Commentary

Scholarly training objectives and requirements for paediatric residents in Canada

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Abstract

In the absence of national standards for scholarly requirements, paediatric resident training varies significantly across Canadian programs. This variability may contribute to significant differences in trainee experiences and productivity. A panel of coordinators of paediatric resident research programs from across Canada met in 2014, to share experiences and identify barriers to successful resident scholarly activity. A survey of all programs was completed in 2015. A scoping review and series of meetings led to the development of a proposed list of expectations, timelines for successful completion and consequences for not completing a scholarly project. We propose a harmonized list of scholarly competencies and activities for paediatric residents in Canada to accomplish before completing their training. We also propose that programs implement standardized timelines and consequences in the event that a resident does not meet their program's scholarly expectations.

The CanMEDS Physician Competency Framework has identified scholarly activity as one of five core roles that should be developed throughout residency training (1). A key aspect of the scholar role includes the development of competencies in several areas, including understanding and applying basic principles of biostatistics, epidemiology and ethical conduct of research (1,2). In most Canadian residency programs, the competencies are tested and achieved through the completion of a scholarly project (often referred to as a research project, although the range is broader and includes quality improvement initiatives) that culminates in a scientific product (abstract, presentation, poster or scholarly manuscript) (3). The completion of a scholarly project is considered a cornerstone in resident training (4), which increases the likelihood of future success in fellowship training (5), and greater satisfaction with residency training. In addition to future success as a clinician

scientist, resident scholarly productivity is also predictor of clinical skills on standardized practical exams (6). Unfortunately, timely completion of a scholarly project with a measurable outcome is often a major challenge for paediatric residents (7). The purpose of the commentary is to describe a strategy to address that limitation in Canada.

The primary aims of this commentary are to: 1) report on a survey paediatric resident programs across the country for what constitutes a scholarly project and describe variation in scholarly support within training programs, 2) establish a list of objectives, expectations and competencies to support paediatric residents in the scholarly aspect of their training and 3) formalize a proposed timeline for completion of a scholarly project, which includes strategies for supporting residents who do not complete an activity within the allotted time.

METHODOLOGICAL DEVELOPMENT OF NATIONAL STANDARDS

During the summer of 2014, coordinators from 11 of 17 Canadian paediatric residency programs met at a face-to-face meeting prior to the Canadian Paediatric Society annual meeting. The purpose of the meeting was to describe components of respective programs for supporting scholarly activity, share best practices and explore the possibility of harmonizing expectations for paediatric resident scholarly projects in Canada. Following the meeting, an executive committee was established to guide the process of harmonizing expectations. The committee developed a survey of research program components and types of projects that would qualify as an acceptable project. The survey was completed by either program directors and/or research coordinators from all 17 Canadian paediatric residency training programs and data were reviewed by the executive committee. The executive committee then reviewed the results of this survey, as well as guidelines, standards and published reports from existing resident programs before agreeing on a set of expectations via several teleconferences. The proposed objectives were presented to all Canadian Paediatric Program Directors at a face-to-face meeting in Vancouver in 2015. Following revisions from the program directors, a version was shared with resident research coordinators at a second face-to-face meeting in 2016 prior to the Canadian Paediatric Society meeting. Following this meeting, a draft of the proposed guidelines was circulated to all resident research coordinators and program directors through a listserv hosted by the Canadian Paediatric Program Directors and discussed on a teleconference. The final version of the guidelines was circulated a final time to all paediatric resident research coordinators for comment, before being submitted to the journal. We attempted to align expectations and objectives with the competency-based 2015 CanMeds framework. The committee was also tasked with creating a national guideline outlining the consequences associated with not completing a scholarly project in a timely manner.

CURRENT STATUS OF CANADIAN PAEDIATRIC RESIDENT RESEARCH PROGRAMS

A representative from each of the 17 Canadian paediatric resident programs provided information regarding their scholarly activities and expectations. Most surveys were completed by scholarly program coordinators and the remainder were completed by paediatric resident program directors. Nearly half of the paediatric residency programs reported providing protected time for a staff member to coordinate the scholarly activity for residents. Nearly 40% of programs reported providing funding

for the resident research program. The remaining provides in-kind support.

Scholarly education

The large majority (70%) of programs have a fixed curriculum for fundamental research skills while 30% have a flexible program. As of 2015, three programs in Canada have a dedicated block of time during which core scholarly skills are taught. In 2016, one centre adopted a dedicated 4-week research block to the PGY1 year and another adopted a 1 week block to their resident curriculum in 2017. The remainder provide teaching during academic half day or through alternative protected time. The majority (>75%) of programs provide interactive seminars and workshops in human ethics, basic epidemiology, basic biostatistics, literature searches, critical appraisal and evidence-based medicine. Nearly all provided in-person lectures while one provides on-line lectures. Less than 20% of programs had dedicated funding for resources to deliver the curriculum.

Standards for scholarly projects

All programs provide residents with an opportunity to complete an elective during which they have protected time for a scholarly project. All programs, as of 2015, considered the completion of a scholarly project as a mandatory element of completing residency. However, only one program had written guidelines for consequences associated with not completing the project. In terms of the criteria for proof of completion, the majority of programs (>50%) required a poster or oral presentation while the minority (<40%) required a document to be submitted to a program director or coordinator.

PROPOSED REQUIREMENTS FOR A SCHOLARLY PROJECT IN CANADIAN PAEDIATRIC RESIDENCY PROGRAMS

The proposed expectations, requirements and timelines for completing a scholarly project during paediatric residency are presented in [Table 1](#) (we have added a user-friendly version in the [Supplementary Appendix](#) for program coordinators to incorporate into their resident progress reviews). Briefly, the Canadian Paediatric Resident Research Network supports the current Royal College of Physicians and Surgeons of Canada's requirements for residents' significant participation in a scholarly project (1,2). It also supports the provision of residents with structured learning sessions in core areas related to completing a scholarly project and the development of CanMeds core competencies through structured activities (i.e., journal clubs, rotation presentations). To facilitate program harmonization, all hypothesis-driven research designs are considered acceptable ([Table 2](#)). Medical education, quality improvement and advocacy projects are acceptable as long as they include

Table 1. Proposed expectations for achieving scholarly designation during paediatric residency training

No.	Proposed skills/training/experience
1	Able to describe the basic principles of epidemiology and be able to apply them in evaluating journal articles (Includes presenting at a Journal Club between PGY 1 and PGY3 years; critical appraisal activities)
2	Able to describe the basic principles of biostatistics and be able to apply them in evaluating journal articles (Includes presenting at Journal Club between PGY1 and PGY 3 years)
3	Complete a research methodology course(s) during the Residency Program (suggested minimum attendance at the lectures of 80%).
4	Complete the Interagency Advisory Panel (Tri-Council Policy Statement, TCPS) on Research Ethics Tutorial and provide a copy of the 'Certificate of Completion' for Resident records. CIHR/NSERC/SSHRC: ' <i>...to promote the ethical conduct of research involving human subjects course in Research Ethics</i> '
5.0	Carry out a scholarly project(s) as per the Royal College of Physicians and Surgeons expectations (Standard requirements to meet).
5.1	Develop (or support a group that develops) a Scholarly Question/Aim
5.2	Select a study design that is considered acceptable (see Table 2)
5.3	Develop or help develop a scholarly evaluation protocol: (1) Rationale; (2) Aims/Hypothesis; (3) Design and Methods; (4) Analytical Plan; (5) Relevance to Child Health
5.4	Prepare an Ethics Submission (if applicable) for review by the local ethics review panel.
5.5	Have the project approved by local resident scholarly committee/coordinator and faculty mentor/supervisor
5.6	Present an interim progress report to scholarly committee/coordinator (i.e., works in progress) during PGY2 or early in early PGY3
5.7	Carry out scholarly project (collect the data and analyze)
6.0	Present findings and final project at the Department's Annual Research Day or equivalent
6.1	STRONGLY RECOMMENDED: Present mid-term report to committee/fellow residents to determine progress to date
6.2	ADVANCED: Presentation of final project at national or international conference.
7.0	Write up scholarly findings and submit scholarly report to the satisfaction of the resident research coordinator/program director and faculty mentor/supervisor (Faculty mentor/supervisor should sign off on manuscript).
7.1	STRONGLY RECOMMENDED: Abstract submitted to local/national research competition
7.2	ADVANCED: Peer-reviewed publication prepared and submitted to medical journal

Table 2. Proposed list of acceptable study designs for paediatric resident scholarly projects

Study design
Quality Improvement*
Medical Education Evaluation/Project*
Knowledge translation activities*
Advocacy projects*,†
Surveillance studies
Case Series Study
Prospective Qualitative Study
Retrospective, hypothesis-driven clinical or epidemiological observational research using an existing database
Systematic or scoping review
Prospective, hypothesis-driven clinical or epidemiological observational or experimental study

Some programs may consider pairing residents into small groups to complete larger research projects.

*Must include an evaluation component; †must have significant individual contribution.

an evaluation component based on rigorous methodology. We provide a suggested timeline for accomplishing milestones for the scholarly project (Table 3). This timeline can be used to track progress and set goals for paediatric scholarly projects. In addition, we recommend that all programs mandate a final oral or poster presentation to a research committee or panel of attending physicians as well as a formal written report. If these criteria are not met by a resident towards the end of their training, the committee suggests the resident complete a mandatory research elective, in order to complete all missing components of their scholarly project (Table 4).

DISCUSSION

The completion of a scholarly project is generally regarded as a key indicator of successful residency training. However, data from paediatric (7), internal medicine (8,9) and emergency medicine (10) training programs suggest that only half of residents successfully complete a project. Several institutions in Canada (3,11,12) and the USA (12,13) have created novel

Table 3. Proposed time for a scholarly project during paediatric residency

No.	Milestone	Timeline
1	Complete TCPS2* Tutorial	Before end of PGY1
2	Identify a research mentor	Before end of PGY1
3	Submit a short summary of research project to committee/coordinator	End of PGY1 (September PGY2)
4	Submit ethics proposal to Biomedical Research Ethics Board	December PGY2
5	Complete basic introduction to Epidemiology/Biostatistics Course	During PGY2
6	Present interim progress ('Works in Progress') regarding proposed project	March-June PGY2
7	Submit interim progress report or meet with local coordinator/committee regarding progress	End of PGY2
8	Present a manuscript during Local Resident Research Competition/Research Days	March-June PGY3
9	Submit manuscript for publication or to resident research committee	June/July PGY3

TCPS2 Tri-Council Policy Statement 2 (2014): Ethical Conduct for Research Involving Humans

Table 4. Proposed consequences for not achieving proposed milestones and project in the proposed timeframe

Level 1—Delay during interim reporting (either missing a works in progress, interim meetings, interim reports)
<p>If the resident fails to achieve interim milestones, they and their mentor will be asked to meet with the program director and / or program research lead to determine the barriers to the scholarly project, revise the timeline and agree on a course of action.</p> <p>If the resident does not respond to the revised agreement, this will be treated as an incomplete rotation and the resident will be required to take an additional elective to make up for lost time.</p>
Level 2—Incomplete project by PGY3
<p>Level A—Delay was unrelated to the effort/commitment of the resident (they were on track throughout and delay occurred during / at the end of the study due to circumstances out of the resident's control).</p> <p>Consequence: Submit final report detailing barriers to completion and resident and mentor meet with program director and research committee lead to discuss.</p> <p>Level B—Delay was caused by a reluctance by the resident to complete a project</p> <p>Consequence: If a resident fails to complete a project, present at a local or national meeting and fails to submit a final product, this should be treated the same as an incomplete clinical rotation; the resident will be held back from finishing residency or transferring to sub-specialty training until the project is complete to a level considered acceptable to the program director, research coordinator and mentor.</p> <p>A timeline should be established and agreed upon by both the program coordinator and research coordinator/committee during which time the resident will complete the necessary tasks to be considered an adequate scholarly project.</p>

programming to enhance scholarly activity. Programs often respond to concerns regarding protected time for research (14) by including blocked rotations for research. The current survey expands on these studies by demonstrating that few programs mandate the completion of a scholarly project. Developing core standards across paediatric resident programs in Canada and learning from the success of programs that offer longitudinal blocks for scholarly training may enhance the quantity and quality of scholarly projects among paediatric residents in Canada.

Qualitative or survey studies of residents reveal that the majority of residents feel they do not have the time to complete a scholarly project. Residents also state lack of formalized training as a significant barrier to project completion. Currently, there are six programs in Canada that provide a block of time dedicated to core skill building in basic principles

of evidence-based medicine and critical appraisal (Dalhousie and Manitoba – 4 weeks; Calgary – 3 weeks; Western – 3 weeks; Alberta – 1 week; Ottawa – 1 week). Informal feedback from residents enrolled in these programs suggests that residents benefit greatly from these teaching blocks, and feel better prepared to undertake the development of a scholarly project (15). Given that evidence-based medicine is at the core of all physician activities, the creation of a committee of scholars and residents that can support and implement these guidelines, presented here may enhance resident productivity (3). Research is limited for the role that scholarly activity plays in the subsequent career choices of residents and on the optimal method for supporting scholarly activity. Consideration should therefore be given to formal evaluations of programs that support resident scholarly activity to better inform future

initiatives. Following the release of these guidelines, the network of research coordinators, together with the program directors should undertake an evaluation of the uptake of these guidelines and its subsequent impact on resident scholarly productivity across Canada.

In an era of evidence-based medicine and an explosion of scientific information, it has never been more important for paediatric resident training programs in Canada to provide support for high-quality scholarly programs. The creation of a national network of program coordinators has helped to facilitate the harmonization of expectations and knowledge sharing. Several novel, strengths-based initiatives are underway in several paediatric resident programs. The adoption of shared expectations across paediatric residency programs is another important step in this process, which will further to help increase scholarly training, output and satisfaction of residents in Canadian paediatric training programs. We feel this initiative is particularly timely as programs are shifting towards competency-based models of training and evaluation. In developing these guidelines, we carefully considered the potential impact the move towards competency-based models will have on the scholarly training of residents. We recognize that some revisions maybe required as paediatric resident training programs adopt these expectations. However, the clearly established guidelines proposed here will allow for greater consistency in the scholarly training provided to Paediatric residents across Canada and a framework for programs that are aligning training programs with the new CanMeds guidelines. We also believe that most of the core elements of any competency-based training in resident scholarship are captured in our proposed guidelines.

Supplementary Material

Supplementary data are available at *Paediatrics & Child Health* Online.

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