Patient safety education and perceptions of safety culture in American and Canadian urological residency training programs

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Introduction: *To assess the perception of patient safety culture and the infrastructure to support patient safety (PS) education within American and Canadian urological residency programs.*

Materials and methods: *A needs assessment was developed by experts in patient safety. The survey contained items about prior PS education, perceived value of learning PS, components of an ideal PS curriculum, and desired resources to facilitate PS education. Select items from the validated AHRQ Survey on Patient Safety Culture (SOPS) were also included. The survey was distributed electronically (12/2018-2/2019) to all urology residents (RES) and program directors (PD) of urological residency programs via the Society of Academic Urologists. All responses were anonymous.*

Results: *A total of 26 PD (18.3%; 26/142) and 100 RES (6.7%; 100/1,491) completed the survey. Nearly all RES received PS training (79%), but this was lower for PD (42%). The majority of RES and PD felt that PS was an important educational competency (RES = 83%; PD = 89%) and a pathway for academic success (RES 74%; PD 84%). Both groups desired an online PS curriculum (RES = 69%; PD = 68%) with error causation models (RES = 42%; PD = 52%) as the primary topic to cover. Assessment of safety culture confirmed safety is a priority, but only 1 PD (5%; 1/19) and 25 RES (25%; 25/100) rated their residency program's overall safety grade as "excellent".*

Conclusions: *PS education remains a priority for program directors and urological trainees. Both groups called for additional resources from urological professional societies for this education. To that end, an online, centralized, freely accessible PS curriculum is under development.*

Key Words: safety, safety management, education, internship and residency, education, medical, graduate

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Introduction

The Accreditation Council for Graduate Medical Education (ACGME) is the governing body tasked with developing the structure for post-graduate residency education in the United States. Core Competencies developed by the ACGME served as the basis for resident education across all specialties from 1999 until 2013.[1] The ACGME's Core Competencies transitioned to the Next Accreditation System (NAS), which began phased implementation in 2013.[2,3]

The NAS requires the learning environment created by the sponsoring institution be assessed through the Clinical Learning Environment Review

(CLER) Program.[3,4] The CLER program emphasizes institutional support for education and practice in patient safety (PS), health care quality (QI), care transitions, supervision, duty hours and fatigue management, and professionalism.[4] Although the ACGME mandates continuous improvement in the health care delivery system as an educational priority, early evidence suggests programs and sponsoring institutions are falling short.[5-7]

In early 2019, the ACGME further specified PS in their updated Common Program Requirements.[8] Accordingly, residents must have access to PS systems, be able to analyze care in order to assess safety, and contribute to the culture of safety.[8] Residents must also be provided with formal education on PS and have knowledge of event reporting at the local level.[8] These elements have been adopted in the updated CLER Pathways to Excellence.[9] A similar set of requirements is also outlined in the Canadian CanMEDS framework and Milestones.[10]

Although there is a clear emphasis on PS from the ACGME and CanMEDS, specific policies or best practices on how to educate residents are lacking.[9] As a result, each residency program and sponsoring institution is largely left to develop their own PS education curriculum.[11] While some urology programs undoubtedly possess the institutional resources to develop a high-quality PS education program, most lack this ability.[7]

We envision a standardized, specialty-relevant resource for educating urological trainees on PS. The degree to which local PS infrastructure and curriculum resources vary remains largely unknown. Therefore, in conjunction with the Society of Academic Urologists (SAU) we sought to assess the perception of PS culture and the infrastructure to support education in this domain within urological residency programs.

Materials and methods

Study population

The study population consisted of two groups. The first group was all allopathic urological residents (RES) in the United States (US) and Canada. In the 2018-19 academic year, this represented 1,331 clinical residents in the US and 160 in Canada.[12,13] The second group was all urological residency program directors (PD) in the US. In the 2018-19 academic year, there were a total of 142 ACGME accredited urology residency programs in the US and 12 Royal College of Physicians and Surgeons of Canada (RCPSC) accredited programs.[12,13] The master list of all RES and PD names and email addresses was obtained on behalf of the SAU from the American Urological Association (AUA). The SAU is the primary professional society for medical educators within urology in the US. Unfortunately, the list supplied by the AUA did not include PD from Canada, but it did include RES.

Survey instrument

A needs assessment was developed by experts in patient safety. The survey contained items about prior training in the principles of PS, perceived value of learning PS, components of an ideal PS curriculum, and resources the urological profession could provide to facilitate additional learning in PS. Select items from the validated AHRQ Survey on Patient Safety Culture (SOPS) were also included to identify how perceptions of PS culture may influence available PS resources.[14] Two different, but complementary survey instruments were created: one for the RES and one for the PD (available at: https://upenn.box.com/v/safety-education-urology). The surveys were first field tested by two program directors and by three residents from the authors' institutions to ensure the instrument had content validity. Feedback received was used to revise the instrument.

Survey distribution

The survey was distributed electronically (12/2018-2/2019) by the SAU to all urology RES of both accredited US and RCPSC programs and only to PD of accredited US urological residency programs. The survey was distributed by the SAU to maintain privacy of the email addresses. All survey results were received and aggregated directly by the SAU. All responses were anonymous. However, to increase survey participation a raffle for an Apple Watch was offered. To be eligible for this raffle the respondent did have to fill in their name, email address, and telephone number. A total of three email reminders were sent to increase responses.

Statistics

All attitudinal response items were converted to percent positive (strongly agree/ agree or neither/ disagree/strongly disagree). Similarly, all ranking items were also converted to percent positive (rank order 1 or 2).

A primary analysis was performed to assess the association of receiving prior PS education or self-reporting an "excellent" residency program PS grade on RES respondent attitudes about PS as an avenue for academic success. These two variables were selected as they had face validity as a proxy for a robust and celebratory safety culture and infrastructure which is known to encourage physicians to engage in this type of work/scholarship.[15,16]

To determine if there was a response bias, a sensitivity analysis was also performed comparing age and gender of RES respondents to the entire population of urology RES. Age and gender were selected as these variables were available to the SAU from the original AUA name/email address master file and both are known to be associated with physician survey response rates.[17]

All categorical variables were analyzed with chi-square and all continuous data with a 1-way ANOVA. A p value of < 0.05 was considered statistically significant. This study was reviewed by the University of Pennsylvania IRB (IRB00000043) and determined that it qualifies as quality improvement and that no further review was necessary.

Results

A total of 26 PD and 100 RES completed the survey for a response rate of 18.3% (26/142) and 6.7% (100/1,491), respectively. In a sensitivity analysis for response bias, there was no association among responders with respect to gender ($p = 0.09$), but there was an association with age ($p < 0.01$). Those who did respond had a mean age approximately 1 year older than all urology RES (32.3 versus 31.0 years).

Program director responses

The majority (69%; 18/26) of PD respondents completed residency training after 2000. A total of 46% (12/26) and 27% (7/26) of PD confirmed that their faculty position also includes time as a QI or PS leader, respectively. However, only 42% (8/26) of PD had ever received formal education/training in PS. Less than half of these programs (46%; 12/26) have a urology faculty member assigned as a PS officer. Despite this, 73% (19/26) of their programs' residents do receive formal education in PS with the primary teacher of this content either a urology patient safety leader (42%; 8/19) or an assigned urologist, not a PS leader (47%; 9/19). Nearly all PD (89%; 17/19) agreed that learning PS should be an educational component of residency training. Similarly, 84% (16/19) of PD agreed that studying PS is an avenue for academic acknowledgement, promotion, or success.

Resident responses

There was a relatively equal distribution of RES respondents across post-graduate years: PGY-1 (1%; 1/100); PGY-2 (13%; 13/100); PGY-3 (13%; 13/100); PGY-4 (27%; 27/100); PGY-5 (18%; 18/100); >PGY-5 (28%; 28/100). The majority (79%; 79/100) of RES have received formal education/training in PS. Nearly all RES (83%; 83/100) agreed that learning PS should be an educational component of residency training. However, slightly less RES (74%; 74/100) agreed that studying PS is an avenue for academic acknowledgement, promotion, or success. There was no association between receiving prior PS education or self-reporting an "excellent" residency program PS grade on the perception that PS is an avenue for academic success (all $p > 0.05$).

Program director and resident preferences, safety culture, and safety knowledge

Nearly all PD and RES requested an online PS curriculum to be supported by urological professional and specialty societies, Figure 1. The most frequent requested educational content to be included in this curriculum

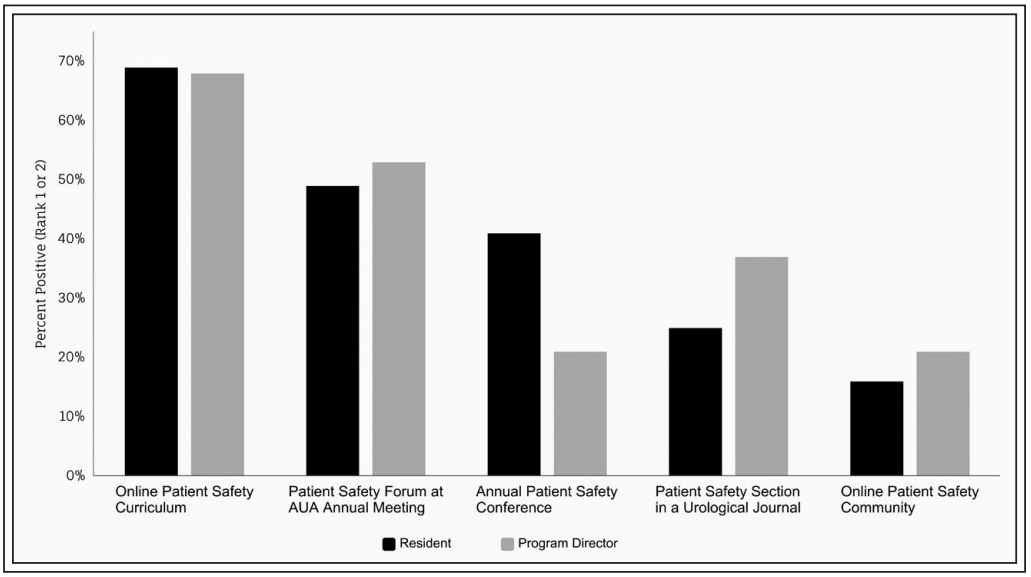

Figure 1. Patient safety education and practice resources desired by program directors and residents.

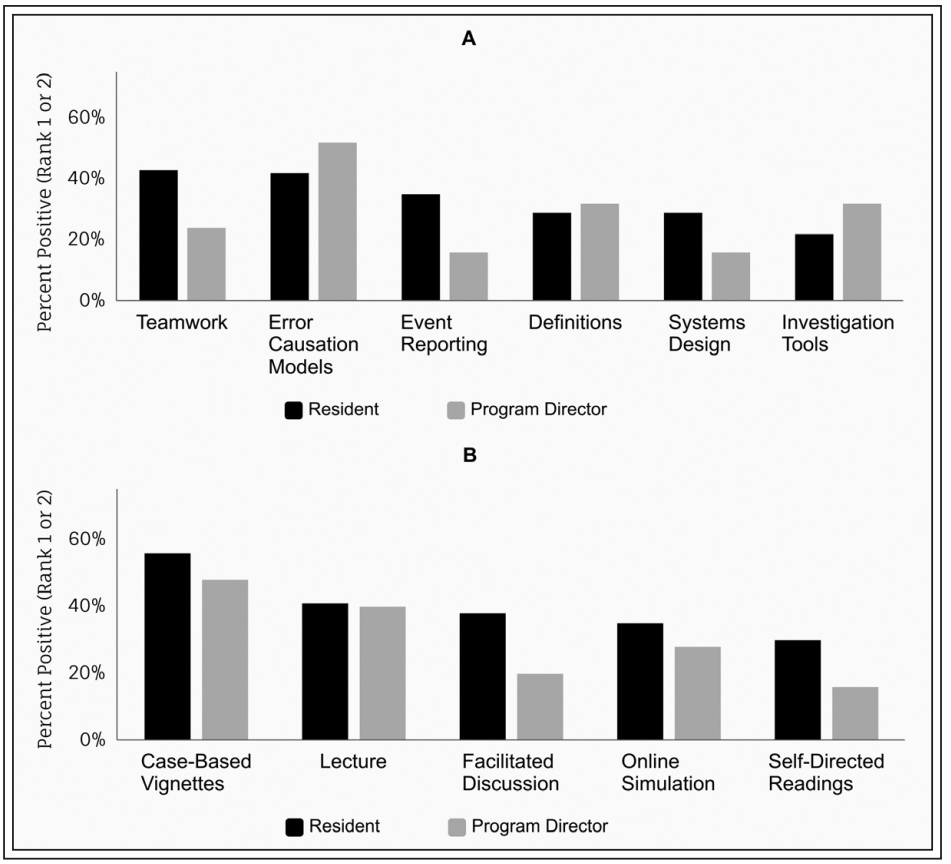

Figure 2. Patient safety curriculum content **(A)** and format **(B)** desired by program directors and residents.

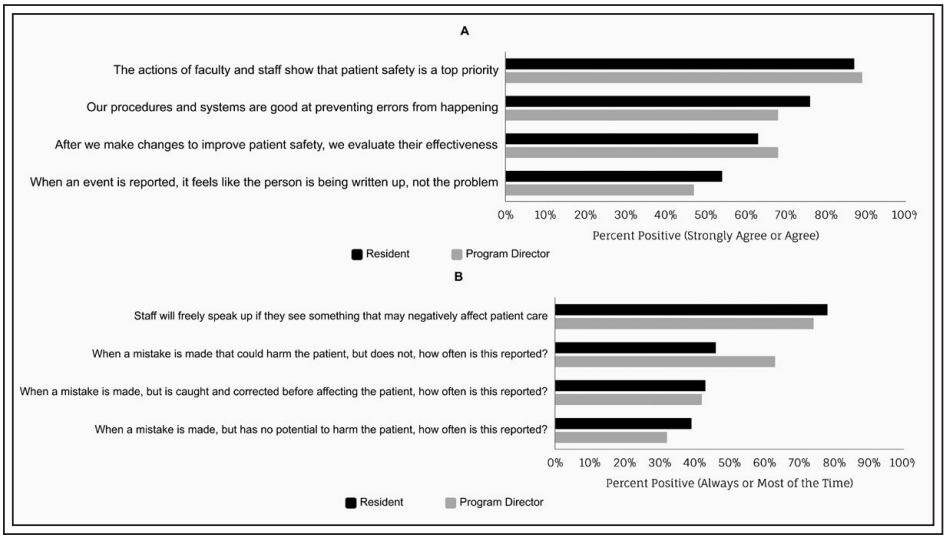

Figure 3. Residency program patient safety culture **(A)** and reporting culture **(B)**.

was discussion of error causation models, Figure 2. Figure 2 displays additional desired educational content and format. Assessment of local safety culture within the residency programs showed safety is a priority, but other markers, most notably reporting culture was relatively weak, Figure 3. In fact, only 1 PD (5%; 1/19) and 25 RES (25%; 25/100) rated their residency program's overall safety grade as "excellent". Figure 4 displays baseline knowledge of common patient safety concepts.

Discussion

In this study, we found that there is a lack of PS infrastructure in terms of qualified, trained personnel in urological residency programs with less than half of programs reporting an internal PS officer. Furthermore, nearly half of these programs report their trainee PS education is being facilitated by an assigned urologist, rather than an individual with expertise in this area. Despite these deficiencies, PS education remains a priority for PD and RES alike with nearly all confirming that it should be a component of residency training, and more importantly, that it can be a pathway for academic success. Similarly, both groups called for additional resources and support from urological professional societies for this type of education.

PS training and education continues to be

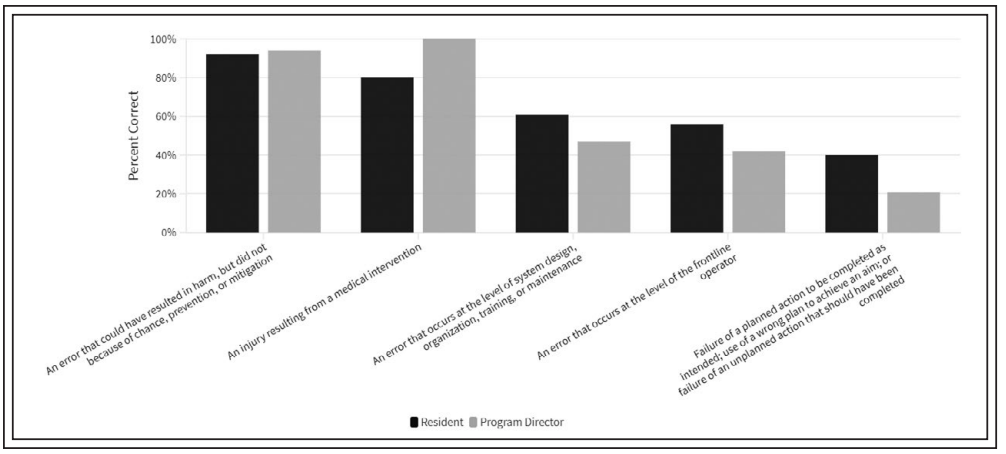

Figure 4. Individual knowledge assessment results of common patient safety principles.

a priority area for the ACGME and CanMEDS.[8,10,18] In fact, the Clinical Learning Environment Review (CLER) Program Pathways to Excellence version 2.0 continues to outline PS as a topic Focus Area.[18] Chief among the Pathways for this Focus Area is PS education.[18] This is in alignment with our respondents' attitudes towards PS education with nearly all PD and RES confirming that this should be a competency achieved during residency training. Furthermore, we demonstrated the perception that the study and practice of PS is an avenue for academic or professional success.

Despite this alignment, it is no longer sufficient to focus educational efforts in this domain on trainees alone. Also contained within the ACGME requirements is the need for faculty engagement.[8,18] This may be problematic for many programs as there appears to be a relative paucity of urology faculty with this type of expertise. Less than half of responding PD's programs had a urology patient safety officer. Equally as concerning, less than half of programs with an established PS curriculum had this instruction supervised by a urology PS leader. This data suggests that solutions to meet the ACGME requirements will also need to include a faculty development component. The American Association of Medical Colleges (AAMC) has developed a program specifically for faculty.[19] However, the time commitment, in-person format, and requirement for specially trained AAMC facilitators has limited its diffusion and use.[19,20]

For the trainees, 79% confirmed they have received formal education in PS. This number is certainly reassuring, but far from universal. Furthermore, when explicitly asked to define basic patient safety concepts, the percentage correct was poor (60% or less in 3 of the 5 measured concepts). This suggests the current educational programs are not sufficiently robust. Unfortunately, this is not surprising, given the heterogeneity of PS educational curricula for residents available in the literature.[21] In fact, no best educational practices yet exist for teaching PS, although some foundational elements appear to be important, such as learner interest, faculty expertise, didactic/experiential learning, allocated time, and organizational support.[21]

Regarding the architecture for a proposed national-level PS curriculum, a logical repository for housing the content would be a urological professional society. A professional society with a robust education department could leverage existing resources to facilitate the development and distribution of a PS curriculum to relevant stakeholders, including residents and academic faculty alike. Our survey confirmed that nearly all responders felt that our professional societies should support PS education.

To begin the process of a centralized online PS curriculum we have started to build a library of case-based simulations covering the content of safety definitions/concepts, error causation models, and event reporting that was requested by our PD and RES, Figure 2. The first module in this series can be freely accessed at https://vimeo.com/380153795. Future content will be uploaded as it is created along with accompanying knowledge self-assessments for both individual and programmatic evaluation.

However, the application of safety concepts to clinical practice is key as knowledge alone is not sufficient. Synergy between self-directed online adult learning and local faculty and institutional support is paramount. Context is key for any educational program, which is why we measured several elements of safety culture. We found a reasonably supportive environment for safety practice, although areas such as reporting culture could be improved. Assessment of these domains will need to be incorporated into local educational plans.

Our study has several limitations. First, we acknowledge that our response rate is low. However, response rate should not be equated to response bias.[22]

In fact the two may be related, but often are not.[22] In this case, we performed a sensitivity analysis with the available demographic data, again balancing the need for anonymity to ensure truthful responses versus the need for post-administration analysis. Our sensitivity analysis did not show an association of response with gender, but there was such an association with age. However, the age effect size of 1 year was very small, which is likely not meaningful in the context of this study.[17] Nevertheless, since each residency program and sponsoring institution is unique in terms of its local resources and culture, these results may not be completely generalizable. We also realize that we PD from Canadian programs were not included, and due to the anonymity of the survey responses, we could not separate US and Canadian perceptions at the RES level. However, this is the largest study to date, and it is very likely to be the only international study performed exclusively to examine PS education within urological training. Therefore, these results do provide a guide for how best to direct resources to meet the educational competencies established by society, our profession, and accrediting bodies.

Conclusions

In this study, we found that PS education remains a priority for program directors and urological trainees alike with nearly all confirming it should be a component of residency training, and more importantly, that it can be a pathway for academic success. However, both groups called for additional resources and support from urological professional societies for this type of education and practice. To that end, an online, centralized, freely accessible PS curriculum is under development.

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