The current landscape of urological undergraduate education in Canada

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Abstract

Introduction: Urological presentations are commonly seen in primary care and urologists are concerned that educational gaps exist in undergraduate curricula in Canadian medical schools. A pan-Canadian survey of undergraduate urology education directors (UUEDs) was used to determine the current status of undergraduate urology education in Canada.

Methods: In the fall of 2018, a survey was administered to all 17 UUEDs representing every Canadian medical school. The survey assessed multiple factors, including the timing and duration of urologist-led instruction, the perceived adequacy of urological content in the curriculum, and the level of preparedness of graduating students.

Results: The response rate was 100%. Variation in the duration (mean total instructional hours: 22.5±17.2 [5–75] hours) and timing of formal urological instruction was seen. The majority of schools covered core content areas, however, erectile dysfunction, urotrauma, and pediatric urology topics were under-represented. One school had a mandatory urology clerkship rotation (one week), while the other 16 schools offered a selective, with 24.3% of students completing this experience. The majority of UUEDs (64.7%) believed the curricular time devoted to urology was inadequate, 29.4% felt that their graduates were unprepared to diagnose and treat common urological problems, and 76.5% strongly agreed or agreed that a national urology curriculum would be useful.

Conclusions: There was significant variability in the duration of instruction and delivery of urological topics in Canadian medical schools. There was a perceived need for more urological instruction by most UUEDs, who welcomed a more standardized national curriculum as a strategy to address this need.

Introduction

Although curriculum design and delivery varies between medical schools, there is an expectation and assumption that all Canadian medical schools cover core medical content to a similar degree. Unfortunately, there is limited data available to compare the different Canadian medical schools on the quality and quantity of instruction in the formal curricula, including for urology. In the U.S., there has been a steady decline in undergraduate urological education since the 1950s,[1] with studies demonstrating marked variability in total instructional time and clinical exposure in medical school.[1-3] It is presumed that the Canadian trajectory is similar to the American experience. Given this decline, students have less exposure to urology, potentially leading to gaps in their medical expert knowledge, clinical skills, and comfort in dealing with patients presenting with urological conditions.[1,4,5] Decreasing urology exposure in the undergraduate curriculum may negatively impact the quality and appropriateness of referrals to urologists, leading to higher healthcare costs and wait times for specialist consultation.[2] Additionally, Kin and colleagues have shown that in the Canadian context, exposure to urology was the most important factor associated with medical student's positive perception of the specialty, which plays a role in student recruitment to the field and dispelling misperceptions of the specialty.[6]

Given the aging Canadian population and high prevalence of urological conditions presenting to primary care physicians, there is a strong argument to provide adequate undergraduate urological education to medical students. As Canada's population continues to age, there will be more patients with urological symptoms and conditions presenting to primary care physicians.[7,8] Currently, there is limited Canadian data on the proportion of patients with urological symptoms and diagnoses presenting to primary care physicians, however, data from the U.K. suggests that up to 5–10% of patients present to primary care physicians with issues that are urological in

origin.[9] Therefore, though there is limited data on the burden of urological disease presenting to primary care practitioners in Canada, there is a significant overall prevalence of urological conditions, and this is anticipated to increase over time with the aging population.

The goal of the undergraduate medical curriculum is to graduate undifferentiated medical doctors who can recognize and manage common and life-threatening conditions pertaining to all body systems. It is expected that all graduating medical students will successfully complete the Medical Council of Canada Qualifying Examination Part 1 (MCCQE1) prior to commencing their residency. The MCCQE1 is a mandatory, high-stakes examination that evaluates the preparedness of medical students to approach the undifferentiated patient with multiple presentations, including a number of different urological presentations. In 2018, approximately 40% of Canadian medical school graduates matched to a family medicine residency[10] and this group of learners will rely heavily on the basic urological knowledge and skills they learned in their undergraduate studies for their entire careers. Despite the need for urological instruction and exposure in the undergraduate curriculum, there is currently no literature that assesses the formal undergraduate urological curriculum in Canadian medical schools. The purpose of this study is to inform medical educators and administrators about the current undergraduate urology education landscape in Canada, with the goal of using this data to address future curriculum developments in Canadian medical schools. These future curriculum developments may include using a national undergraduate urological curriculum that has already been designed by the Canadian Undergraduate Urology Curriculum Committee (CanUUCC).

Methods

A structured English electronic survey was administered to the undergraduate urology education directors (UUED) of all 17 Canadian medical schools (both anglophone and francophone) via SurveyMonkey®. The survey was designed by a urologist with training in medical education research design, using best practices in educational survey design.[11] The survey respondents from francophone medical schools were all bilingual and did not require a French version of the survey. The survey was sent with instructions for the UUEDs to only report on curricular elements that were under their purview, constituting the formal urological undergraduate curriculum. The survey opened on October 21, 2018 and the last response was collected on December 9, 2018. The survey assessed multiple factors, including hours of instruction, urological topics covered in the curriculum, use of standardized patients (SPs) to teach male rectal and genital examinations, amount of urological exposure during clerkship, adequacy of content, and the preparedness of graduating students to diagnose and treat common urological conditions (see Appendix, available at *cuaj.ca*, for the entire survey). The MCCQE1 medical expert objectives[12] were primarily used to populate the undergraduate urology topic areas included in the survey and the list of topics was also reviewed by undergraduate urology educators (from both anglophone and francophone schools) from CanUUCC prior to survey distribution.

To determine if the presence of a urology residency program had an effect on the total number of instructional hours, the average total number of hours of urological instruction was compared between schools with a five-year post-graduate urology residency program (n=12) and those without a urology residency program (n=5). Additionally, the mean number of instructional hours was compared between schools where UUEDs perceived their graduating students to be 'somewhat prepared' or 'prepared' to diagnose and treat common urological conditions (n=12) vs. schools where the UUEDs perceived their graduating students to be 'unprepared' for such tasks (n=5).

Results

All 17 UUEDs completed the survey, yielding a response rate of 100%. There was considerable variation in the duration (mean total duration: 22.5±17.2 [5–75] hours) of urological instruction and timing of when urological topics were taught in the formal urological curriculum (Fig. 1). Fifteen schools have a structured urology pre-clerkship curriculum, with a mean duration of 9.5±6.1 (2–27) hours of pre-clerkship lectures and 5.6±6.0 (0–24) hours of pre-clerkship small-group instruction. In clerkship, the mean duration of lectures is 3.8±3.9 (0–15) hours and the mean duration of small-group instruction is 3.5±5.8 (0–24) hours. All Canadian schools covered the following five topics at least once in their curriculum: hematuria, lower urinary tract symptoms (LUTS), urinary tract obstruction, urolithiasis, and instruction on the male genitourinary examination. Three topics were underrepresented in the curriculum, with only a minority of schools reporting it being taught in the formal urological curriculum: erectile dysfunction (29.4%), uro-trauma (35.3%), and pediatric urology (41.2%). One school surveyed had a mandatory one-week urology clerkship rotation, while the remaining 16 schools offered a urology selective (median two weeks) for students to participate in. In schools that offered the selective, 24.3% (5–50%) of students completed this experience. For urological clinical skills teaching, more than half of schools (64.7%) used SPs to teach male rectal and genital examinations. Most UUEDs (64.7%) believed the curricular time devoted to urology was inadequate (Fig. 2) and approximately one-third (29.4%) felt that their graduates were unprepared to diagnose and treat common urological problems (Fig. 3). Furthermore, 76.5% of the UUEDs 'strongly agreed or agreed'

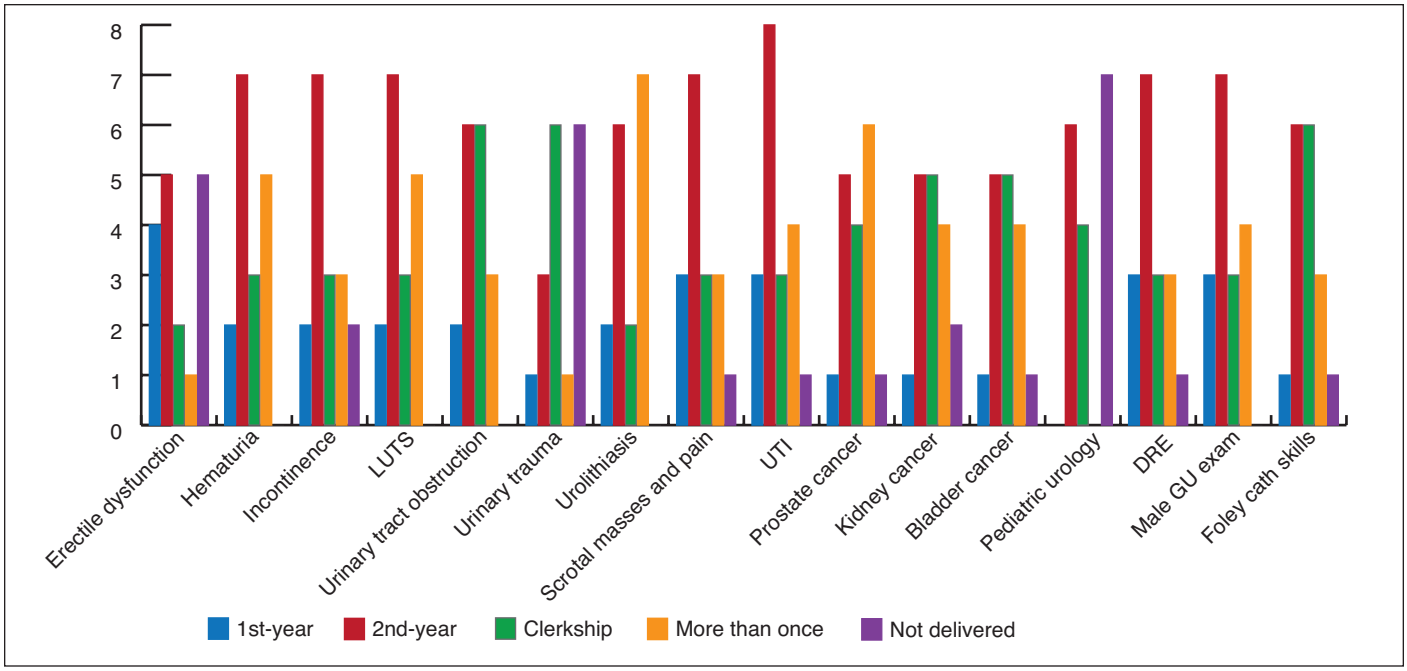

Fig. 1. Areas of urology covered and timing of delivery in the undergraduate curricula in Canadian medical schools (n=17). DRE: digital rectal exam; GU: genitourinary; LUTS: lower urinary tract symptoms; UTI: urinary tract infection.

that a national urology curriculum would be a useful educational resource at their school (Fig. 4).

The comparison of schools with and without a five-year post-graduate urology training program demonstrated the total number of urology instructional hours to be higher in schools with a residency program (mean of 26.4 hours) compared to schools without one (mean of 18.4 hours). Additionally, schools where the UUEDs felt graduating students were either 'somewhat prepared' or 'prepared' to diagnose and treat common urological conditions had more formal urological instructional hours (mean of 26.2 hours) compared to schools where the UUEDs felt graduating students were 'unprepared' (means of 13.6 hours). Given the small sample sizes, we did not have sufficient power to perform inferential statistics to compare groups.

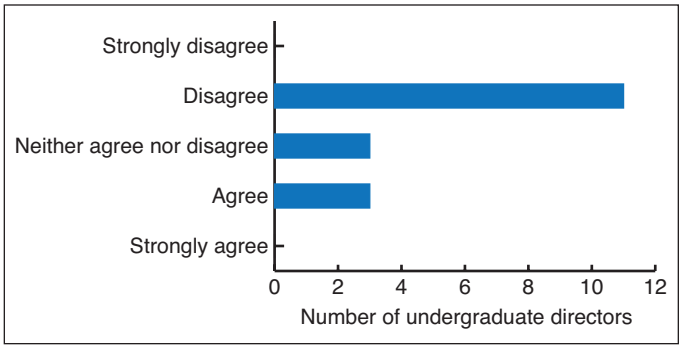

Fig. 2. Response of undergraduate urology program directors (n=17) to the survey question, "Do you feel the amount of urological content in the undergraduate curriculum is adequate at your university?"

Discussion

The purpose of this study was to assess the current landscape of urological undergraduate education in Canada under the purview of the UUEDs and to determine whether a formally designed national curriculum would be beneficial to address any educational heterogeneity between programs. It was hypothesized that there would be significant variation in the amount of urological instruction between schools and that students from schools with a formal residency program would have more exposure to the discipline. The results showed that every medical school in Canada had some degree of formal urological content in their existing curricula, but there was extensive variation in the amount and timing of urological instruction and the availability of clinical

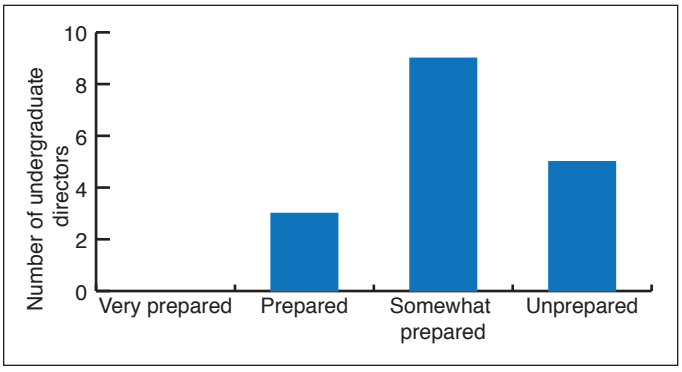

Fig. 3. Response of undergraduate urology program directors (n=17) to the survey question, "Based on your school's overall curriculum, how prepared do you think your average graduating student is to diagnose and treat common urological conditions?"

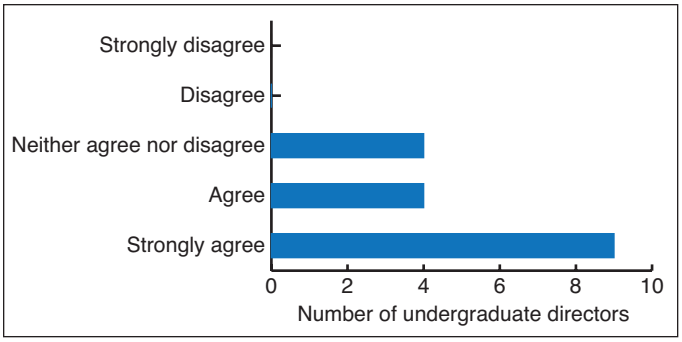

Fig. 4. Response of undergraduate urology program directors (n=17) to the survey question, "Do you feel a nationally developed undergraduate curriculum would be useful at your school?"

experiences in Canadian medical schools. On average, the presence of a urology post-graduate training program does translate to more formal urology exposure to undergraduate medical students. This study did not address specific reasons for this, however one could hypothesize that schools with a post-graduate training program have more available undergraduate teachers, may have more subspecialists to deliver lectures on a greater number of urology topics, and potentially have more influence on decisions regarding the amount of formal urology instruction in the undergraduate curriculum. As would be expected, schools where the UUEDs felt that their graduating students were more prepared had more formal instructional hours in urology on average compared to those schools were the UUEDs felt that their students were unprepared. This trend speaks to the importance of instructional hours on graduating student preparedness, especially in a clinical area with limited exposure in the undergraduate curriculum.

Although there was significant curricular heterogeneity identified in this study, it was reassuring to see some topics being universally covered by all schools. Hematuria, LUTS, urinary tract obstruction, urolithiasis, and instruction on the male genitourinary examination were taught to all Canadian medical students in the formal urological curriculum. There is significant overlap between these five universally covered topics and they align with the top six urological topics that came out of Kerfoot and Turek educational needs assessment for undergraduate medical students in the U.S.[13] Conversely, the minority of Canadian medical schools included erectile dysfunction, uro-trauma, and pediatric urology topics, which speaks to a potential curricular gap. Given that the study was assessing the educational activities under the purview of the UUEDs, more study is required to determine if the duration of instructional time in the formal urological curriculum is an appropriate surrogate for the amount of total urological training students are actually receiving, by either urologists or others.

There is concern that urology and the clinical skills that have traditionally been taught by urologists have been de-emphasized in undergraduate medical education over time, leading to potential negative consequences for future physicians and their patients. A recent review of undergraduate urology curricula from around the world paints a concerning picture in regards to the current state of undergraduate urology instruction, with the majority of medical students having no or insufficient clinical exposure in urology and very few schools emphasizing urology clinical skill training and assessment.[14] Additionally, a survey of 41 accredited American medical schools found that 48% of surveyed schools had no urology lectures or coursework in pre-clerkship and a variable urology clinical experience in clerkship;[3] a similar survey from the U.K. found that 63% of surveyed schools did not have specific urology content in the core medical school curriculum.[2]

In the Canadian context, Nensi and Chande raised concerns about the lack of quantity and quality of education regarding digital rectal examination (DRE) instruction, with a call for more opportunities for students to obtain the necessary experience performing DREs in medical school.[15] If undergraduate medical students do not obtain competency in fundamental knowledge and skills by the time they begin residency, it can affect their future clinical confidence and ability to perform the task in future practice. A study of Quebec family medicine residents found that 33% of survey respondents had never received direct supervision or teaching of a rectal examination and only 25% received this training in medical school.[16] More than half of the residents, 71%, had issues accurately assessing DRE findings on at least one occasion and 84% had omitted the examination even when they knew it was indicated. Although most omitted the examination due to patient refusal, approximately 25% responded they omitted the exam due to lack of confidence, discomfort with doing the examination, or relying on their supervisor to do the examination instead of them. Additionally, several Canadian studies on primary care have revealed that there is often uncertainty among primary care providers on determining appropriate therapy and need for referral to a urologist for common urological presentations, such as benign prostatic hyperplasia, prostatitis, and hematuria.[17-19] These findings, coupled with the large proportion of new medical graduates entering family practice, reiterate the importance of providing adequate urological instruction during medical school in order to provide a solid foundation for further learning and mastery in residency and clinical practice.

Based on the findings of this study, the majority of UUEDs felt that the amount of urological content in the current curricula was inadequate. Previous Canadian studies assessing the perception of graduating medical students to the adequacy of their undergraduate experience in urology demonstrated over 25% of students in both Manitoba[20] and British Columbia[21] felt the curriculum was inadequate. Given these findings, there is a strong rationale to support

the ongoing development of a unified Canadian undergraduate urology curriculum, similar to the American Urological Association's Medical Student Curriculum.[22] CanUUCC is a national body that has been working since 2011 to create a uniquely Canadian undergraduate urology resource for medical students. Over time, CanUUCC has created a multifaceted online curriculum with both descriptive PowerPoint presentations and podcasts that covers 10 important topics in urology at the level of the undergraduate medical student, including: benign prostatic hyperplasia, prostate cancer, urinary tract infection, hematuria, urinary incontinence, pediatric urology topics, uro-trauma, urolithiasis, erectile dysfunction, and scrotal conditions. Additionally, two instructional videos on how to insert a urethral catheter and how to perform a genitourinary examination are provided on the web-based platform. The content is available in both English and French. CanUUCC has recently incorporated self-assessment of knowledge into the platform as well. CanUUCC wants to disseminate further awareness of this free online resource nationally, so medical students can easily access reliable information to supplement their urological foundational knowledge. By having CanUUCC available to provide this important resource, medical schools would not have to sacrifice more precious curricular time to provide instruction but could use in-class time to focus on applied cases or on acquisition of hands-on urological clinical exam skills. Importantly, this unified curriculum would also ensure that all medical students across the country have access to a comprehensive and comparable urological educational experience, which currently is not the case in the Canadian context.

Limitations

This study has important limitations that must be kept in mind when making conclusion of the data presented. While this study reviewed formal urological education under the purview of the UUEDs, it did not investigate whether urological topics may have been covered formally or informally by other disciplines, such as obstetrics and gynecology, family medicine, emergency medicine, general surgery, and pediatrics. Therefore, the amount of urological content in the overall undergraduate medicine curriculum was likely underestimated by the UUEDs. According to Kerfoot and colleagues, there is insufficient evidence that the urological education students receive from non-urologists is inferior to that taught by urologists for common urological conditions.[1] Therefore, for those schools with less formalized urological education, students may have in fact received adequate exposure to urological concepts by non-urologists, which the UUEDs did not account for. More research is required to answer this important question broadly in Canada, potentially by surveying learners specifically on their urological exposure in their undergraduate curriculum. Additionally, the survey responses by the UUEDs are subject to both selection bias and response bias, which may have skewed the results towards a greater perceived need for more extensive urology education in medical schools compared to non-urologists. Including the perspectives of current medical students and residents in regard to their self-identified comfort with urological presentations and perspectives of other non-urologists that treat and teach about urological conditions would have strengthened the study. Lastly, the survey question on the overall level of preparedness of graduating medical students to diagnose and treat common urological conditions may have been interpreted in multiple ways by the UUEDs. The definition of 'preparedness' may have been interpreted as the ability of the student to pass the urology questions on the MCCQE1 or the student's ability to be competent in their approach to patients with urological issues as a future first-year resident. New medical school graduates would have been the best population to survey to answer this question, however, this study did not survey new graduates. Results of a pan-Canadian survey of family medicine residents regarding their deficits in urological knowledge and skills have recently been published by Redmond and colleagues,[23] and their findings do echo the concerns of our country's undergraduate urology education leaders regarding the lack of preparedness of our graduates, giving some validation to this study's findings.

Despite these limitations, this study provides important data that assesses national trends in undergraduate urological education that have never been published previously and speaks to the value of a formal national urology undergraduate curriculum, such as the one that has been designed and consistently updated by CanUUCC.

Conclusions

There is significant variability in the content and delivery of formal undergraduate urology education in Canadian medical schools. Although some topic areas are covered universally by all medical schools, undergraduate urology education leaders across Canada are concerned that their school's current urology curriculum is insufficient. Supporting an easily-accessible, online, national undergraduate urology curriculum that works in tandem with the formal undergraduate urology curriculum could help bridge this potential curricular gap, with the goal of preparing graduating medical students to confidently diagnose and manage a variety of urological patient presentations in their future careers.

Competing interests: Dr. Bhojani has been an advisory board member for Boston Scientific; a speaker for Procept; and participated in the WATER II trial supported by Procept. Dr. Rourke has been an advisory board member for Boston Scientific; is a shareholder of Boston Scientific; and has participated in clinical trials supported by Red Leaf Medical. The remaining authors report no competing personal or financial interests related to this work.

This paper has been peer-reviewed

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