

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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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 through 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.

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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%

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