Benchmarking a Canadian Anesthesiology Resident Research Program against national norms using a logic model framework: a quality improvement study.

Évaluation d'un programme de recherche canadien pour les résidents en anesthésiologie par rapport aux normes nationales à l'aide d'un modèle logique : une étude d'amélioration de la qualité

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Abstract

Background: Canadian specialty training programs are expected to deliver curriculum content and assess competencies related to the CanMEDS Scholar role. We evaluated our residency research program and benchmarked it against national norms for quality improvement purposes.

Methods: In 2021 we reviewed departmental curriculum documents and surveyed current and recently graduated residents. We applied a logic model framework to assess if our program's inputs, activities, and outputs addressed the relevant CanMeds Scholar competencies. We then descriptively benchmarked our results against a 2021 environmental scan of Canadian anesthesiology resident research programs.

Results: Local program content was successfully mapped to competencies. The local survey response rate was 40/55 (73%). In benchmarking, our program excelled in providing milestone-related assessments, research funding, administrative, supervisory, and methodologic support, and requiring a literature review, proposal presentation, and local abstract submission as output. Acceptable activities to meet research requirements vary greatly among programs. Balancing competing clinical and research responsibilities was a frequently reported challenge.

Conclusions: The logic model framework was easily applied and demonstrated our program benchmarked well against national norms. National level dialogue is needed to develop specific, consistent scholar role activities and competency assessments to bridge the gap between expected outcome standards and education practice.

Résumé

Contexte : Les programmes de spécialité canadiens doivent proposer un contenu de formation en lien avec le rôle CanMEDS d'érudit et évaluer les compétences qui s'y attachent. Nous avons évalué notre programme de résidence en recherche par rapport aux normes nationales en la matière à des fins d'amélioration de la qualité.

Méthodes : En 2021, nous avons examiné les documents du programme d'études du département et interrogé les résidents et des médecins récemment diplômés. Nous avons utilisé un modèle logique pour déterminer si les intrants, les activités et les extrants de notre programme couvraient adéquatement les compétences pertinentes liées au rôle CanMeds d'érudit. Nous avons ensuite comparé de façon descriptive nos résultats à une analyse du milieu des programmes de résidence canadiens en recherche en anesthésiologie effectuée la même année.

Résultats : Nous avons établi une correspondance entre le contenu du programme local et les compétences. Le taux de réponse à l'enquête était de 40/55 (73 %). D'après l'analyse comparative, notre programme se démarque par l'offre d'évaluations d'étape, de fonds de recherche, de soutien administratif, de supervision, d'orientation méthodologique, et, en ce qui concerne les extrants, par l'exigence d'une analyse documentaire, de la présentation d'une proposition et de la soumission d'un résumé à l'université. Les activités admissibles pour répondre aux exigences de la recherche varient considérablement d'un programme à l'autre. De nombreux répondants ont signalé la difficulté de concilier les responsabilités cliniques et de recherche.

Conclusions : L'application du modèle logique a été aisée et elle a permis de montrer que notre programme respecte les normes nationales. Un dialogue au niveau national est nécessaire pour définir de manière précise et cohérente les activités et les évaluations des compétences en lien avec le rôle d'érudit afin de combler le fossé entre les normes quant aux résultats attendus et les pratiques des programmes.

Introduction

Canadian residency training programs are expected to teach and assess competencies related to the Scholar role, one of seven roles that make up the Royal College of Physicians and Surgeons of Canada's (RCPSC) CanMEDS physician competency framework.[1] The Scholar role includes Key and Enabling competencies related to evaluating evidence and contributing to scholarship.[2,3] These competencies are typically achieved through participation in a resident research project, and are supported by measurable targets (milestones) that mark trainee progression.[4–7] These milestones serve as guides that clarify learning expectations and provide assessment opportunities for feedback.[8]

Despite this national criterion-referenced framework, research requirements vary across Canadian anesthesiology residency programs in their extent and rigor.[9] In residency programs generally, methods of assessment may not be suitable or consistently applied.[5,10,11] The resultant inconsistencies in curricula, resource inputs, expected outputs, and evaluation threaten the validity of a national standard for scholar role competency. The RCPSC has embarked on a process to update the CanMEDS framework in 2025 (CanMEDS 2025) with goals that include "anticipating and supporting the practical needs of medical education programs" and "considering the practical implementation needs of partnering organizations."[12] This presents an opportunity to reexamine the alignment of education practice with concepts underpinning the CanMEDS competency framework for the Scholar role.

We evaluated our RCPSC accredited anesthesiology resident research program to provide perspective for other Canadian programs and to inform discussions around scholarly activity in residency related to CanMEDS 2025. Specifically, we sought to answer the following research questions: How well is our local program addressing and assessing CanMEDS Scholar competencies? What gaps can be identified in how Scholar competencies are addressed and assessed?

Methods

Study design.

We undertook benchmarking of our local program's scholarly activity against national norms. Benchmarking is a practice grounded in continuous quality improvement that allows an organization to compare key metrics, strategies, and performance to those of other organizations, to identify best practices and develop improvement plans.[13–17] Benchmarking of research skills is a noted gap in medical education.[16] Following a local program evaluation consisting of a resident survey and program document review, we used strategic benchmarking to compare our methods of addressing and assessing scholar competencies in the Anesthesia postgraduate program at the University of Saskatchewan to those of other Canadian anesthesia programs (Figure 1). This evaluation and benchmarking[15,16] project was deemed exempt from ethical review by the institutional Research Ethics Board (Local Program Evaluation: Beh-REB 3291 Feb. 28, 2022; Benchmarking: Beh-REB 3354 Mar 18, 2022).
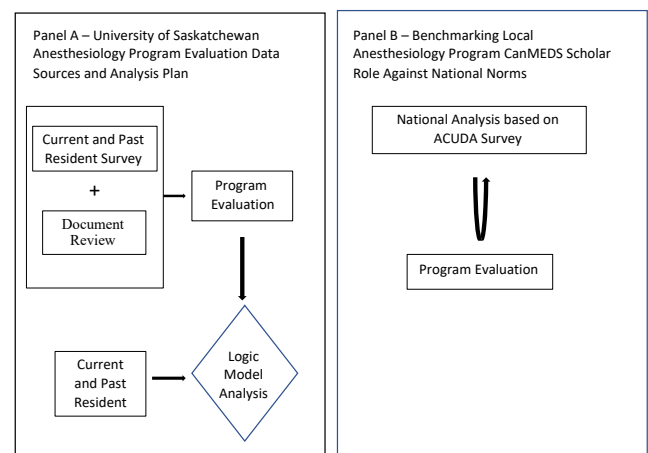
Figure 1. Flow diagrams of data sources and analysis plans

Local program evaluation.

For the local program evaluation, we used data from: 1) a survey of current and past residents, and 2) review of local program documents. We developed the resident survey following a literature review. Survey questions arose from three sources: 1) a previously published needs assessment used in a similar context, consisting of four domains: demographics, current research activities, prior research training, and a research knowledge self-assessment;[20] 2) two authors (EBT, JG) iteratively developed questions *de novo* pertaining to residents' experiences and perceptions of useful resources, departmental support, and overall success in achieving research program objectives; and 3) select questions borrowed from the concurrent ACUDA questionnaire pertaining to challenges. From the previously published survey, we modified questions pertaining to current research activities (e.g. frequency of meeting with supervisor) and self-assessed research knowledge (e.g. areas for additional training) for appropriateness to our setting and activities (eSupplement

A). The survey was pre-tested by four people: a research staff person, a faculty person, and two residents (a senior and a junior), resulting in changes to balance Likert response options, and the addition of a brief description of the Resident Research Program components to preface the questions.

The questionnaire was distributed electronically via Survey Monkey by department administrative staff to 55 current and past residents (graduating classes of 2017-2025) between March 18 and April 26 of 2021. Two reminders were sent. The questionnaire was anonymous except IP addresses, which were removed from the data prior to analysis.

We reviewed local program documents for two purposes: 1) to illustrate program components and outputs in a logic model, and 2) to inform comparisons with the ACUDA Resident Research report. Documents included the annual calendar, the Resident Research Program outline, a Research Orientation presentation offered to new residents, and a research progress database that tracks resident projects, team members, progress, funding, and publications and is administered by the research coordinator.

Logic model

We used a logic model framework,[18,19] a process tool for program planning, implementation and evaluation to illustrate the local program and its various components including inputs, activities and outputs, and to inform comparisons with the ACUDA report. The department's Research Coordinator (EBT) generated a logic model using data obtained from the resident survey, program documents, and publicly available Anesthesiology Scholar competencies (key and enabling competencies) published by the RCPSC[2] and assessed whether these components were aligned with and logically led to the intended outcomes. The logic model was reviewed and revised through an iterative process with local experts- the Postgraduate Program Director (EC) and Executive Director of Research (JG).

Benchmarking

Benchmarking against national norms allowed us to contextualize our findings, identify best practices,[16] and support program evolution to achieve the CanMEDS Scholar competencies. National scholarly activity norms were established by a report conducted by and circulated to the Research Committee of the Association of Canadian Universities of Anesthesia (ACUDA), "*Resident Research in*

the CBME Era: A report of a survey of ACUDA research committee members" (eSupplement B). ACUDA is an organization with representation from all 17 Canadian Anesthesiology programs regulated by the RCPSC, and the Research Committee's membership consists of the Research Director or designate from each program. Their survey was developed concurrently to the local program evaluation, but independently by the committee, through iterative feedback and consensus on content. It asked committee members to provide basic data about their residency program, the types of resident research activities and assessments, and the challenges the program faced related to resident research. Thirteen ACUDA programs (13/17, 76%), including our own program, completed the ACUDA questionnaire.

Analysis

We tabulated descriptive statistics for the local program resident survey, using all responses (even partial ones). We report key findings from the local program document review in the logic model framework as inputs, activities, outputs, outcomes, and challenges. Finally, we compared key metrics and findings related to inputs, activities, outputs, outcomes, and challenges against the national norms established by the ACUDA research report.

Results

Local program evaluation.

Forty respondents (40/55, 73% response rate) participated in the local program questionnaire. The logic model provided a framework to illustrate local program inputs, activities, outputs, outcomes, and challenges (Table 1).

Benchmarking

Like most (13/17, 7676%) ACUDA programs, the local resident research program has between 25-35 residents. A comparison with national norms is presented in Appendix A, Table 2.

Inputs. Residents rated the availability of local resources more favorably than national norms. Most of our residents agreed the local program has sufficient resources to ensure their research success; the most important resources were identified as supervisor mentorship (33/35, 94%) followed by research staff (31/35, 88%); ACUDA programs identified finding supervisors to be challenging. The ACUDA report identified more challenges with faculty and leadership promotion of scholarly activity than the local program.

Table 1. A logic model for a resident research program in anesthesiology

Program Delivered		Program Results	
Inputs *Resources invested*	Activities *Training opportunities*	Outputs *Assessment opportunities*	Outcomes *Scholar Key and Enabling Competencies*[2]
Human resources: Resident Research Coordinator [1], Research Associate, Statistician Research Active Faculty [2] (*n* = 16) Financial resources: Resident Research Day Awards Internal research funding (amount determined on year-to-year basis)	Resident Research Orientation [3] Librarian Tutorial [4] Clinical Research Methodologies (CLR800) Course [5] CLR800 Tutorials Biostatistics and Research Methods Academic Half Day Journal Club Biannual Check-in/Research progress meeting with coordinator Resident Research Day Protected research days (30) [6]		3. Integrate best available evidence into practice
		1a. CLR800 assignment – Overview of Research Process and N=1 Trials 1a. CLR800 assignment – Literature Review 1c. CLR 800 assignment – Develop Research Question 1b. Journal Club - Critical Appraisal x1 1a. CLR800 assignment - Project Proposal 2a. Project Proposal 2b. Early Peer Review - Proposal Poster Presentation	3.1 Recognize practice uncertainty and knowledge gaps in clinical and other professional encounters and generate focused questions that address them
		1b. Journal Club - Critical Appraisal x1	3.2 Identify, select, and navigate pre-appraised resources
		1a. CLR800 assignment - Research Process 1b. CLR800 assignment - Critical Appraisal x2	3.3 Critically evaluate the integrity, reliability, and applicability of health-related research and literature
		1a. CLR800 assignment - Research Process 1b. CLR800 assignment - Critical Appraisal x2 2b. Early Peer Review - Resident Research Day Proposal Poster	3.4 Integrate evidence into decision-making in their practice
			4. Contribute to the creation and dissemination of knowledge and practices applicable to health
		1a. CLR800 assignment - Project Proposal 2a. Project Proposal to Research Coordinator 2c. Late Peer Review - Journal Club Proposal Presentation 2f. Resident Research Day - Dissemination of Results 2e. Data Collection and Analysis	4.1 Demonstrate an understanding of the scientific principles of research and scholarly inquiry and the role of research evidence in health care
		1a. CLR800 assignment - Research Process 1a. CLR800 assignment - Project Proposal 1b. Journal Club - Critical Appraisal 2a. Project Proposal to Research Coordinator 2c. Late Peer Review - Journal Club Proposal Presentation 2d. Obtain Research Ethics and other Approvals 2d. Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans 2e. Data Collection and Analysis	4.2 Identify ethical principles for research and incorporate them into obtaining informed consent, considering potential harms and benefits, and considering vulnerable populations
		2 a-f. Mentored Research or Scholarly Project	4.3 Contribute to the work of a research program
		1a. CLR800 assignment - Research Process 1a. CLR800 assignment - Project Proposal 1b. CLR800 assignment - Critical Appraisal x2 2a. Project Proposal 2c. Late Peer Review- Journal Club Presentation 2b. Early Peer Review- Resident Research Day Proposal Presentation	4.4 Pose questions amenable to scholarly inquiry and select appropriate methods to address them
		1b. Journal Club - Critical Appraisal x1 2f. Resident Research Day - Dissemination of Results 2f. Dissemination/Presentation at Conferences (encouraged) 2.f Publication (encouraged)	4.5 Summarize and communicate to professional and lay audiences, including patients and their families, the findings of relevant research and scholarly inquiry
Challenges: Residents have difficulty balancing the demands of research with clinical requirements, and difficulty finding research projects that are small enough to complete yet still important enough to justify their execution.			

[1]The resident research coordinator is a university employee responsible for matching residents with projects and evaluating their progress against the milestones listed in the competencies.

[2] Research active faculty have a track record of completing research projects with residents, medical students, or independently

[3] The resident research orientation is a 3-hour session that outlines the scholarly curriculum for the residents

[4] The librarian tutorial is a 3-hour session that orientates residents to library resources and databases.

[5] The Clinical Research Methodologies course is an online 16-week graduate level course offered by the College of Medicine and open to graduate studies students of various faculties. It is mandatory for residents in our program.

[6] Protected research days are days without clinical responsibilities during which the resident is to dedicate their time to the completion of their research. These are in addition to research related tasks completed at other times.

Activities. Most ACUDA programs permit residents to complete a Case Report as a research project, but these are insufficient alone to meet the research requirement in our program. Other acceptable project types and quantity are similar across programs.

Outputs. In our program, residents are assessed for Scholar competencies through a literature review, presenting a proposal to an intramural audience, and submitting a written abstract for an intramural research day; this is not the case in about half of ACUDA programs. In most ACUDA programs, most residents give an oral research presentation at an intramural forum; our local program requires all residents to present interim or completed study results at the annual Resident Research Day.

Outcomes. The local resident research program has established eight assessment opportunities for Scholar competencies (Table 1), whereas the minority of ACUDA programs reported having milestones (or Entrustable Professional Activities; EPAs) related to the scholarly project.

Challenges. Both local and ACUDA respondents report the greatest challenge to research project success is the difficulty of balancing resident scholarly activity with clinical responsibilities. Slightly more of our residents reported difficulty finding research projects that are important but small enough to complete, compared to ACUDA programs. Substantially more local respondents valued research as important, whereas nearly half of ACUDA programs report residents undervalue the importance of research.

Discussion

Our study evaluated and compared our program's scholarly activity program to national norms and highlighted gaps in the mobilization of Scholar competencies. The logic model framework[18,19] allowed us both to describe the program and guide evaluation and benchmarking with national norms. This study illustrates how an evaluation and benchmarking analysis can identify gaps to refine both a local and national approach to structure, deliver, and assess competencies related to the Scholar role. This approach could be replicated in other residency programs and specialties to improve the teaching and assessment of the Scholar role.

Our program was in the minority of ACUDA programs with specific assessment opportunities for milestones related to

scholarly activities. CanMEDS describes the Scholar competencies (*Outcomes)*; Competency by design (CBD) and related assessments are developed at the national program level by the specialty committee and incorporate CanMEDS milestones. Because scholarly competencies are poorly assessed in a work-based setting, it will be important to identify specific and consistent assessment opportunities for Scholar competencies (*Outputs*). Experts in CBD suggest competencies should be assessed in a stepwise, sequenced manner, with multiple circumstances repeatedly over time using Direct Observation, In-Training Evaluation Reports, and Portfolios.[4–7,21] Specialty Committees should clarify learning expectations for trainees through standardized assessment tools.

Individual PGME programs are responsible to resource (*Inputs*), design (*Activities*), and determine *Outputs* of the curriculum. A realist review of strategies and mechanisms for encouraging resident research in clinical settings identified three best practices: 1) opportunities to engage in practice-informed research supported by longitudinal curricula; 2) guidance by clinician-researchers; and 3) assessing residents' research readiness and promoting their intentionality for engagement.[22] While our local research program demonstrated strengths in providing resources and supports including guidance from 16 research-active clinical faculty (*Inputs*), longitudinal practice-informed structure (*Activities*), and several assessment opportunities (*Outputs),* our logic model highlights areas where those inputs and activities are ill-fitted to outputs and outcomes. This may relate to the relative difficulty with assessing non-medical expert roles compared to clinical CanMEDS competencies.[10,11,23,24] Our evaluation suggests that the existence of substantial resources, and training and assessment opportunities did not ease residents' challenges in balancing clinical and research responsibilities. Working groups to develop and share resources among programs have been proposed as a solution to fill the need for teaching and assessment tools.[24]

 Strengths of this research include benchmarking our local findings against national norms to frame the inputs, activities, outputs, and challenges within the larger context of PGME Anesthesiology scholarly programs in Canada. Other programs and specialties may reproduce this work in their own contexts using the ACUDA report for reference (eSupplement 2). Limitations include those inherent to the secondary use of data; the national findings allowed us to

compare program inputs, activities, and challenges more comprehensively than outputs and outcomes because the latter were not a focus of the original work. Further, local findings were obtained from current and past residents whereas national findings were obtained from members of the ACUDA research committee using different survey instruments; it is possible these different perspectives and methods contributed to discrepancies in attitudes towards resources and barriers.[25] Benchmarking methods can be employed to compare high level structures, strategies, and performance to inform and identify gaps despite disparate sources of data.[13–17]

Conclusions

We identified a gap between national standards for outcomes versus national standards for education and assessment of the Scholar role. We found our local residency research scholarly requirements to be similar and at times, more stringent than other Canadian Anesthesiology programs, and the challenges faced by residents to be shared with other programs. The Anesthesia Specialty Committee could improve the consistency and quality of assessments of the Scholar role. As the Royal College reconsiders, the CanMEDS competency framework, we encourage progressive and regular assessment of Scholar role milestones related to the resident research requirement–with the intention of helping residents complete scholarly work and enhancing resident perception of competence. We hope the CanMEDS 2025 will guide Anesthesia's CBD program to develop better assessments at the national level.

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Appendix A.

Table 2. Benchmarking of local program against national norms.

	Local program document review [1]	Local program resident survey [1]	ACUDA research report
Inputs			
Scholarly activity project is mandatory	Yes		11/13 (85%) mandatory 2/13 (15%) optional
Method of connecting residents with mentors	May approach researcher directly		13/13 (100%) residents may approach researcher directly
	May discuss with Research Director or Coordinator		12/13 (92%) residents may approach research director directly
	Project ideas list is centrally available		3/13 (23%) projects are centrally posted by researchers
Readily available funding for extramural conference presentations	Yes, via PGME fund		10/13 (77%)
Monetary awards at internal research symposia	Yes, via sponsorship [3]		10/13 (77%)
Program has adequate:			
Resources and supports		≤4% identify inadequate funding, administrative support and methodological consultants as a challenge	≤4/13 (31%) report 1 (no challenge) or 2 for funding, administrative support and methodological consultants on 5-point Likert scale
Supervisors/ mentorship		≤4% identify inadequate number of supervisors available as a challenge	5/13 (31%) report 1 (no challenge) or 2 for number of supervisors available to supervise residents on 5-point Likert scale
Research staff		22% identify inadequate research assistant support as a challenge	2/13 (15%) report 1 (no challenge) or 2 for access to research assistants on 5-point Likert scale.
Activities			
Acceptable project types			
Original investigations	Yes		12/12 (100%)
Quality improvement work	Yes		13/13 (100%)
Curriculum development without metric measurement	No		5/13 (38%)
Curriculum development with metric measurement	Yes		8/13 (62%)
Advanced academic course work	Yes		7/13 (54%)
Advanced clinical course work	No		3/13 (25%)
Case reports	No		10/13 (83%)
Literature reviews	No, not in isolation		7/13 (54%)
Typical number of protected research days within the curriculum	30 days		Mode = 30 days (6/12 respondents) Range = 0 to 90 days
Number of projects residents are involved in			
1 project in its entirety		52%	8/13 (62%) report 81-100% of residents meet this criterion
2 or more projects in their entirety		17%	12/13 (92%) report ≤20% of residents meet this criterion
1 project in its entirety plus smaller roles in other projects		22%	13/13 (100%) report ≤40% of residents meet this criterion
Resident's role in research tasks:			
Statistical analysis and interpretation	Residents interpret the analysis carried out by a statistician		5/13 (39%) report ≥81% of residents are involved in interpreting data analyzed by another team member or organizing data into tables and figures

Work in a basic science wet lab	Very rarely		5 (39%) report residents never work in a basic science wet lab; 7 report they do so rarely (<20% of the time)
Outputs			
Literature review, proposal presentation, abstract submission for internal research day	Yes, 100%		7/13 (54%)
Manuscript preparation & publication	Not required by program, required by some supervisors; approx. 30% publish		3/13 (23%) report 81-100% of residents write a complete manuscript
Oral presentation to internal audience	Yes, 100%		8/13 (62%) report 81-100% of residents give an oral research presentation at an intramural forum
Outcomes			
Entrustable professional activities or milestones related to scholarly activity project [4]	Yes		4/13 (31%)
Challenges			
Balancing responsibilities		65% report difficulty	9/13 (69%) report this to be a major challenge (4 or 5 on a 5-point Likert)
Finding appropriately sized projects		52% report difficulty	5/13 (38%) report this to be a major challenge (4 or 5 on a 5-point Likert)
Inadequate access to research assistants for consent, data collection, and related tasks		22% identified this challenge	6/13 (46%) report this to be a major challenge (4 or 5 on 5-point Likert)
Faculty inadequately promote the value of research		4% identified this challenge	3/13 (23%) report this to be a major challenge (4 or 5 on a 5-point Likert)
Residents undervalue the importance of research		9% identified this challenge	6/13 (46%) report this to be a major challenge (4 or 5 on a 5-point Likert)

1 Color coding-- green exceeding national norms; yellow falling behind national norms
2 More than one response was allowed in the ACUDA questionnaire
3 Saskatchewan Division of the Canadian Anesthesiologists Society
4 All programs have EPAs and milestones as set out by the RCPSC. We interpreted this to mean that programs had not clearly outlined assessment opportunities for EPAs and milestones.
5 Residents could select more than one in the local program evaluation

Objective of the Questionnaire:

To obtain valuable information for the refinement and modification of the resident research curriculum that will ensure that residents receive comprehensive research training, and build confidence in their research skills, such that they are encouraged to critically appraise and potentially participate in research in their future careers.

The Royal College of Physicians and Surgeons, Objectives of Training in Anesthesiology states: Anesthesiologist are able to...

Contribute to the development, dissemination, integration and translation of new knowledge and practices, which includes completing a scholarly project, understanding, applying and critically analyzing research contributions, ethics, and methodology.

The purpose of the department's Resident Research Program is to prepare the residents for RCPS exams, and to prepare the residents for their clinical careers.

Anesthesiology residents in our department are required to complete the Clinical Research Methodology (CLR800) course, and participate in the accompanying tutorials, obtain research ethics and SHA approvals, collect data, present at Resident Research Day and Journal Club, and disseminate results by submitting to an academic journal or presenting at a professional meeting or academic conference.

The Department of Anesthesiology aims to provide residents with opportunities to engage in research in areas in which they are interested, with the appropriate resources and supports to be successful in their exams and in research, and the skills to critically appraise and potentially pursue future independent research.

1. In what year of your Anesthesiology Residency are you, or in what year did you complete your Residency?

- ◯ R1
- ◯ R2
- ◯ R3
- ◯ R4
- ◯ R5

- ◯ 2020
- ◯ 2019
- ◯ 2018
- ◯ 2017

2. In your opinion, how effective is the Department Research Program in supporting the residency objectives listed above?

- ◯ Extremely effective
- ◯ Effective
- ◯ Somewhat Effective

- ◯ Neutral
- ◯ Not effective
- ◯ Unsure/not enough information to comment

3. In general, how positive do you feel about the Resident Research Program <u>requirements</u> as a whole (i.e. research project requirement, CLR800, tutorials, Journal Club presentations)?

○ Very positive   ○ Negative

○ Positive   ○ Very negative

○ Neutral   ○ Unsure/not enough information to comment

4. In general, how positive do you feel about the Resident Research Program <u>supports</u> as a whole (i.e. faculty supervisors, research staff, other supports)?

○ Very positive   ○ Negative

○ Positive   ○ Very negative

○ Neutral   ○ Unsure/not enough information to comment

5. In your opinion, how well does the Resident Research Program prepare you/residents for the **RCPSC Exam**?

○ A great deal   ○ A little

○ A lot   ○ None at all

○ A moderate amount   ○ Unsure/not enough information to comment

6. In your opinion, how well does the Resident Research Program prepare you/residents for **future clinical careers**?

○ A great deal   ○ A little

○ A lot   ○ None at all

○ A moderate amount   ○ Unsure/not enough information to comment

7. In your opinion, how well does the Resident Research Program prepare residents for **future academic careers** (one that includes research)?

○ A great deal   ○ A little

○ A lot   ○ None at all

○ A moderate amount

8. How often do you receive **research related support** or offer of **research related support** (e.g. meeting, email, virtual call, documents and resources) from your supervisor, research support staff/faculty, or instructors?

○ More often than I need   ○ Not nearly enough

○ Just the right amount   ○ Never

○ Not quite enough

9. My <u>faculty supervisor</u> checks in with me on my research progress...

○ More often than I need   ○ Not nearly enough

○ Just the right amount   ○ Never

○ Not quite enough

10. How often do you receive **research related support** or an offer of **research related support** (e.g. meeting, email, virtual call, documents and resources) <u>from your supervisor</u>?

○ About once a week   ○ Once a year

○ A few times a month   ○ Less than once a year

○ Once a month   ○ Never

○ Once every couple of months

11. The <u>research support staff</u> (coordinator, associate, assistant) checks in with me on my research progress...

○ More often than I need   ○ Not nearly enough

○ Just the right amount   ○ Never

○ Not quite enough

12. How many times in a year do you receive **research related support** or an offer of **research related support** (e.g. meeting, email, virtual call, documents and resources) from <u>research support staff</u> (coordinator, associate, assistant)?

○ About once a week   ○ Once a year

○ A few times a month   ○ Less than once a year

○ Once a month   ○ Never

○ Once every couple of months

13. With regards to my research project, my biannual progress check-in with PGME occur...

○ More often than I need

○ Just the right amount

○ Not quite enough

○ Not nearly enough

14. Which supports and resources do you feel are most important for Resident Research success? Choose as many as you like.

☐ CLR800 Course (Modules and assignments) ☐ Supervisor support and mentorship

☐ CLR800 (Module and other material) Tutorials ☐ None of the above

☐ Research Coordinator, Associate, Assistant support

Other (please specify)

[   ]

15. I feel that the department of Anesthesiology has the resources and supports available to ensure that I become and capable and confident independent researcher.

○ Strongly agree ○ Disagree

○ Agree ○ Strongly disagree

○ Neither agree nor disagree

16. Provide an example of a time when you felt most prepared, informed, or capable in research? Did anyone assist you in reaching that place?

[   ]

Research Skills

17. I believe that the research training I received/am receiving during my residency, provided/will provide me with adequate skills to be proficient in:

- [ ] Study Design
- [ ] Database Management
- [ ] Budget
- [ ] Writing Grant Proposals
- [ ] Statistics
- [ ] Ethics in Research
- [ ] Managing a Research Team
- [ ] Manuscript Preparation
- [ ] None of the above

18. The CLR800 Curriculum I received/am receiving during my residency provided/will provide me with adequate skills to be proficient in:

- [ ] Study Design
- [ ] Database Management
- [ ] Budget
- [ ] Writing Grant Proposals
- [ ] Statistics
- [ ] Ethics in Research
- [ ] Managing a Research Team
- [ ] Manuscript Preparation
- [ ] None of the above

19. I would benefit/could have benefited from additional training and practice from the CLR800 curriculum in areas relating to:

- [ ] Study Design
- [ ] Database Management
- [ ] Budget
- [ ] Writing Grant Proposals
- [ ] Statistics
- [ ] Ethics in Research
- [ ] Managing a Research Team
- [ ] Manuscript Preparation
- [ ] None of the above

20. My supervisor and the department faculty provided/provide me with adequate training and mentorship:

- [ ] Study Design
- [ ] Database Management
- [ ] Budget
- [ ] Writing Grant Proposals
- [ ] Statistics
- [ ] Ethics in Research
- [ ] Managing a Research Team
- [ ] Manuscript Preparation
- [ ] None of the above

21. I would benefit/could have benefited from additional training and mentorship from my supervisor and the department faculty relating to:

- [ ] Study Design
- [ ] Database Management
- [ ] Budget
- [ ] Writing Grant Proposals
- [ ] Statistics
- [ ] Ethics in Research
- [ ] Managing a Research Team
- [ ] Manuscript Preparation
- [ ] None of the above

22. The Department research staff provided/provide me with adequate training and mentorship and CLR800 tutorials in the areas of:

- [ ] Study Design
- [ ] Database Management
- [ ] Budget
- [ ] Writing Grant Proposals
- [ ] Statistics
- [ ] Ethics in Research
- [ ] Managing a Research Team
- [ ] Manuscript Preparation
- [ ] None of the above

23. I would benefit/could have benefited from additional training and mentorship and CLR800 tutorials from the Department research staff in the areas of:

- [ ] Study Design
- [ ] Database Management
- [ ] Budget
- [ ] Writing Grant Proposals
- [ ] Statistics
- [ ] Ethics in Research
- [ ] Managing a Research Team
- [ ] Manuscript Preparation
- [ ] None of the above

24. To be a proficient researcher in my future career, I would benefit/ could have benefitted from more training in:

- [ ] Study Design
- [ ] Database Management
- [ ] Budget
- [ ] Writing Grant Proposals
- [ ] Statistics
- [ ] Ethics in Research
- [ ] Managing a Research Team
- [ ] Manuscript Preparation
- [ ] None of the above

25. I am confident in my abilities to independently conduct research in:

- [ ] Study Design
- [ ] Database Management
- [ ] Budget
- [ ] Writing Grant Proposals
- [ ] Statistics
- [ ] Ethics in Research
- [ ] Managing a Research Team
- [ ] Manuscript Preparation
- [ ] None of the above

Additional Comments

26. If you have any additional comments, things to share, suggestions or ideas to improve the program, please share them with us.

27. Please rate the following items on a 5-point Likert scale as to what extent you perceive them to be challenges, with 1 being 'not at all' to 5 being 'tremendous'.

	Not at all				Tremendous
Inadequate administrative support	○	○	○	○	○
Inadequate funding for resident scholarly activity projects	○	○	○	○	○
Inadequate access to biostatistical consultants	○	○	○	○	○
Inadequate access to methodological consultants	○	○	○	○	○
Inadequate access to research assistants for consent, data collection, and related tasks	○	○	○	○	○
Inadequate number of supervisors with appropriate skill set for supervision of resident scholarly activity	○	○	○	○	○
Inadequate number of supervisors with active research or QI programs into which residents' scholarly activity projects can be incorporated	○	○	○	○	○
Inadequate number of supervisors willing to supervise resident scholarly activity projects	○	○	○	○	○
Difficulty finding appropriately sized projects for residency that are small enough to complete yet still important enough to justify their execution	○	○	○	○	○
Departmental leadership inadequately	○	○	○	○	○

promotes the value of research and resident scholarly activity	○	○	○	○	○
Departmental faculty inadequately promote the value of research and resident scholarly activity	○	○	○	○	○
Residents undervalue the importance of research and resident scholarly activity	○	○	○	○	○
Residents, in general, struggle to balance the demands of a resident scholarly activity project with other clinical and non-clinical responsibilities	○	○	○	○	○
Particular residents struggling to achieve clinical competence can't afford to take on the additional responsibility of a resident scholarly activity project	○	○	○	○	○

Resident Research in the CBME Era: A report of a survey of ACUDA research committee members

Survey led by and report prepared by:

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Department of Anesthesiology, Perioperative and Pain Medicine, University of Manitoba

INTRODUCTION

Resident participation in scholarly activity is a longstanding tradition in anesthesiology departments with well established local and national forums for supporting resident research including the CAS annual meeting and CARF's support of a resident research grant. This tradition has endured despite perennial challenges in funding scholarly activity and more recent challenges to researchers posed by increasingly stringent standards for institutional approval, funding, reporting and publication of research.

The last few years have also seen significant change in the delivery of the anesthesiology residency curriculum. The specialty was among the first in Canada to shift to a competency based residency curriculum with increased documentation of learner exposures and experiences, and increased transparency in learner expectations through milestones and entrustable professional activities. With regards to scholarly activity projects, the curriculum guide and entrustable professional activity guide don't offer prescriptive guidance on active participation, focusing more on milestones of theoretical knowledge acquisition. The participatory milestones in the sole relevant EPA (core EPA #40 in the 2019 edition) are to "contribute to a scholarly investigation and to the dissemination of research findings", "actively participate as a research team member" and "prepare a manuscript suitable for publication in a peer-reviewed journal".

Despite these significant challenges and changes, there has been no recent work characterizing the administration and outcomes of anesthesiology residency scholarly activity projects in Canada. The objective of this survey was to complete an environmental scan of how resident scholarly activity projects are conducted in ACUDA programs, to characterize their outputs and the perceived challenges to success. The survey results were meant to serve as a source of practical, foundational knowledge for further work at the individual department or national level to enhance resident exposure to scholarly activity.

METHODS

This was a voluntary, anonymous, cross-sectional, self-administered, web-based survey of Association of Canadian University Departments of Anesthesia (ACUDA) research committee members, by the committee. No ethics committee permissions were sought for this survey. The survey population was the ACUDA research committee, whose membership includes a designate from each of the ACUDA institutions. The designate is typically that department's Head of Research or similar position, or a designate. An anonymous survey was chosen over solicitation of departmental documents in order to obtain content experts opinions of the *de facto* administration of scholarly activity projects, as opposed to the historical ideals, narrow focus and lack of anonymity offered through official departmental documents. However, within the survey, a specific request was made soliciting departmental competency based curriculum documents specific to the scholarly activity project.

A draft survey was prepared in June 2021 by T. Mutter with assistance from G. Bryson. The survey was circulated to the ACUDA research committee in advance of its annual virtual meeting on June 12, 2021 with a request for feedback. At the meeting, the survey and feedback received were presented and reviewed. There was consensus to distribute the survey over the coming weeks and provide a report of analyzed results in the Fall of 2021. A finalized version of the survey was created incorporating all feedback.

The survey requested basic data about the residency program, and the types of scholarly activity projects permitted and undertaken. The survey also requested information about how projects were completed and the expectations of resident's participation, including grading and remediation. Respondents were also asked to rank the importance of a number of potential challenges to running a successful resident scholarly activity program.

The survey was deployed online using the Survey Monkey® platform. Email invitations to participate were sent to committee members with a link to the survey on an approximately weekly basis from June 23 to July 21, 2021. The survey was closed on about August 3, 2021. The results for all questions were analyzed descriptively and presented in text or tables. No qualitative analysis of free text answers was undertaken but answers that were notable to the author are included in this report. Where free text answers obviously mapped to a provided stem, they were re-coded accordingly.

RESULTS

A total of 13 out of 17 Canadian university programs completed the survey.

- Eleven (85%) programs have a mandatory scholarly activity project component to their residency program, and the remaining 2 programs have an optional scholarly activity project.
- 10 respondents' programs (77%) have between 25-35 FRCPC residents, and of the remaining 3 programs (23%), 1 program has a total of 12 residents, one program has 50 residents, and one program has 94 residents.
- In all (13/13), or nearly all (12/13) programs, the residents approach potential supervisors directly to identify potential projects, or the director of research (or designate) to discuss projects, respectively. In 3 (23%) of programs, projects are centrally posted by supervisors though the department research office or other means.
- Only 4 of 13 (31%) programs have EPAs or milestones related to the scholarly project.
- 8 (62%) of programs offer both readily available funding for conference abstract presentations and cash awards for best projects at internal department research symposia.
  - Of the remaining 5 programs, 2 offer readily available funding for conference abstract presentations only, one offers gift cards for the best three projects only, one offers no rewards and one offers cash awards and attempts to fund conference abstract presentations via project grants.

The survey asked respondents to report the distribution of specific types of scholarly activity projects in their program and whether certain types of projects were permitted to qualify for the scholarly activity project.

TABLE 1. Proportion of programs permitting specific project types

	N	(%)
Original investigations*	12	100%
Quality improvement work	13	100%
Curriculum development without metric measurement	5	38%
Curriculum development with metric measurement	8	62%
Advanced course work in academia	7	54%
Advanced clinical course work*	3	25%
Case reports*	10	83%
Literature reviews (in isolation)	7	54%

*n = 12, 1 respondent left the stem blank but completed all other stems.

Original investigations are primary or secondary research projects where the primary aim is to disseminate broadly applicable knowledge in an academic journal.

Quality improvement work is scholarly activity where the primary aim is to measure local performance against accepted practice norms as part of a continuous process of improvement in care delivery.

Curriculum development examples include coursework material for other residents or medical students, including simulation programs. Outcome metric measurement means the new curriculum material is formally evaluated using quantitative or qualitative methods, against the older material it replaces.

Advanced course work in academia means advanced courses, degrees or certificates in research, education or leadership.

Advanced clinical course work includes formal POCUS, TEE training and other training to develop advanced clinical skills.

Two respondents' programs permit other types of projects not listed. These were, respectively, projects in the medical humanities, and a general answer of "we leave it flexible for the residents".

TABLE 2. Proportion of residents participating in specific project types, given that they are permitted.

	1-20%	21-40%	41-60%	61-80%	81-100%
	N (%)	N (%)	N (%)	N (%)	N (%)
Original investigations	2 (17%)	4 (33%)	1 (8%)	4 (33%)	1 (8%)
Quality improvement work	5 (38%)	5 (38%)	2 (15%)	0 (0%)	1 (8%)
Curriculum development without metric measurement	4 (80%)	0 (0%)	0 (0%)	0 (0%)	1 (20%)
Curriculum development with metric measurement	8 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Advanced course work in academia	7 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Advanced clinical course work	1 (33%)	0 (0%)	0 (0%)	1 (33%)	1 (33%)
Case reports	9 (90%)	1 (10%)	0 (0%)	0 (0%)	0 (0%)
Literature reviews (in isolation)	3 (43%)	3 (43%)	1 (14%)	0 (0%)	0 (0%)

Interpretation:

Table 1:

- Original investigations and quality improvement work are accepted as scholarly project types at all respondents' programs.
- Case reports are accepted at almost all programs (10 (83%)).
- Other project types varied in their acceptance from 25% (advanced clinical course work) to 62% (curriculum development with metric measurement).

Table 2:

- Original investigations vary greatly in the proportion of a program's scholarly projects, while quality improvement work represents a minority of projects in almost all programs.
- Where permitted, advanced clinical course work varies greatly in the proportion of program's scholarly projects, and literature reviews consistently represent a minority of projects.
- Other project types including curriculum development, case reports and advanced course work in academia represented a small minority (1-20%) of projects in almost all the programs where they were permitted.

Several survey questions addressed the amount of dedicated time made available to residents for scholarly activity projects.

Dedicated blocks of time with significantly reduced clinical duties are available in all respondents' programs. This includes 6 programs that exclusively selected the stem "dedicated 2 to 4 week blocks of time with significantly reduced clinical responsibility". The remaining 7 programs used free text entries to answer the question. They described dedicated blocks of time as low as 1 week in duration (1 program), flexibility in when dedicated blocks of time are taken (3 programs), processes related to how residents apply for dedicated blocks of time (2 programs) and a mixed approach of 10 half days per year plus dedicated blocks of dedicated time of 1 to 2 months (1 program).

TABLE 3. Maximum amount of dedicated time allowed for a scholarly activity project.

	N	%
No policy maximum	1	8%
120 days	5	38%
102 days	1	8%
60 days	3	23%
20 or fewer days	3	23%

TABLE 4. Typical (i.e. modal, common) amount of dedicated time allowed for a scholarly activity project.

	N	%
0 days	1	8%
20 days	1	8%
30 days	6	50%
60-70 days	3	25%
90 days	1	8%
Did not answer	1	

Respondents were asked a question regarding the number of projects residents would be involved in and the associated roles they would play in both general (Table 5) and specific terms (Table 6).

TABLE 5. Proportion of residents expected to complete one or more scholarly projects.

	0%	1-20%	21-40%	41-60%	61-80%	81-100%
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Resident sees ONE project through the research cycle* over the course of their residency	0 (0%)	2 (15%)	0 (0%)	2 (15%)	1 (8%)	8 (62%)
Resident sees MORE THAN ONE project through the research cycle over the course of their residency	1 (8%)	11 (85%)	0 (0%)	0 (0%)	1 (8%)	0 (0%)
Resident sees ONE project through the research cycle over the course of their residency, AND participates in one or more other projects in a smaller role	0 (0%)	9 (69%)	4 (31%)	0 (0%)	0 (0%)	0 (0%)
Resident participates in ONE project in a smaller role, i.e. without seeing the project through the whole research cycle	4 (31%)	6 (46%)	3 (23%)	0 (0%)	0 (0%)	0 (0%)
Resident participates in MORE THAN ONE project in a smaller role, i.e. without seeing any project through the whole research cycle	5 (38%)	7 (54%)	1 (8%)	0 (0%)	0 (0%)	0 (0%)

*Research cycle means the resident is involved in proposal development, interpretation and dissemination of results in written and/or oral format, including in local forums. It need not include submitting/publishing a peer reviewed manuscript. Residents may also be involved in data collection and analysis.

Interpretation Table 5:
- In 8 (62%) of programs 81-100% of residents see one project through the research cycle.
- In all but one program, residents seeing more than one project through the research cycle is unlikely (0-20%), and in all programs, participating in a second or subsequent project in a smaller role was uncommon (1-40%).
- In addition, participating in one or more projects, only in a smaller role, was uncommon (0-40%).

Respondents were asked to report the likelihood that a resident would participate in a list of research related tasks over the course of a research cycle, given that the research project involved the type of task.
A summary of findings is presented here with raw data provided in Table A in the appendix.

- In only 7 (54%) of programs would a resident almost always (at least 81% of the time) be expected to complete a literature review, present a proposal to an intramural audience, or submit a written abstract for an intramural research day.
- In only 8 (62%) programs do residents almost always (at least 81% of the time) give an oral presentation of interim or completed analysis at an intramural forum.
- In only 3 (23%) programs do residents almost always (at least 81% of the time) write a complete manuscript for intramural dissemination.
- In only 5 (39%) programs would a resident almost always (at least 81% of the time) be involved in interpreting data analyzed by another team member or organizing data into tables and figures.
- Residents are likely (at least 61% of the time) to attend research team meetings in an observer role or write a completed manuscript for dissemination beyond the department in only 2 (15%) and 1 (8%) of programs, respectively.
- Residents rarely (20% or less) or never (0%) prepare intramural grant submissions, extramural grant submissions or draft a response to peer reviewed commentary in 9 (69%), 11 (85%) and 10 (77%) of programs, respectively.
- In 5 (39%) programs residents never work in a basic science wet lab and in an additional 7 programs, they do so only rarely (20% or less of the time).
- Resident involvement varied within and between programs for the following tasks:
  - Ethics approvals
    - Writing a proposal
    - Completing an ethics board submission form
  - Recruitment and data collection
    - Screening/consenting study participants
    - Developing data collection forms
    - Screening abstracts or full-text articles (i.e. systematic reviews)
    - Completing clinical assessments on participants (e.g. CAM scores)
    - Completing chart reviews
  - Cleaning/organizing raw data
  - Analyzing data
  - Oral presentation of interim or completed analysis at an extramural forum (e.g. CAS)

In summary, there are few or no research-related activities that are consistently part of resident scholarly activity projects across the country, even when controlling for the project actually requiring that task.

Respondents were asked questions related to the grading and remediation of scholarly activity projects.

TABLE 6. Grading of scholarly activity projects

	N	%
Participation only (no "fails")	2	15%
Project completion necessary for a "pass"	7	54%
Pass / Fail based on other criteria besides project completion	2	15%
Other	2	15%

The 2 programs that answered "other" described their grading schemes as follows:
- Presentation of work outside the department (abstract at meeting, hospital quality day, university MedEd research day, etc.) is the expected outcome. For some larger projects, an individual resident may present a portion of the greater work to fulfill their requirements while the rest of the project moves on.
- All that present at resident research night receive anonymous cumulative feedback from those who attend as well as the judges for the competition.

TABLE 7. Consequences of not meeting the program's performance outcome standards on scholarly projects.

	N*	%
Documentation in FITER or performance evaluation	5	45%
Unknown	2	18%
Program director review and decision	1	9%
Addressed by competency committee with provision of support for remediation	1	9%
No remediation and no consequence	1	9%
Exemption from scholarly project (in those with clinical performance issues)	1	9%

*only 11 respondents answered this question

Respondents were asked to rate the importance of various potential challenges to a successful resident scholarly activity program.

TABLE 8. Potential challenges to running a successful resident scholarly activity program. 1 indicates the item is not at all a challenge; 5 indicates it is a tremendous challenge.

STEM	RATING				
	1	**2**	**3**	**4**	**5**
Inadequate administrative support	3 (23%)	0 (0%)	7 (54%)	2 (15%)	1 (8%)
Inadequate funding for resident scholarly activity projects	1 (8%)	3 (23%)	6 (46%)	3 (23%)	0 (0%)
Inadequate access to biostatistical consultants	4 (31%)	2 (15%)	3 (23%)	3 (23%)	1 (8%)
Inadequate access to methodological consultants	3 (23%)	3 (23%)	3 (23%)	4 (31%)	0 (0%)
Inadequate access to research assistants for consent, data collection, and related tasks	1 (8%)	1 (8%)	5 (38%)	2 (15%)	4 (31%)
Inadequate number of supervisors with appropriate skill set for supervision of resident scholarly activity	1 (8%)	2 (15%)	3 (23%)	4 (31%)	3 (23%)
Inadequate number of supervisors with active research or QI programs into which residents' scholarly activity projects can be incorporated	2 (15%)	1 (8%)	3 (23%)	3 (23%)	4 (31%)
Inadequate number of supervisors willing to supervise resident scholarly activity projects	2 (15%)	3 (23%)	2 (15%)	3 (23%)	3 (23%)
Difficulty finding appropriately sized projects for residency that are small enough to complete yet still important enough to justify their execution	0 (0%)	1 (8%)	7 (54%)	3 (23%)	2 (15%)
Departmental leadership inadequately promotes the value of research and resident scholarly activity	7 (54%)	2 (15%)	1 (8%)	3 (23%)	0 (0%)
Departmental faculty inadequately promote the value of research and resident scholarly activity	4 (31%)	3 (23%)	3 (23%)	1 (8%)	2 (15%)
Residents undervalue the importance of research and resident scholarly activity	0 (0%)	1 (8%)	6 (46%)	4 (31%)	2 (15%)
Residents, in general, struggle to balance the demands of a resident scholarly activity project with other clinical and non clinical responsibilities	0 (0%)	2 (15%)	2 (15%)	6 (46%)	3 (23%)
Particular residents struggling to achieve clinical competence can't afford to take on the additional responsibility of a resident scholarly activity project	0 (0%)	3 (23%)	5 (38%)	2 (15%)	3 (23%)

Table 8 interpretation:
The following stems had median and modal scores of 1 or 2 (i.e. not a problem or a small problem) for the majority of institutions:

- Departmental leadership inadequately promotes the value of research and resident scholarly activity.
- Departmental faculty inadequately promote the value of research and resident scholarly activity.

The following stems were scored as 4 or 5 (i.e. major challenges) for a majority (i.e. at least 7 of 13) respondents:

- Inadequate number of supervisors with appropriate skill set for supervision of resident scholarly activity (7 respondents).
- Inadequate number of supervisors with active research or QI programs into which residents' scholarly activity projects can be incorporated (7 respondents).
- Residents, in general, struggle to balance the demands of a resident scholarly activity project with other clinical and non-clinical responsibilities (9 respondents).

More variation in responses was observed for the remaining stems that are not listed above), with median scores for these stems were consistently at 3. However, the following stems were scored as 4 or 5 (i.e. major challenges) for 6 of 13 respondents:

- Inadequate access to research assistants for consent, data collection, and related tasks.
- Inadequate number of supervisors willing to supervise resident scholarly activity projects.
- Residents undervalue the importance of research and resident scholarly activity.

The following free text answers were selected as particularly informative:
Are there other challenges to running a successful resident scholarly activity program at your department that were not captured in the previous question?
"Residents tend to have very low interest in research with the exception of those who enroll for a formal degree. And how do you expect residents to produce a significant contribution in a period of months while under pressure to achieve clinical proficiency and under the threat of exams at the end? Do not forget that very gifted grad students take on average 2 years of dedicated work to get a project wrapped up. Maybe it is time to be realistic about what residents can achieve."

Do you have any other comments about this topic/survey?
"The success we've had in our department has largely been through the elimination of the concept of "resident research." There's just research, led by faculty, in which residents take part. The key is having capable research, QI, and MedEd faculty who make themselves, their teams, and their projects available for resident participation. The support of our broader research programs by our faculty has been essential. Our annual internal funding competition for faculty mandates trainee engagement thus linking our research and education missions. The strong support of our Program Director and Chair has been invaluable."

CONCLUSIONS

The survey results point to a large amount of variation in how the scholarly activity project is administered within individual ACUDA (anesthesiology) residency programs and between ACUDA programs. This variation within programs may be interpreted either positively or negatively, offering either flexibility to suit residents' needs, or a lack of standardization of the curriculum. Variation across programs points to potential differences in opportunities and expectations across Canadian programs and again, the lack of a national standard for a minimum exposure/competency in scholarly activity.

In addition, the survey responses revealed considerable variation in the types of challenges programs face in delivering a scholarly activity program within an anesthesiology residency. It would seem likely that this contributes to some of the variation seen in how resident scholarly activity projects are administered across programs. Answers to individual questions in this section were also particularly telling. About half of programs felt that a lack of fundamental infrastructure such as like appropriate supervisors and research assistants was a major challenge. Further, 69% of programs felt that a major challenge was residents' struggle to balance a scholarly activity project with other demands. This raises concerns about the sustainability of the anesthesiology residency scholarly activity project in its current form.

APPENDIX

Consider the following research-related tasks. IF THE RESEARCH PROJECT INVOLVES THE LISTED TASK, how likely would a resident working on the project be expected to participate in the task?

TABLE A.

	*NA		*0%		1-20%		21-40%		41-60%		61-80%		81-100%	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Completing a literature review	0	0%	0	0%	1	8%	1	8%	2	15%	2	15%	7	54%
Writing a proposal for an ethics board submission	0	0%	0	0%	3	23%	2	15%	2	15%	3	23%	3	23%
Oral presentation of proposal to an intramural audience (e.g. research in progress)	0	0%	1	8%	2	15%	0	0%	2	15%	1	8%	7	54%
Completing an ethics board submission	0	0%	3	23%	2	15%	2	15%	3	23%	1	8%	2	15%
Preparing a proposal for an intramural grant submission	0	0%	2	15%	7	54%	1	8%	1	8%	2	15%	0	0%
Preparing a proposal for an extramural grant submission	0	0%	3	23%	8	62%	1	8%	1	8%	0	0%	0	0%
Attending research team meetings in an observer role	1	8%	2	15%	4	31%	1	8%	3	23%	1	8%	1	8%
Attending research team meetings in a leadership role	0	0%	4	31%	6	46%	3	23%	0	0%	0	0%	0	0%
Screening/consenting study participants	0	0%	2	15%	3	23%	3	23%	2	15%	1	8%	2	15%
Developing data collection forms	0	0%	0	0%	1	8%	4	31%	2	15%	3	23%	3	23%
Screening abstracts or full-text articles (i.e. systematic reviews)	0	0%	1	8%	2	15%	2	15%	2	15%	2	15%	4	31%

Task	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Completing clinical assessments on participants (e.g. CAM scores)	0	0%	3	23%	3	23%	3	23%	1	8%	2	15%	1	8%
Completing chart reviews	0	0%	0	0%	2	15%	4	31%	3	23%	2	15%	2	15%
Working in a basic science wet lab	2	15%	3	23%	7	54%	0	0%	0	0%	0	0%	1	8%
Cleaning/organizing raw data	0	0%	0	0%	3	23%	4	31%	5	38%	0	0%	1	8%
Analyzing data	0	0%	1	8%	5	38%	1	8%	3	23%	3	23%	0	0%
Interpreting data analyzed by another team member (e.g. statistician)	0	0%	0	0%	3	23%	1	8%	1	8%	3	23%	5	38%
Organizing data into tables/figures	0	0%	0	0%	1	8%	2	15%	2	15%	3	23%	5	38%
Writing an abstract for intramural dissemination (e.g. research day)	0	0%	0	0%	1	8%	2	15%	0	0%	3	23%	7	54%
Writing a completed manuscript for intramural dissemination (e.g. research day)	1	8%	1	8%	1	8%	5	38%	0	0%	2	15%	3	23%
Writing a completed manuscript for dissemination beyond the department**	0	0%	0	0%	4	31%	4	31%	4	31%	1	8%	0	0%
Drafting a response to peer reviewed commentary	0	0%	3	23%	7	54%	2	15%	0	0%	1	8%	0	0%
Oral presentation of interim or completed analysis at an intramural forum (e.g. research day)	0	0%	0	0%	1	8%	0	0%	0	0%	4	31%	8	62%
Oral presentation of interim or completed analysis at an extramural forum (e.g. CAS)	0	0%	0	0%	2	15%	4	31%	2	15%	2	15%	3	23%

*NA means the task would never occur based on the types of resident scholarly activity projects at your institution. In comparison, 0% means the task could occur in the course of a resident scholarly activity project at your institution, but the resident would never participate in the task. **formally sharing QI findings with decision makers or submitting a manuscript to a journal