaluation, a Surgical Case and/or Video Preparedness Assessment, and a standardized LOR. These standardized tools may be completed by each program as part of the subinternship. They can help decrease bias in student evaluation and will hopefully allow for a thorough and fair assessment of students that can be part of their residency applications (Diagram 5).
Through social media and well-attended webinars, we were able to accumulate significant interest from the urologic and medical education community. Nineteen programs across the country implemented the vSIU at their institutions and registered them with the SAU, and there were likely other programs that implemented the vSIU independently. In addition to local program feedback, the vSIU will have a centralized evaluation and feedback process for both educators and students which will be administered on a national level through the SAU. The evaluation process will consist of questionnaires assessing curriculum variation, satisfaction, learning outcomes, barriers to implementation, and reusability from the perspectives of students and program directors. This evaluation is ongoing, and outcomes will be published separately.

DISCUSSION

The concept of a virtual subinternship, particularly in a surgical specialty, is unprecedented. To our knowledge, the vSIU is the first of its kind in any field of medicine. By standardizing and disseminating the vSIU, the SAU has facilitated its rapid implementation nationwide.

We expedited institutional access to our guidebook, and the vSIU was implemented by at least 19 institutions across the country (13% of all SAU member institutions), starting as early as July 2020 and continuing through October 2020. There were likely additional programs that implemented the vSIU without registering with the SAU, so the exact number of programs offering the vSIU is unknown. Given the novelty of this approach to subinternships, evaluation and feedback of the vSIU will be key in the adoption of future virtual subinternships. We will evaluate each component of the curriculum from a learner, educator and institutional perspective. This feedback will be used to improve the vSIU and hopefully develop virtual subinternships in other specialties. The results of our curriculum assessment will be included in a future publication. Furthermore, the ultimate goal of this initiative is to improve patient care by better preparing these students for residency. To that end, resident proficiency metrics such as in-service exam scores and ACGME Milestones can be evaluated in the future.

We believe that this novel approach to teaching surgical skills and medical knowledge, as well as providing standardized assessments and LOR, are essential during the pandemic and will likely become a standard component of medical and surgical education in post-pandemic world. Virtual subinternships will allow more students access to high-quality expert-curated content while decreasing administrative and financial challenges—both to the program as well as the students. Indeed, the entire process of away rotations has been called into question recently, due to excessive cost and concerns of financial and regional biases. The average cost of doing a single away rotation has been estimated at almost $1,000, adding to the already significant financial burden of medical school and residency applications. The virtual subinternships may allow programs and students to achieve many of the same goals of education, evaluation, and auditioning, while minimizing expense and bias.

The vSIU will certainly have its limitations, as well. Most notably, virtual subinternships lack hands-on involvement in the operating room, which is an essential component of surgical education. This deficit may have a negative impact on student growth and on proper performance assessment. Since the vast majority of technical surgical training occurs during residency, rather than subinternship, we believe students will be able to compensate quickly for the decrease in operative exposure. Additionally, virtual subinternships can counteract this by offering an expanded didactic curriculum to give students a better understanding of the fundamentals of the field. Further study on student learning outcomes and program perspectives will elucidate the extent to which the lack of hands-on experience detracted from learning and assessment during the vSIU. Another important limitation of the virtual format is the challenge for students and programs to get to know one another. The process of learning about a program’s culture and examining whether a student and program are compatible typically relies, in part, on informal unscheduled workplace interactions. While the vSIU can provide an effective platform for scheduled discussion, these casual conversations may be less frequent.

Despite these limitations, virtual subinternships have potential to improve medical student education on a large scale. In order to help programs develop these courses, we feel that centralized guidance is important. We created the vSIU guidebook in order to offer structure and standardization to ensure a high-quality educational experience, while simultaneously leaving space for flexibility on the part of each program. As a centralized resource, it can easily and conveniently be updated, allowing it to remain current for years to come. In developing a standardized experience, we acknowledge the potential to create too much uniformity and detract from the individuality of each institution. The process for programs to build a virtual elective is very labor-intensive, and the guidebook was intended as a resource to provide a framework and lighten that burden. It was not intended to be used as a “cookie-cutter” course, and we were explicit that the guidebook should not limit local program creativity. We would advise other fields employing similar standardization efforts to emphasize...
the importance of local program autonomy in order to develop a meaningful and rich educational experience.

Although much of our content is specific to urology, the curriculum’s framework is generalizable to all specialties. We structured the course based on the ACGME core competencies, with the goal of preparing medical students for residency. Much of the content in the core competencies, skills, and assessments modules can be directly applied to subinternships in any field of medicine, and the structure of the knowledge-based modules can be easily adapted for any specialty. With the majority of surgical subinternships currently lacking a unifying curriculum, the framework provided by the vSIU can help improve the breadth and depth of learning.32

Virtual subinternships allow expanded medical student access to high-quality education. With a standardized, accessible, and expertly-curated curriculum, we anticipate that this guidebook can serve as a template for urology programs in the United States and worldwide, as well as for educators in other fields to build similar programs. Due to the limitations of the traditional subinternship process, we believe that the virtual subinternship will become a foundational part of urologic education moving forward, and we hope it will be adapted by other medical and surgical fields.

CONCLUSION

The vSIU is a novel initiative to maintain high-quality medical student urologic education despite the disruption caused by the COVID-19 pandemic. Produced by a national collaboration of experts, the vSIU guidebook facilitates the implementation of this virtual course, ensuring medical student exposure to important topics in urology and lightening the burden of curriculum development from residency programs. Virtual subinternships have tremendous potential to expand access to education for medical students, and could easily be adopted by all fields in medicine.

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