

Deficits in urological knowledge and skills among family medicine residents in Canada

Elaine J. Redmond MD¹; Sahar Saleem, MD¹; Trustin S. Domes, MD²; Keith F. Rourke, MD¹

¹Division of Urology, Department of Surgery, University of Alberta, Edmonton, AB, Canada; ²Division of Urology, University of Saskatchewan, Saskatoon, SK, Canada

Cite as: Redmond EJ, Saleem S, Domes TS, et al. Deficits in urological knowledge and skills among family medicine residents in Canada. *Can Urol Assoc J* 2020;14(12):E631-5. <http://dx.doi.org/10.5489/cuaj.6428>

Published online June 16, 2020

Appendix available at cuaj.ca

Abstract

Introduction: The last 10–15 years has seen a decline in formal undergraduate urological education throughout Canada. Given the large volume of urological presentations in family practice, trainees need to acquire the requisite urological knowledge and skills to serve their patients. The objective of this study is to determine the perceived level of urological knowledge and skills among Canadian family medicine residents.

Methods: A 15-item, anonymous, online survey was distributed via email to all Canadian family medicine program directors from September to December 2018 and distributed to their residents. The survey obtained data on demographics, training, undergraduate urology experience, self-reported proficiency in interpreting urological investigations, performing common urological procedures, and managing common urological conditions. Descriptive statistics were used to summarize data.

Results: The questionnaire was completed by 142 family medicine residents with representation from Western Canada (27.5%), Ontario (32.4%), and Quebec (40.1%); 39.4% of respondents had completed a urology rotation during medical school and only 29.1% felt that their medical training prepared them for the urological aspects of family medicine. Although the majority of respondents felt proficient in performing a digital rectal examination (58.5%) or managing urinary tract infections (97.9%), only a minority felt competent in performing male genitourinary examination (40.1%), uncomplicated male (34.5%), female (45.8%) or difficult (9.2%) urethral catheterization. Likewise, the minority of respondents felt comfortable managing erectile dysfunction (41.5%), scrotal swelling (34.7%), and scrotal pain (25.7%).

Conclusions: There are significant deficiencies in urological knowledge and skills among family medicine residents in Canada, possibly because of insufficient educational experiences during medical training.

Introduction

Most patients with urological issues will first present to their family physician. Although its significance is often underestimated, the initial evaluation performed by the physician frequently determines the course of investigation and ultimately treatment. Studies have previously estimated that 5–10% of consultations in primary care involve problems relating to the genitourinary tract.^{1–3} However, the prevalence of urological diseases in the community is expected to increase exponentially in the future due to the expanding elderly population in Canada and the often chronic nature of these conditions. Additionally, acute urological presentations, such as testicular torsion, urinary retention, gross hematuria, Fournier's gangrene, and renal colic require prompt recognition and specialist referral in order to optimize treatment outcomes and reduce complications. Likewise, many chronic urological complaints greatly impact patient quality of life and are treated primarily with lifestyle modifications and/or oral medications and may be well-managed in the community without the need for specialist intervention. Therefore, it is important that family physicians have a working knowledge of the pathophysiology, examination, and treatment of common urological conditions.

Concurrently and unfortunately, the past decade has witnessed an insidious decline in formal urology teaching by medical schools worldwide.^{4–7} A recent study reported that in 65% of U.S. medical schools, it is possible for students to graduate without any exposure to clinical urology.⁸ Another U.S. survey revealed that only 17% of medical schools have compulsory rotations in urology compared to 99% of institutions surveyed in 1956.⁹ Canada has had similar trends, with no medical school requiring a compulsory clinical rotation in urology. The impact of this deficit is likely significant. Previous publications have hypothesised that family medicine practitioners who have been exposed to clinical urology provide better urological care and make fewer inappropriate referrals.^{3,10} However, the impact of the reduction in teaching on a family physician's ability to accurately assess and treat urological conditions remains unclear. The aim of this

study was to investigate the self-reported competency of family medicine residents in managing common urological presentations. Our hypothesis is that current undergraduate medical education training does not provide family medicine residents with the competencies needed to effectively manage urological diseases.

Methods

Institutional ethics approval was obtained to create and distribute an anonymous, online survey to family medicine residents across Canada. This survey was distributed via email to all Canadian family medicine program directors on two occasions from September to December 2018. Program directors were asked to distribute the survey to their residents. Participation in the survey was done on a voluntary basis. The survey consisted of 15 questions, including participant demographics and exposure to urology during medical training (Appendix available at cuaj.ca). Respondents were invited to report their experience and proficiency in performing common urological procedures such as male digital rectal examination (DRE), male and female catheterization, insertion of suprapubic catheter, and vasectomy. Self-reported proficiency was assessed using a five-point Likert scale (strongly disagree to strongly agree). Respondents were also questioned regarding their proficiency in male genitourinary (GU) examination, sexual history-taking, and interpretation of investigations such as computed tomography of the kidney-ureter-bladder (CT-KUB), renal ultrasound, urinalysis, and semen analysis. Finally, they were asked to describe their confidence in managing several common conditions, such as urinary retention, hematuria, urinary tract infection (UTI), erectile dysfunction (ED), urological malignancy, and scrotal swelling. Self-reported proficiency was assessed using a five-point Likert scale. All questionnaires were completed anonymously. Results were collated on an excel database and analysed using SPSS. Descriptive statistics were used to summarize data.

Results

One hundred and forty-two residents from Ontario (46/142, 32.4%), the Prairies (Alberta, Saskatchewan, Manitoba) (39/142, 27.5%), and Quebec (57/142, 40.1%) responded to the questionnaire. Family medicine programs from British Columbia and the Atlantic provinces were unable to or elected not to participate in the survey. The response rate of the survey was challenging to calculate, as individual responses were anonymized according to ethics approval and coded only by region. Based on Canadian Resident Matching Service data, there are approximately 1500 residents per year of residency. When excluding programs not or likely not participating, the total number of possible partici-

pants was likely 2000. Based on this estimate, the response rate was approximately 7%. By gender, 69% of respondents were female (98/142), 28.9% male (41/142), and 2.1% non-binary (3/142). Eighty-six respondents (60.6%) did not have a clinical rotation in urology during medical school and 70.9% (100/142) felt their exposure to urology during medical school and residency did not adequately prepare them for the urological aspects of family medicine practice.

Hematuria, UTI, lower urinary tract symptoms (benign prostatic hyperplasia), ED, and urinary calculi were highlighted by the residents as being the most relevant urological components of a medical school/family medicine curriculum (Fig. 1).

Despite this, many respondents did not feel confident in managing several of these and other common urology presentations (Table 1). Most felt comfortable managing UTIs (138/141, 97.2%), kidney stones (106/142, 75.6%), female urinary incontinence (89/142, 62.7%), benign prostatic hyperplasia (89/142, 62.7%), and urinary retention (81/142, 57.0%). However, self-reported proficiency in managing many common urological presentations was low, such as with hematuria (79/140, 56.5%), ED (59/141, 41.8%), scrotal swelling (49/141, 34.7%), and scrotal pain (39/142, 25.7%).

In terms of common urological examinations and procedures, most reported low rates of proficiency in performing basic procedures, such as DRE (83/142, 58.5%), male GU examination (57/142, 40.1%), male urinary catheterization (49/142, 34.5%), female urinary catheterization (65/142, 45.8%), and difficult catheterization (13/142, 9.2%) (Fig. 2). Perhaps not surprising, a substantial number of residents felt they had received insufficient training in male GU examination (60/142, 42.3%), DRE (34/142, 23.9%), and sexual history-taking (20/142, 14.1%). Self-reported experience with examination and procedures closely mirrored proficiency (Table 2). For example, 64.1% (91/142) of respondents performed more than 10 DREs and 42.9% (61/142) performed more than 10 male GU examinations. Similarly, 21.8% (31/142) of respondents performed >5 male urinary catheterizations and 28.9% (41/142) of respondents performed >5 female catheterizations.

Although the majority of residents felt proficient in their interpretation of urinalysis and renal ultrasound, over half of respondents were concerned regarding their ability to interpret CT-KUB and the majority did not feel proficient in their ability to interpret semen analysis (Table 3).

Discussion

Urological diseases are very common in family practice. Most urological conditions are chronic in nature and can significantly impair a patient's quality of life without necessarily affecting their lifespan. For example, approximately 17% of

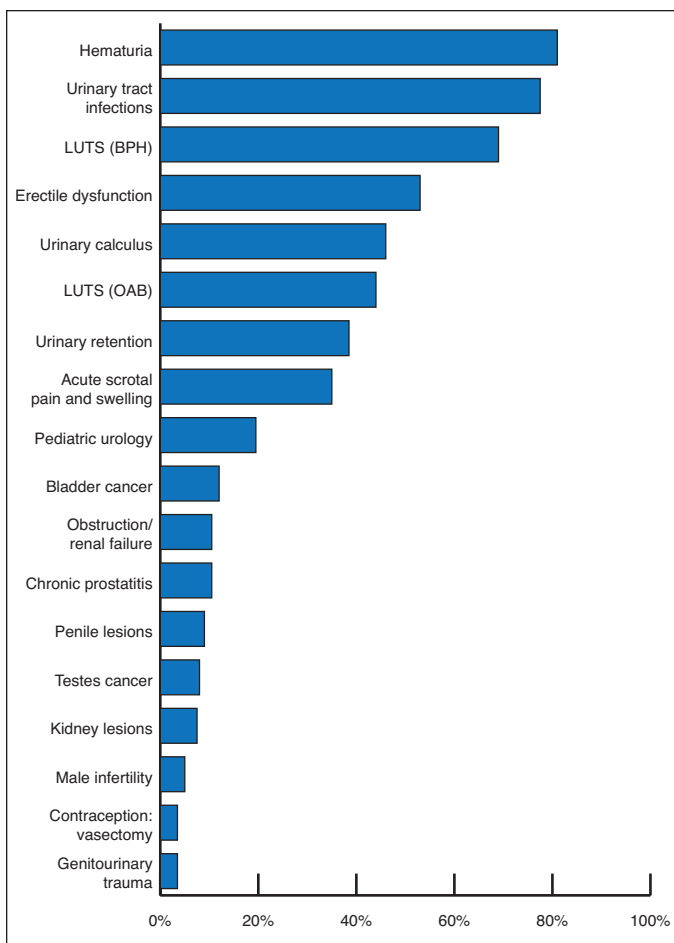


Fig. 1. Bar graph demonstrating key topics identified as being the most relevant urological components of a medical school/family medicine curriculum. BPH: benign prostatic hyperplasia; LUTS: lower urinary tract symptoms; OAB: overactive bladder.

men and 38% of women over 60 suffer from urinary incontinence; however, the overall incidence of lower urinary tract

symptoms is estimated to be much higher than this.^{11,12} The incidence of urinary symptoms, including urinary incontinence, increases with age, meaning that the prevalence of these conditions in the community is likely to increase significantly as the geriatric population in Canada increases.¹³⁻¹⁵ In a universal healthcare system such as Canada, family physicians play a critical role in the assessment and care of patients with urological problems, especially since the majority of patients with urological issues will first present to their family physician. Despite this importance, the majority of family medicine residents who responded to our survey reported insufficient exposure to urology during their training. In fact, 70.9% felt their exposure to urology during training did not adequately prepare them for the urological aspects of family practice.

This reported lack of preparedness likely directly relates to a lack of clinical exposure to urology during medical training, given that the majority (60.6%) of respondents in our survey did not have a clinical rotation in urology during medical school. This diminished exposure to urology may result in a lack of confidence among many newly qualified physicians. Many urological diseases felt to be important by family medicine residents had poor self-reported proficiency. For example, hematuria was felt to be important by the vast majority (81.7%) of respondents but barely over half (56.5%) felt proficient in managing hematuria. Likewise, ED was felt to be important by most (53.5%) but the minority reported being competent in this area (41.8%). Furthermore, many respondents did not feel confident in managing several common urology presentations, such as ED (41.5%), scrotal swelling (34.7%), and scrotal pain (25.7%). It is self-evident that the absence of formal urology training during medical school and family medicine residency may lead to decreased confidence in managing common urological problems and, in turn, have a profound effect on the

Table 1. Self-reported proficiency in managing common urological presentations

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total respondents
Acute urinary retention	1.4% (2)	19.7% (28)	21.8% (31)	52.1% (74)	4.9% (7)	142
Difficult urinary catheterization	20.4% (29)	50.0% (71)	20.4% (29)	7.8% (11)	1.4% (2)	142
Gross hematuria	1.4% (2)	13.6% (19)	28.6% (40)	53.6% (75)	2.9% (4)	140
Adult urinary tract infection	0.0% (0)	0.7% (1)	1.4% (2)	42.6% (60)	55.3% (78)	141
Epididymitis	2.8% (4)	21.1% (30)	23.9% (34)	45.1% (64)	7.0% (10)	142
Prostatitis	2.8% (4)	15.5% (22)	31.0% (44)	44.4% (63)	6.3% (9)	142
Erectile dysfunction	1.4% (2)	22.7% (32)	34.0% (48)	37.6% (53)	4.3% (6)	141
Urinary incontinence in women	1.4% (2)	9.2% (13)	26.8% (38)	52.1% (74)	10.6% (15)	142
Kidney stones	0.7% (1)	5.6% (8)	19.0% (27)	59.9% (85)	14.8% (21)	142
Prostate cancer screening and diagnosis	0.7% (1)	9.2% (13)	22.7% (32)	58.9% (83)	8.5% (12)	141
Pediatric urinary tract infections	2.1% (3)	16.9% (24)	29.6% (42)	45.8% (65)	5.6% (8)	142
Scrotal pain	4.23% (6)	28.17% (40)	40.14% (57)	26.06% (37)	1.41% (2)	142
Scrotal swelling	2.1% (3)	25.5% (36)	37.6% (53)	33.3% (47)	1.4% (2)	141
Lower urinary tract symptoms in men	0.7% (1)	9.9% (14)	26.8% (38)	57.8% (82)	4.9% (7)	142

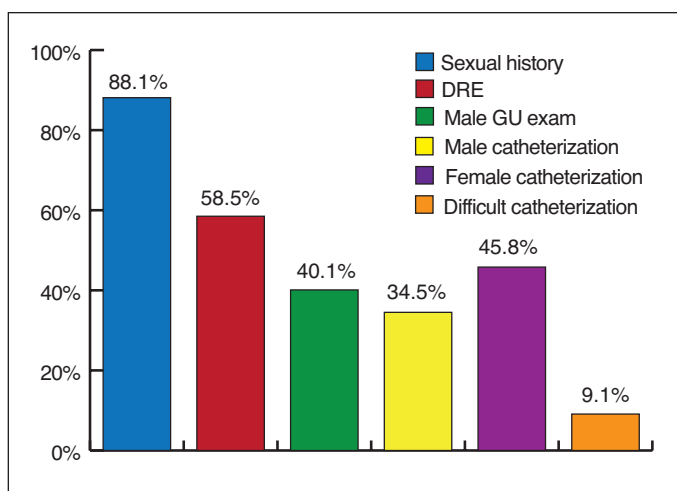


Fig. 2. Self-reported proficiency performing common genitourinary (GU) examinations and procedures. DRE: digital rectal examination.

treatment and management of urological conditions in the community and may almost certainly lead to some degree of unnecessary referral. These deficiencies are even more magnified in physical examination and procedures, with the minority of respondents comfortable with male GU examination (40.1%), male urinary catheterization (34.5%), female urinary catheterization (45.8%), and difficult catheterization (9.2%). It appears that these deficiencies also closely relate to a lack of clinical exposure, with only 42.9% performing over 10 male GU examinations, 21.8% performing >5 male urinary catheterizations, and only 28.9% of respondents performing >5 female catheterizations.

In totality, these likely represent significant deficiencies in training and may be unrewarding for the family physician and disadvantageous to both their patients and specialist colleagues in urology. The problem has recently become more acute, given the increasing prevalence of urological conditions, the demand on secondary care services, and a general drive to manage increasing numbers of patients in primary care.

According to the 2019 Canadian Residency Matching Service statistics, 33.7% of graduating medical students in Canada enter a family medicine residency.¹⁶ In fact, the majority of students enter fields considered to be generalist physicians who will encounter urological patients in an

undifferentiated form. Therefore, it is important that the medical school curriculum also shoulders some of the responsibility in adequately preparing family physicians for community urological practice. The erosion in exposure to urology during medical training has been identified by a number of studies worldwide, with many graduating students reporting a lack of rotations in clinical urology during medical school and limited training in DRE or male GU examination.^{8,17} This apparent deficit in urological education has previously been investigated by Hoag et al,¹⁸ who found that 44% of final year medical students at the University of British Columbia felt their urological medical education was inadequate, with only 41.2% completing a urology rotation during their training. Interestingly, 100% of those who attended University of Northern British Columbia reported satisfaction with their urology exposure. Most students on this campus completed rotations in urology (12/13) and subsequently reported significantly higher quality teaching on DRE and male GU examination compared with other campus groups where formal rotations in clinical urology were less likely. Perhaps in response to this study, Patel et al¹⁹ investigated the utility of implementing a mandatory, one-week clinical rotation in urology and found it was associated with increased student comfort in managing common urological conditions, including male catheterization.

Our study found that a concerning number of family medicine residents felt deficient in their assessment of common urological conditions. It is clear from this and other studies that the current undergraduate medical curriculum does not provide family medicine residents with the competencies needed to effectively manage urological disease. Several deficiencies have been identified by this study, which may serve as an educational needs assessment that could be used to develop collaborative approaches to address these inadequacies. The family medicine training scheme is a two-year program; therefore, it is not practical to expect every resident to rotate in urology. However, we strongly recommend that the family medicine curriculum be revised to incorporate shorter electives in urology, urology masterclass workshops, or the opportunity to attend urology outpatient clinics in order to meet the core learning objectives outlined by the Medical College of Canada (LMCC). Further development of a curriculum in urology focused mainly on family medicine

Table 2. Self-reported experience performing common genitourinary examinations and procedures

Number performed	0	1–5	6–10	11–20	>20	Total respondents
Sexual histories	0.0% (0)	9.9% (14)	18.3% (26)	16.2% (23)	55.6% (79)	142
Digital rectal examinations	0.0% (0)	14.8% (21)	21.1% (30)	26.8% (38)	37.3% (53)	142
Male genitourinary examinations	0.7% (1)	36.6% (52)	19.7% (28)	26.1% (37)	16.9% (24)	142
Vasectomies	88.7% (126)	9.2% (13)	2.1% (3)	0.0% (0)	0.0% (0)	142
Male urinary catheterizations	16.9% (24)	61.3% (87)	21.8% (31)	0.0% (0)	0.0% (0)	142
Female urinary catheterizations	12.0% (17)	59.2% (84)	28.9% (41)	0.0% (0)	0.0% (0)	142
Insertion of suprapubic catheter	93.6% (132)	4.3% (6)	2.1% (3)	0.0% (0)	0.0% (0)	141

Table 3. Self-reported proficiency in the interpretation of common urological investigations

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total respondents
Urinalysis	0.7% (1)	2.8% (4)	9.9% (14)	65.5% (93)	21.1% (30)	142
Semen analysis	26.2% (37)	45.4% (64)	19.2% (27)	7.1% (10)	2.1% (3)	141
CT-KUB	14.2% (20)	41.1% (58)	25.5% (36)	17.7% (25)	1.4% (2)	141
Renal ultrasound	9.9% (14)	37.3% (53)	26.8% (38)	24.7% (35)	1.4% (2)	142

CT-KUB: computed tomography kidney ureter bladder.

residents would likely be helpful, given the current time constraints limiting mandatory clinical rotations in urology.

There are several limitations to this study. A non-validated questionnaire was used, and this assessed a broad but selected area of urological conditions. Furthermore, respondents self-assessed their proficiency, and the results may have been influenced by a disclosure bias. The survey was emailed to all family medicine program directors for distribution to their residents, however, on review of responses, some programs elected to not participate in the survey. Although a complete national survey performed over several consecutive years would provide a more complete description of the study question, the validity of our results is strengthened by the fact that the responses were consistent across each province. Despite these limitations, we feel this study provides valuable insight into the current state of the urological education and self-reported competency among family medicine residents in Canada.

Conclusions

Our study revealed that a large number of family medicine residents feel their urology training needs are not being met, with a significant proportion reporting deficiency in their management of common urological conditions. Medical school and family medicine curricula should be evaluated to ensure that the core learning objectives in urology are adequately addressed and that qualified family medicine doctors are sufficiently prepared to manage common urological conditions in the community.

Competing interests: Dr. Rourke has been an advisory board member for and is a shareholder in 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.

References

1. Stubbings CA, Gowers JI. A comparison of trainee and trainer clinical experience. *J R Coll Gen Pract* 1979;29:47-52.
2. Carney TA. Clinical experience of a trainee in general practice. *J R Coll Gen Pract* 1979; 29:40-4.
3. Teichman JM, Weiss BD, Solomon D. Urological needs assessment for primary care practice: Implications for undergraduate medical education. *J Urol* 1999;161:1282-5. [https://doi.org/10.1016/S0022-5347\(01\)61663-X](https://doi.org/10.1016/S0022-5347(01)61663-X)
4. Benson GS. The decline of urological education in United States medical schools. *J Urol* 1994;152:169-70. [https://doi.org/10.1016/S0022-5347\(17\)32848-3](https://doi.org/10.1016/S0022-5347(17)32848-3)
5. Redmond EJ, Kelly NP, McCarthy C, et al. Attitudes of GP trainees towards the training received in urology on the GP training scheme. *Irish J Med Sci* 2016;185:165-9. <https://doi.org/10.1007/s11845-015-1261-1>
6. Kan KM, Jayadevan R, Rodriguez N, et al. The current state of urological education for medical students. *Urol Pract* 2017;4:71-5. <https://doi.org/10.1016/j.urpr.2016.03.004>
7. Sam P, Heermans JT, Schmidt CM, et al. Current state of urologic medical school education: A scoping review. *Urology* 2019;123:59-63. <https://doi.org/10.1016/j.urol.2018.07.044>
8. Kerfoot BP, Masser BA, Dewolf WC. The continued decline of formal urological education of medical students in the United States: Does it matter? *J Urol* 2006;175:2243-7. [https://doi.org/10.1016/S0022-5347\(06\)00314-4](https://doi.org/10.1016/S0022-5347(06)00314-4)
9. Loughlin KR. The current status of medical student urological education in the United States. *J Urol* 2008;179:1087-90. <https://doi.org/10.1016/j.juro.2007.10.068>
10. Mishail A, Shahsavari M, Kim J, et al. Deficits in urological knowledge among medical students and primary care providers: Potential for impact on urological care. *J Urol* 2008;180:2140-7. <https://doi.org/10.1016/j.juro.2008.07.043>
11. Stothers L, Thom D, Calhoun E. Urologic Diseases in America Project: Urinary incontinence in males — demographics and economic burden. *J Urol* 2005;173:1302-8. <https://doi.org/10.1097/01.ju.0000155503.12545.4e>
12. Thom DH, Nygaard IE, Calhoun EA. Urologic Diseases in America Project: Urinary incontinence in women national trends in hospitalizations, office visits, treatment, and economic impact. *J Urol* 2005;173:1295-301. <https://doi.org/10.1097/01.ju.0000155679.77895.cb>
13. Heidler S, Deveza C, Temml C, et al. The natural history of lower urinary tract symptoms in females: Analysis of a health screening project. *Eur Urol* 2007;52:1744-50. <https://doi.org/10.1016/j.eururo.2007.08.007>
14. Jacobsen SJ, Girman CJ, Lieber MM. Natural history of benign prostatic hyperplasia. *Urology* 2001;58:5-16. [https://doi.org/10.1016/S0090-4295\(01\)01298-5](https://doi.org/10.1016/S0090-4295(01)01298-5)
15. Statistics Canada Distribution of the total population by age group, observed (1921-2013) and projected (2014 to 2063) according to low-growth scenario, medium-growth and high-growth scenarios, Canada. 2014. Available at: <http://www.statcan.gc.ca/pub/91-520-x/2014001/c-g/desc/desc2.5-eng.htm>. Accessed Sept. 13, 2019.
16. Canadian Resident Matching Service. Available at: <http://www.carms.ca>. Accessed Sept.13, 2019.
17. Oksana S, Tomasz S, Karolina K, et al. Assessment of knowledge concerning urology among medical students in Poland. *Folia Med Cracov* 2018;58:81-95.
18. Hoag NA, Hamidizadeh R, MacNeily AE. Undergraduate exposure to urology: impact of the distributed model of medical education in British Columbia. *Can Urol Assoc J* 2013;7:20-5. <https://doi.org/10.5489/cuaj.277>
19. Patel P, Nayak JG, McGregor TB. The value of a core clinical rotation in urology for medical students. *Can Urol Assoc J* 2015;9:392-6. <https://doi.org/10.5489/cuaj.3297>

Correspondence: Dr. Keith F. Rourke, Division of Urology, Department of Surgery, University of Alberta, Edmonton, AB, Canada; krouke@ualberta.ca