



ACCOUNTABILITY REPORT

2019

Department of Anesthesia,
Pain Management
& Perioperative Medicine

OFFICE OF RESEARCH

Anesthesia, Pain Management and Perioperative Medicine Vision, Mission & Beliefs

Vision

Responsive to the anesthesia care needs of our Maritime community while simultaneously providing international leadership in anesthesia education and research.

Mission

Serving the public good through excellence in anesthesia clinical practices, research and education.

Beliefs

- Patients are entitled to safe, evidence-based and patient-centred care.
- Lifelong learning is a prerequisite to safe, competent care and professional, compassionate clinicians.
- Scholarly curiosity and the advancement of knowledge are fundamental to the improvement and enhancement of patient care.
- Stewardship of local and global resources is a departmental responsibility.
- Transparency and accountability in combination with creative thinking and leadership are foundational to the department's vision.
- Sharing our expertise regionally, nationally and internationally is a professional obligation.
- Development of future generations of anesthesia care providers able to contribute to excellence in patient care, research and education is a professional responsibility and commitment.

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EXECUTIVE SUMMARY

The Department of Anesthesia, Pain Management and Perioperative Medicine **2019 Research Accountability Report** includes research-related achievements with respect to established targets and goals stated in the *Research Accountability Framework*. The information in this report highlights research productivity from January to December 2019 as well as data from previous years for comparative and trending purposes. Targets that were met, partially met, or not met in 2019 are outlined below in summary.

AREAS IN WHICH THE DEPARTMENT MET ITS TARGETS IN 2019:

- Thirty-seven *new* research projects were initiated in 2019.
- The number and value of grants and industry contract funded research are 50 and \$9.0M, respectively (*Figure 1* and *Table 1*), an increase from \$8.3M in 2018.
- The proportion of collaborative projects and publications remains high at 91%.
- Eighty-five per cent of researchers are members on research-related administrative committees with 80%, 40% and 20% serving on local, national and international committees, respectively.
- Fifty per cent of researchers chair research-related committees with 50%, 25% and 5% serving on local, national and international committees, respectively.
- Thirty per cent of researchers perform editorial activities with 25% and 20% serving on national and international committees, respectively.
- Forty-four per cent of abstracts were presented as a podium.
- Six media interviews were provided by researchers in 2019.
- Eighty per cent of researchers supervise learners as the primary supervisor and 20% supervise graduate students.

AREAS IN WHICH THE DEPARTMENT IMPROVED BUT DID NOT MEET ITS TARGETS IN 2019:

- Seventy-five per cent of researchers reviewed papers in 2019, whereas 74% of researchers reviewed journal papers for submission in 2018. The target is 80%.
- Forty per cent of researchers reviewed funding applications in 2019, whereas 45% of researchers reviewed funding applications in 2018. The target is 80%. The 2019 result is representative of researchers' career stage (35% assistant professors) and/or less than 20% research time (50% of researchers).

AREAS IN WHICH THE DEPARTMENT DID NOT MEET ITS TARGETS IN 2019:

- Sixty-five per cent of researchers are at the rank of associate professor or higher, whereas the target is 75% of researchers have academic rank of associate or higher. The 2019 result is representative of researchers' career stage.
- The total number of publications reached is 96 in 2019 (Figure 3), whereas 118 publications were published in 2018. All publications were peer reviewed.
- There were 36 abstracts accepted in 2019, whereas 59 abstracts were accepted in 2018.
- Seventy-five per cent of all researchers presented an abstract in 2019, whereas 79% of researchers presented an abstract in 2018. The target is 100%.
- Thirty-five per cent of researchers were invited to present their work in 2019 as a keynote, plenary or symposium speaker. The target is 50%. The 2019 result is representative of researchers' career stage.
- No research recognition award was conferred in 2019.

INTRODUCTION

The annual **Research Accountability Report** details the Department's research activities in relation to predetermined targets outlined in the *Anesthesia, Pain Management and Perioperative Medicine Research Accountability Framework*. The accountability framework was developed by a working group of departmental researchers and administrative staff. Through it, the Department attempted to structure the ongoing measurement of the value of the full scope of scholarly research activity, from engaging in the process of creativity to implementing research projects, communicating the results, and influencing clinical best practice.

The framework ties resources devoted to research to the outcomes; it identifies the most appropriate indicators of research activity and productivity, identifies current targets, and how to measure indicators as well as how to report the results. It also outlines an evaluation strategy.

This *Research Accountability Report* covers the time period from January to December 2019 for all deliverables with the exception of funding that corresponds to the period of April 1, 2019 – March 31, 2020, based on documented requirements of the Nova Scotia Department of Health and Wellness. It is the product of the framework's Measurement and Reporting Plan in which key indicators and targets were identified in 2010 and revised in 2014 for subsequent measurement and reporting. The results of this report will be used in the implementation of the Evaluation Strategy. Consistent with the Results Chain, this report reflects the activity of research-oriented clinicians or other professional faculty with protected time (time funded by the Department) for research.

The following outlines the 2019 research-related results for each predetermined target. It also provides a comparison to the data from previous years. This is done in graphical and table formats. Lists of protected time for research (FTE), currently held research grants/contracts and peer-reviewed publications are found in *Appendix A, B and C*, respectively.

Engage in the process of creativity

INDICATOR: Number of new proposals that are developed into research endeavours

TARGET: New research projects reflects maintenance or increase from previous year
(17 new projects in 2018)

RESULT: **Thirty-seven new research projects are underway (funded and unfunded)**

Thirty-seven new research projects began in 2019; 22 funded and 15 unfunded. In general, these studies examined important questions in health research (*Appendix B*).

To summarize:

- An interdisciplinary research team including researchers and health care practitioners together with key health administrators are funded to explore the optimal clinical approach to manage chronic pelvic pain in women.
- Research innovation stimulated almost \$1.0M in product development of a plant-based meal replacement beverage as well as cannabinoid formulations for inflammatory urinary and bowel conditions.
- The development of new approaches to provide regional anesthesia to cardiac patients has advanced in 2019. This NSHA-funded research project is the first in the department to include a patient partner as a co-investigator.
- Three collaborative initiatives were funded to form networks to develop national guidelines for perioperative corticosteroid use, digital health tool and a national preclinical sepsis platform.
- Vital research questions are being asked about transgender and nonbinary persons' experiences in the perioperative context and whether education about sexual and gender minorities to anesthesia residents is needed.
- Airway management and oxygenation studies have focused on the difficult airway in pediatric patients as well as developing prediction models of apnea and hypopnea events in adults.
- Two funded projects involve the examination of cannabis use to manage symptoms in children with cancer and adolescents with chronic headaches.
- Several medical education research projects have started to examine communication efficacy and patient-centredness training for multidisciplinary clinical obstetrical teams as well as determining the impact of experience on the use of point-of-care ultrasound in term pregnancy.

- Several projects focused on the fundamental study of inflammatory mechanisms of pain-related diseases and other projects examined novel clinical interventions and treatments for optimal pain management. Neuroimaging projects that involve patients with brain injuries and those with chronic pain led to over \$4.0M in new research funding in 2019.

The 2019 Anesthesia Research Day saw 15 studies presented. These were generated by a variety of trainees, including five residents/fellows; six graduate/post doc students and four undergraduate students. The pre-presentation topics were 60% clinical and 40% fundamental research.

Engage in the process of research

INDICATOR: Number and value (\$) of grants and industry contracts received

TARGET: Total funding (\$) reflects maintenance or increase from previous year (52 funded projects totalling \$8.3M in 2018)

RESULT: **50 funded projects totalling more than \$9.0M**

Note: For reporting purposes, the fiscal year April 1, 2019 – March 31, 2020, is used for research funding only based on Department of Health and Wellness requirements.

There are 50 ongoing and new grant/industry funded projects amounting to over \$9.0M (*Figure 1 and Table 1*).

National and international funds make up approximately 42% of this total with 58% of funds from regional, institutional and department organizations. Major contributors to this success are the availability of protected time (*Table 2 and Appendix A*) and national collaborations, as well as the support provided by the Office of Research.

Grant-funded research underway in the Department includes 15 projects funded by the Tri-Council agencies (CIHR, NSERC, SSHRC), accounting for 79% of the total funds. Seven projects funded by the Tri-Council are led by department members and total more than \$5.6M. A list of the grants is in *Appendix B*.

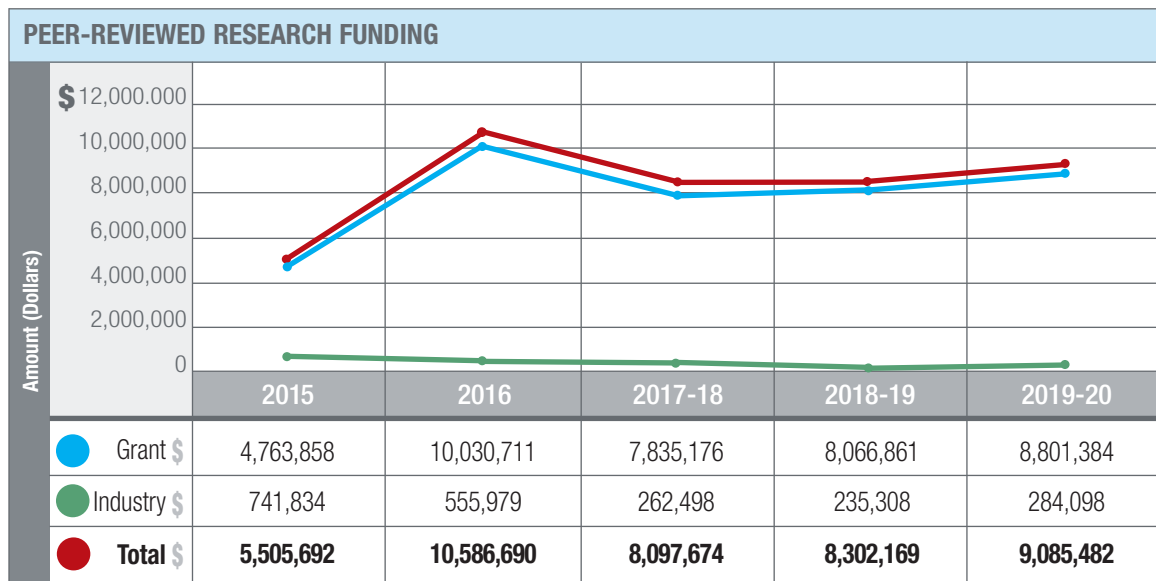


Figure 1: The amount (\$) in external research grant/industry contract funding received (2015-19). Five large-scale grants ended in 2016 account for the decrease in funding for 2017-18: three collaboration grants and two grants led by department members.

Note: The value of research funding each year includes revenue from all research awards generating funds in that year (for multi-year awards, the revenue is reported in the year it is budgeted). All research projects in which a Department researcher is a team member are included. Also, the number of grants received reflects the number of grants and contracts generating funds that year (which may be continuing from earlier years).

Table 1: Number of grants and industry contracts received (2015-19)

FUNDING GRANTS & INDUSTRY CONTRACTS BY YEAR					
	2015	2016	2017-18	2018-19	2019-20
Grant	51	51	57	48	47
Industry	6	9	6	4	3
Total	57	60	63	52	50

While there is consistent FTE assignment for research for the past two years (*Table 2*), there is a notable increase in funding dollars per FTE for 2019-20 (*Figure 2*). See *Appendix A*.

Table 2: Protected time (FTE) for research activities (2015-19)

FTE PROTECTED TIME FOR RESEARCH ACTIVITIES BY YEAR					
	2015	2016	2017-18	2018-19	2019-20
Protected Time	4.6	6.5	6.9	6.1	5.7

Note: In 2016 total FTE includes all Anesthesia researcher-protected time at Central Zone-Adult, Pediatric and Women's and Obstetric (Appendix A).

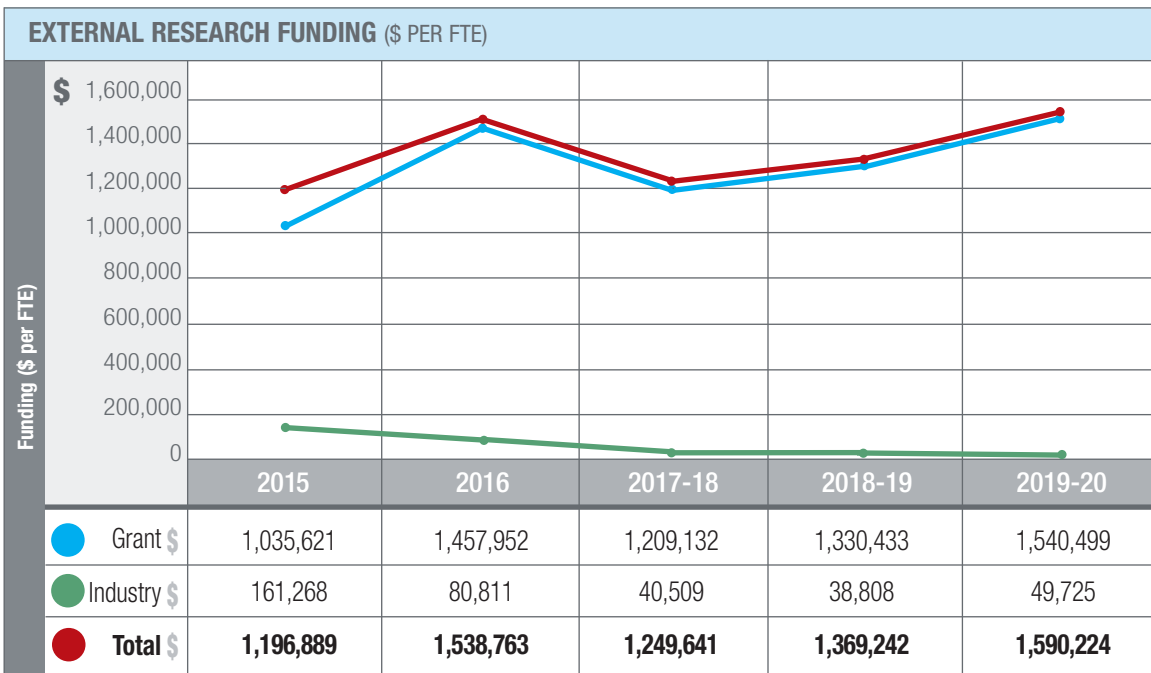


Figure 2: The amount (\$/FTE) in external research grant/industry relative to FTE (Table 2) of protected time for research

INDICATOR: Annual value (\$) of grants and industry contracts received by departmental principal investigators

TARGET: External funding dollars obtained as a principal investigator reflects maintenance or increase from previous year
(\$2.0M from departmental principal investigators in 2018-19)

RESULT: **\$2.1M was obtained by departmental principal investigators**

Fifteen of 20 researchers (75%) with protected time were designated as principal investigators for at least one grant or contract totalling almost \$2.1M.

INDICATOR: Annual value (\$) of grants and industry contracts received by departmental co-investigators

TARGET: External funding obtained as a co-investigator reflects maintenance or increase from previous year
(\$6.3M from co-investigators in 2018)

RESULT: **\$7.0M was achieved by departmental co-investigators**

An additional \$7.0M in external grants and contract funding was achieved by researchers with protected time designated as co-investigators.

Actively seek collaborative opportunities with interdisciplinary colleagues

INDICATOR: Number of collaborative projects and publications

TARGET: 80% of all projects and publications are collaborative

RESULT: **91% of all projects and publications are collaborative**

Of 96 publications, 92 have co-authors (96%). Of 50 funded grants and industry contracts, 41 have co-investigators (82%). Therefore, 133 out of 146 projects and publications are collaborative (91%).

Members of scientific and organizing committees

INDICATOR: Number of researchers who participate in research committee work

TARGET: 80% of all researchers are members of research-related administrative committees: 50% local, 40% national and 10% international

RESULT: **85% of all researchers are members of research-related administrative committees: 80% local, 40% national and 20% international**

Seventeen of 20 researchers are members of research-related administrative committees (85%).

INDICATOR: Number of researchers who chair research-related committees

TARGET: 25% chair research-related committees

RESULT: **50% of researchers chair research-related committees**

Ten of 20 researchers were invited to chair research-related committees (50%): 50% local, 25% national and 5% international.

SCHOLARLY SYNTHESIS (CONT'D)

INDICATOR: Number of researchers who review journal articles

TARGET: 80% review journal articles

RESULT: **75% of researchers review journal articles**

Fifteen of 20 researchers were invited to review journal manuscripts (75%).

INDICATOR: Number of researchers who review funding applications

TARGET: 80% review funding applications: 50% at the local, 40% at national level and 10% at international level

RESULT: **40% review funding applications: 15% local, 25% national and 5% international**

Eight of 20 researchers were invited to review funding applications (40%).

INDICATOR: Number of researchers who perform editorial activities

TARGET: 25% perform editorial activities

RESULT: **30% of researchers perform editorial activities: 25% national and 20% international**

Six of 20 researchers perform editorial activities (30%).

Engage in the administrative process

INDICATOR: Engage in planning activities to advance the research mission of excellence

The Department strives for a culture of excellence in our clinical practice and programs, research, and education. In supporting this, the Office of Research and its researchers strive for research excellence through working together with patients to find evidence-based solutions leading to the best possible pain management and perioperative care for our families and global communities.

The 2018-21 research strategic plan is an integration of effort and feedback from working groups focused on 1) enhancing research growth and collaboration, 2) building research capacity and 3) fostering patient engagement in the research process (*Appendix D*). For 2019, the research priorities are outlined in *Table 3*.

Table 3: Office of Research strategic priority alignment with relevant institutions' strategic plans

PARTNER STRATEGIC PRIORITY ALIGNMENT			
2019-20 STRATEGIC PRIORITIES	Dal Med Forward	IWK	NSHA
1. Take advantage of funding opportunities for building collaborative research teams, emphasizing internal collaborations	Aligned	Aligned	Aligned
2. Cultivate junior investigator research partnerships for enhanced national/international clinical trial participation	Aligned	Aligned	Aligned
3. Implement targeted research training opportunities and mentorship support for junior investigators and trainees	Aligned		
4. Advocate with key stakeholders for integrating research into optimal HR, space and information management decision-making	Aligned	Aligned	Aligned
5. Integrate patient advisors into the Department's research activities while nurturing uptake from investigators	Aligned	Aligned	Aligned

INDICATOR: Number of associate and full professors

TARGET: 75% of all researchers are associate professor or higher and 60% of research-related promotions are successful

RESULT: **65% of all researchers are ranked as associate professor or higher**

There are nine full, four associate and seven assistant professors who receive protected time to conduct research in the Department of Anesthesia, Pain Management and Perioperative Medicine.

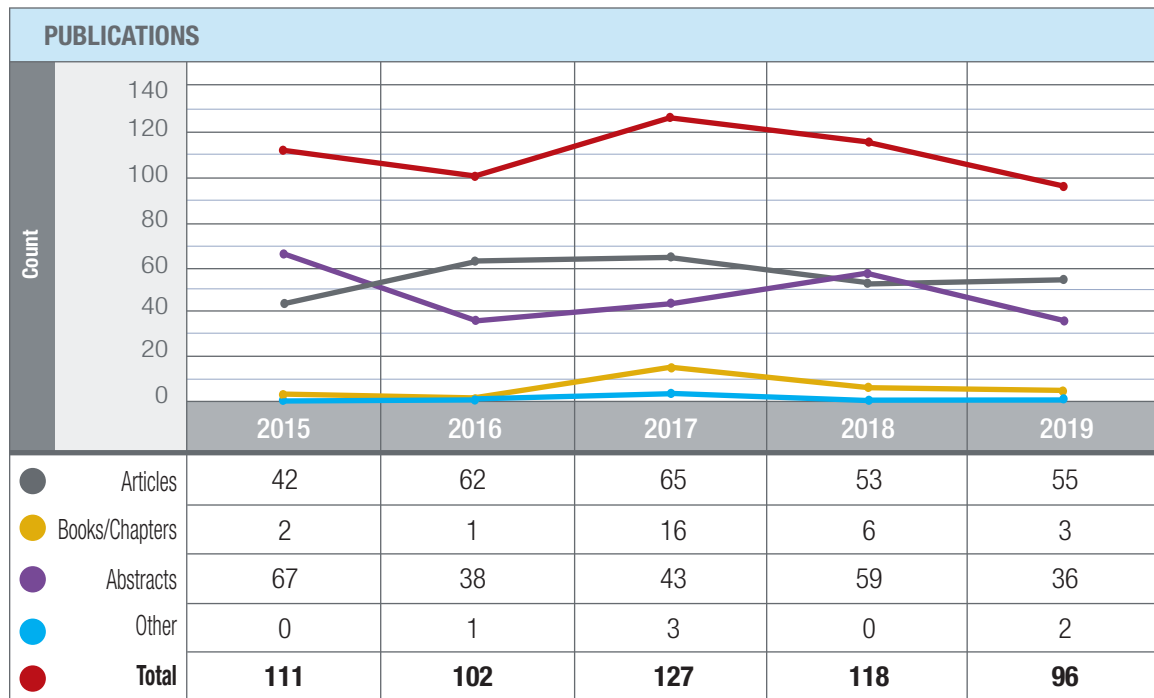
Write and publish

INDICATOR: Number of accepted and published publications (peer reviewed and non-peer reviewed)

TARGET: Trending of accepted and published peer and non-peer review papers reflects maintenance or increase from previous year
(118 publications in 2018)

RESULT: **96 publications have been submitted and accepted**

In 2019, 96 publications were submitted and accepted (*Figure 3*) with 55 peer-reviewed manuscripts published online (*Appendix C*). *Table 4* shows the relative protected time with respect to number of publications.



Note: Previous to 2015, invited presentations were categorized as abstract presentation, which may explain the decline in the overall publications category in 2015 and 2016.

Figure 3: Number of submitted and accepted publications (peer reviewed and non-peer reviewed)

Table 4: Number of submitted and accepted publications (peer reviewed and non-peer reviewed) relative to FTE of protected time (*Table 2*) for research

PUBLICATIONS PER FTE PROTECTED RESEARCH TIME					
	2015	2016	2017	2018	2019
Articles	9	9	9	9	10
Book/Chapters	0	0	2	1	1
Abstracts	15	6	6	10	6
Other	0	0	0	0	0
Total	24	15	18	19	17

INDICATOR: Number of peer-reviewed publications

TARGET: 90% of publications are peer reviewed
(100% publications were peer reviewed in 2018)

RESULT: **100% of the publications were peer reviewed**

INDICATOR: Number of accepted abstracts

TARGET: Trending of accepted abstracts reflects maintenance or increase from previous year
(59 abstracts accepted in 2018)

RESULT: **36 abstracts were accepted**

Prepare and deliver presentations

INDICATOR: Number of all presentations (local, national, international)

TARGET: Trending of presentations reflects maintenance or increase from previous year (40 local, 25 national and 12 international invited presentations in 2018)

RESULT: **32 local, 18 national and 23 international invited presentations**

The total number of presentations by researchers is found in *Figure 4* with adjustments relative to protected time for research shown in *Table 5*. While the number of local and national presentations slightly decreased, international level presentations have noticeably increased.

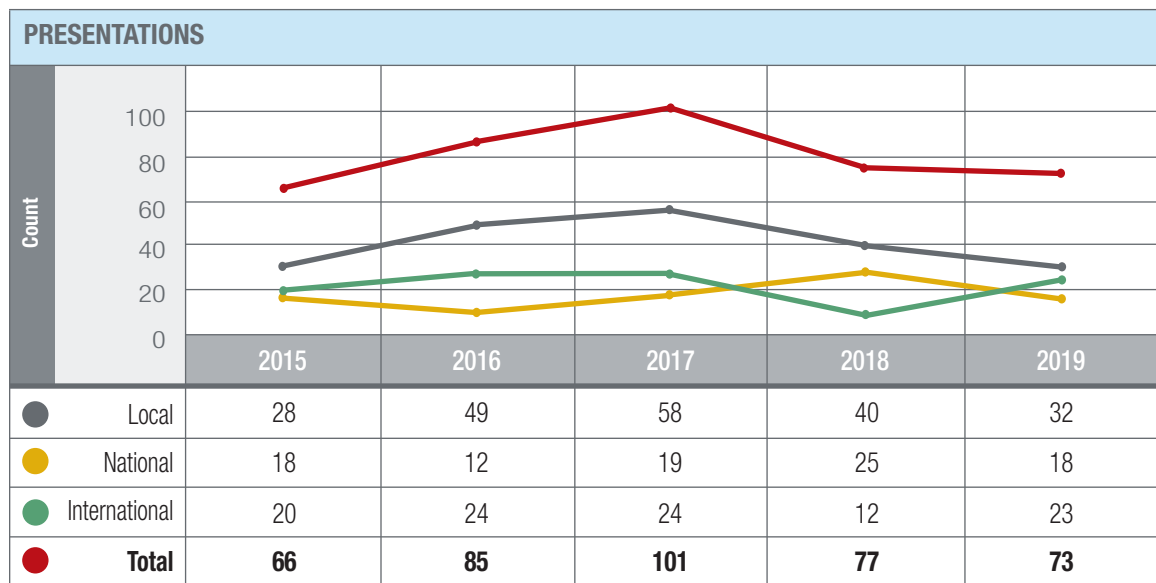


Figure 4: Presentations (count) for local, national and international audiences

Table 5: Number of presentations relative to FTE protected time (*Table 2*) for research

PRESENTATIONS RELATIVE TO FTE PROTECTED TIME					
	2015	2016	2017	2018	2019
Local	6	8	8	7	6
National	4	2	3	4	3
International	4	4	3	2	4
Total	14	13	14	13	13

INDICATOR: Number of invited presentations

TARGET: 50% of all researchers are invited to present (plenary, keynote or symposium)
(37% of researchers were invited to present in 2018)

RESULT: **35% of all researchers are invited to present (plenary, keynote or symposium)**

Several researchers (35%) were invited to present their work in 2019 as a keynote, plenary or symposium speaker.

INDICATOR: Number of abstracts presented annually

TARGET: 100% of all researchers have an abstract presented annually
(79% of all researchers presented an abstract in 2018)

RESULT: **75% of all researchers presented an abstract in 2019**

INDICATOR: Number of abstracts presented as a podium presentation

TARGET: 20% of abstracts are invited to present a podium
(49% of abstracts were podium presentations in 2018)

RESULT: **44% of abstracts were invited to present a podium presentation**

Seventy-five per cent of all researchers presented an abstract in 2019. There were 36 abstracts accepted in 2019 with 44% of abstracts invited to present as a podium presentation.

Strategically Engaging with External Stakeholders

INDICATOR: Number of interviews provided to the media

TARGET: Number of media interviews reflects maintenance or increase
(Four media interviews were provided in 2018)

RESULT: **Six media interviews were provided by researchers**

Regional Anesthesia faculty members were featured online to discuss *PBLD: Neuraxial Blockade and Issues around Consent, Coagulation Conundrum* (Dr. Kwesi Kwofie) and *American Society of Regional Anesthesia May Newsletter* (Dr. Jennifer Szerb).

Dr. Mary Lynch was invited to speak at several media channels (radio, TV and print) about *Collateral Damage to Patients in the Cross Fire of the Opioid Crises, Chronic Pain Crises and the Need for a National Pain Strategy*, as well as the *Development of a New Policy on Cannabinoids by the WCB*.

INDICATOR: Number of recognition awards

TARGET: FTE reflects maintenance or increase of research recognition awards from previous year

RESULT: **No research recognition award was conferred in 2019**

Table 6: Number of recognition awards (2015-19)

RECOGNITION AWARDS BY YEAR					
	2015	2016	2017	2018	2019
Awards	2	1	1	1	0

Mentoring, Teaching and Supervision

INDICATOR: Number of researchers supervising trainees (undergraduate, graduate, postgraduate students and research projects for residents and fellows)

TARGET: 50% of researchers supervise trainees as the primary supervisor (84% reported in 2018)

RESULT: **80% of researchers supervise trainees as the primary supervisor**

INDICATOR: Number of researchers supervising graduate students (MSc and PhD)

TARGET: Number of graduate students reflects maintenance or increase (21% reported in 2018)

RESULT: **20% of researchers are supervising graduate students**

APPENDICES

APPENDIX A – 2019 PROTECTED TIME FOR RESEARCH

2018 PROTECTED TIME FOR RESEARCH					
CENTRAL ZONE - ADULT	FTE	PEDIATRIC	FTE	WOMEN'S & OBSTETRIC	FTE
J. Bailey	0.03	T. Dumbarton	0.01	R. George	0.25
A. Finley	0.20	A. Finley	0.20	D. McKeen	0.20
J. Hashmi	1.00	A. Vlatten	0.10	A. Munro	0.15
O. Hung	0.50	S. Wright	0.10	A. Sjaus	0.15
K. Kwofie	0.20			V. Uppal	0.10
C. Lehmann	0.60				
M. Lynch	0.40				
J. McDougall	0.33				
D. McKeen	0.20				
A. Milne	0.20				
M. Schmidt	0.40				
J. Szerb	0.10				
E. Tan	0.05				
V. Uppal	0.10				
A. Vlatten	0.05				
TOTAL	4.36	TOTAL	0.5	TOTAL	.85

Note: The research deliverables captured in this report include 20 researchers (5.71 FTEs) who have protected time to conduct research in the Department of Anesthesia, Pain Management and Perioperative Medicine.

Funded Projects: Note that the dollar amount is the total value of the award, whereby annual amounts are provided in Figure 1.

NEW FUNDED PROJECTS

1. Bailey JG, Uppal V, Dib K (2020-2022). Continuous Serratus Anterior Blockade for Sternotomy Analgesia following Cardiac Surgery: A pilot feasibility study [Grant] – NSHARF – \$23,561.
2. Bailey J, Uppal V, Neira V, Hendy A, Chadrawy E, Hammond P, Langille L, Mills V (2020-2021). Continuous serratus anterior blockade for sternotomy analgesia following cardiac surgery: A pilot feasibility study [Grant] – Department of Anesthesia, Pain Management and Perioperative Medicine – \$19,894.
3. Bessissow A, Baldini G, Minnella E, Fiore JF, Merrett P, Morley E, Sloan E, Wong M, Hung O, et al (2020). Towards National Recommendations for Perioperative Corticosteroids Stress Dose Administration [Grant] – CIHR – \$15,000.
4. Calkin C, Friedman A, Hashmi J (2019-2023). Neuroanatomical and neurofunctional assessment in acquired brain injury [Grant] – Global Affairs Canada – \$3,600,000.
5. Chambers CT, Ali S, Barwick M, Campbell F, Campbell-Yeo M, Finley A, Jordan I, Orji R, Stevens B, Stinson J, Taddio A, Wittman H (2019-2020). "It Doesn't Have to Hurt": Towards a Patient – and Family-Focused Digital Health Tool to Improve Children's Pain Management – A Consensus Conference. CIHR Planning and Dissemination Grant – Institute Community Support [Grant] – CIHR – \$10,000.
6. Cheng Zhenyu, Lehmann Christian (2019-2023). Pseudomonas aeruginosa protease promotes chronic inflammation and immune evasion [Grant] – CIHR – \$963,900.
7. Donald S, Uppal V, Bailey J, Sandeski R (2020). A cadaver investigation assessing the needle path of the costoclavicular brachial plexus block [Grant] – Department of Anesthesia, Pain Management and Perioperative Medicine – \$4,904.
8. Hashmi J, Cane D, Matwin S, Beauuprie I, Fisk J, Kelland A, Lynch M, Mukhida K, Beyea S, Bowen C, Matharoo G (2020-2023). Strategy for understanding how expectations interfere with chronic pain management: a multi-modal neuroimaging study [Grant] – CIHR – \$466,651.
9. Juan Zhou, Christian Lehmann, (2019-2021). Novel Treatments for bladder inflammation and pain [Grant] – Mitacs – \$186,666.
10. Kelly L, Chambers CT, Finley GA, Lacaze T, Oberlander T, Huntsman R, Alcorn J (2020-2023). Cannabis for chronic daily headaches in adolescents [Grant] – SickKids Foundation – \$293,335.
11. Kelly L, tJong, Moore, Hepburn, Alcorn, Finkelstein, Lacaze, Oberlander T, Rassekh, Tsang, Balneaves, Balshaw, Burns, Crooks B, Drogemoller, Dupuis, Dyson, Finley GA, et al (2020-2024). Cannabis for symptom management in children with cancer: a demonstration project by the Canadian Childhood Cannabinoid Clinical Trials (C4T) platform [Grant] – CIHR – \$1,499,000.
12. Lalu MM, Mendelson AA, Fox-Robichaud AE, Kubes P, McIntye M; Co-Is: Cepinskas G, Dos Santos C, Ellis C, Fergusson D, Fiest K, Gill S, Kowalewska P, Krewulak K, Lehmann C, Liaw P, Macala K, Marshall J, McDonald B, Mei S, Presseau J, Vazquez-Grande G, Veldhuizen R, Winston B, Zarychanski R, Zhou J (2019-2020). National Preclinical Sepsis Platform: Developing a framework for accelerating innovation in Canadian sepsis research [Grant] – CIHR – \$9,995.
13. Lehmann C (2019-2020). Interstitial Cystitis and IBD research [Grant] – CRA with Tetra Bio-Pharma – \$489,195.
14. Lynch M (2019). Annual Atlantic Pain Conference [Donation] – Industry support and registrations – \$24,500.
15. Lynch M, Curwin G (2019-2020). Product Formulation, Physiology and Sensory Testing 1 [Grant] – IRAP/NRC Science & Technology Assistance Program – \$5,000.
16. Lynch M, Curwin G (2019-2020). Product Formulation, Physiology and Sensory Testing 2 [Grant] – IRAP/NRC Science & Technology Assistance Program – \$5,000.
17. Lynch M, Curwin G (2020-2021). Product Development and Regulatory approval of a plant-based meal replacement beverage [Grant] – ACOA Business Development Program – \$300,000.
18. MacCormick H, Johnson LT, Cyr JD, George RB, Bould MD (2020-2021). Lived experiences of transgender and nonbinary persons in the perioperative context: a qualitative study [Grant] – Department of Anesthesia, Pain Management and Perioperative Medicine – \$20,002.
19. Munro A, Randle E, Dryden T (2019-2021). Interdisciplinary approach to managing Chronic Pelvic Pain [Grant] – TRIC IWK – \$3,000.
20. Sjaus A, Tan E (2019-2020). The impact of expertise and equipment on point of care ultrasound (POCUS) in term pregnancy: Inferior vena cava imaging by non-experts using hand-held point-of-care ultrasound device – a comparison with expert operator and full size ultrasound equipment [Grant] – Department of Anesthesia, Pain Management and Perioperative Medicine – \$12,592
21. Tuyishme J, Szerb J, Whitfield K, Bianco J (2020-2021). Nutritional Status Among Critically Ill Patients in Rwanda: Is It Feasible to Take a Novel Approach to Enteral Feeding? [Grant] – Jewish Community Foundation Montreal – \$12,904.
22. Zhou J, Lehmann C, Chappe V (2019-2020). Targeting iron for modulation of inflammation and infection in cystic fibrosis [Grant] - The Lung Association of Nova Scotia (LANS) Legacy Research Grant - \$25,000.

NEW SCHOLARLY PROJECTS (UNFUNDED)

1. Cheung C, MacCormick H, Munro A, George RB (2020). Education About Sexual and Gender Minorities Within Canadian Anesthesia Residency Programs: Where Do We Stand? [Clinical]
2. Dumbarton T (2019-2020). Pediatric Difficult Airway Management Database [Database]
3. Fomer D, Rigby M, Wiemer H, Bailey JG, Smyth D (2020-2021). Medical versus surgical treatment for peritonsillar abscesses [Clinical]
4. Jin S, Munro A, Uppal V, McKeen D (2019-2020). The incidence and predictors of failed spinal anesthesia in caesarean delivery: a single centre retrospective review [Clinical]
5. Ke J, George RB, Wozney L, Munro A (2019-2020). Perioperative Mobile Application for Mothers Undergoing Caesarean Delivery: A Prospective Cohort Study on Patient Engagement [Development and Innovation]
6. Lynch M (2020). Rapid review – represented Canada and what happens when we don't treat [Clinical]
7. Munro A, George RB, Rosen N, MacKinnon S (2019-2020). The Association between Labour Epidural Analgesia and Postpartum Depression: A Longitudinal Cohort Study [Clinical]
8. Power-MacDonald S, Sjaus A, Ritchie K (2020). Patient-centeredness training and assessment for multidisciplinary obstetrical teams: The perspective of a professional actor as a simulated patient [Medical Education or Training]
9. Schmidt M (2019-2021). Real-Time Detection and Automated Prediction of Apnea and Hypopnea Events by Measuring Airway Impedance via the Forced Oscillation Technique in an Observational Study [Clinical]
10. Schmidt M (2020). Sterilization of membranes using the vPRO (hydrogen peroxide) method for memsorb [Development and Innovation]
11. Schmidt M (2020). Sterilization/Recycling of membranes using the vPRO (hydrogen peroxide) method for N95 Masks [Development and Innovation]
12. Sjaus A, Power-MacDonald S, Ritchie K, Vakharia N (2019-2020). Teaching Interdisciplinary Communication for High Risk Obstetrical Teams: Qualitative Analysis Shows that Interactive Classroom and Simulation are Complementary [Medical Education or Training]
13. Sjaus A, Ritchie K (2019-2020). Cognitive skills for decision making in anesthesiology: Qualitative analysis of structured oral examinations [Medical Education or Training]
14. Vlatten A, Jagannathan N (2020-2021). Evaluation of the STORZ pediatric DBlade in 20 consecutive pediatric patients with difficult direct laryngoscopy [Clinical]
15. Ward C, Munro A, Houser C, Brousseau P (2020-2021). A Survey of the Anesthesia Assistant Profession in Canadian Teaching Hospitals: 12 Years Later [Clinical]

CONTINUING ONGOING FUNDED PROJECTS

1. Bailey JG, Uppal V, Richardson G, Miller A (2019-2020). Health care resource and costs comparison between spinal anesthesia in a block room versus general anesthesia for primary hip and knee arthroplasty: an economic analysis [Grant] – Dalhousie – \$4,727.
2. Bailey JG, Uppal V, Richardson G, Miller A (2019-2020). Health care resource and costs comparison between spinal anesthesia in a block room versus general anesthesia for primary hip and knee arthroplasty: an economic analysis [Grant] – NSHARF – \$4,844.
3. Barry G, Bailey J, Sardinha J, Milne A, Uppal V (2018-2019). Factors associated with rebound pain after peripheral nerve block for ambulatory surgery: A single-centre retrospective cohort study [Grant] – Dalhousie Anesthesia Research Fund (ARF) – \$4,953. Declined.
4. Barry G, Bailey J, Sardinha J, Milne A, Uppal V (2018-2019). Factors associated with rebound pain after peripheral nerve block for ambulatory surgery: A single-centre retrospective cohort study [Grant] – NSHARF – \$4,893.
5. Buckley DN, Hudspith M, Choinière M, Davis K, Diatchenko L, Finley GA, Fréchette P, Gilron I, Iorio A, Latimer M, MacDermid J, Poulin P, Schneider C, Stevens B, Stinson J (2016-2021). SPOR Network: Caring for patients with chronic pain: Connecting patient needs with research and treatment across the lifespan [Grant] – CIHR – \$25,000,000.
6. Chambers CT, Finley GA, Jordan I, LeBlanc C, Orji R, Parker JA, Stinson J, Tutelman PR (2019-2020). Development of an app for parents to improve procedural pain management in children: needs assessment and user experience design [Grant] – IWK – \$24,988.
7. Chambers, CT & Maynard DJ (co-Directors), & Ali S, Barwick M, Campbell F, Campbell-Yeo M, Carter N, Finley GA, Jordan I, Larocque L, Mogil J, Noel M, Oberlander T, Stevens B, Stinson J, Taddio A (2019-2023). Solutions for Kids in Pain (SKIP) [Grant] – Networks of Centres of Excellence: Knowledge Mobilization initiative (NCE-KM) – \$1,600,000.
8. Chappel V, Anini Y, Croll R, Lehmann C, Pelis R, Xu Z (2017-2019). CFTR regulation by VIP: molecular basis and therapeutic potential [Grant] – American Cystic Fibrosis Foundation – \$214,000.
9. Dumbarton TC, Michaud F (2019-2020). An ethnography of environmentalism in the pediatric operating rooms [Grant] – Dalhousie – \$2,300.
10. Hanly JG, Beyea S, Fisk JD, Friedman A, Hashmi JA (2018-2021). Characterization of brain dysfunction with multimodal functional neuroimaging in patients with SLE and cognitive impairment [Grant] – NSHA – \$615,826.
11. Hashmi JA (2016-2020). Predictive role of brain networks in pain modulations [Grant] – Natural Sciences and

APPENDIX B – 2019-20 RESEARCH PROJECTS (CONT'D)

- Engineering Research Council (NSERC) Discovery Grants Program – \$159,000.
12. Hashmi JA (2016-2021). Canada Research Chair Tier II (Pain) [Grant] – CIHR – \$500,000.
 13. Hashmi JA (2017-2021). Title [Grant] – CFI – \$364,599.
 14. Hashmi JA, Beyea S, Matwin S, Lynch M (2017-2020). Role of brain mechanisms of learning and expectation in chronic back pain [Grant] – CDHA – \$99,588.
 15. Hashmi JA, Lynch M, Beaupre I, Mukhida K (2017-2021). Brain mechanisms of expectation and their role in pain sensitivity and hypervigilance in fibromyalgia [Grant] – CDHA – \$175,000.
 16. Hung OR, Milne AD, d'Entremont M (2018-2019). Development of a new lightwand intubation device. - Early Stage Commercialization Fund [Grant] – Innovacorp – \$15,000
 17. Latimer M, Rudderham S, Martin D, McNally M, Finley A (2019). Using a co-learning approach to create collaborative community-led solutions to improve Indigenous Children's ear, oral and mental wellness for healthy development [Grant] – Research Nova Scotia Trust – \$50,122.
 18. Latimer MA, Martin D, McNally M, Rudderham S, Finley GA, Harman K, MacLellan J, Sylliboy JR, Doiron L, Gloade K, Hachey S, Janus M, Noel G, Vine J (2019-2020). Using a co-learning approach to create a collaborative community-led solution to improve Indigenous Children's ear and oral wellness and healthy development for school readiness [Grant] – CIHR – \$100,000.
 19. LeBlanc J, & ASDIT Investigators [Including George RB] (2015-2020). Accessing safe deliveries in Tanzania [Grant] – International Development Research Centre (IDRC) – \$168,390.
 20. Lehmann C, Zhou J, Hoskin DW (2016-2021). Iron-related mechanisms in immune cell function [Grant] – NSERC CRD – \$574,800.
 21. McDougall J (2017-2022). Contribution of proteases and protease activated receptors to joint neuropathy and arthritis pain [Grant] – CIHR – \$761,175.
 22. McDougall J (2018-2020). Sex differences in joint neuropathic pain involve Nav1.8 ion channels [Grant] – The Arthritis Society – \$351,100.
 23. McDougall J (2019-2024). Regulation of microglial pannexin-1 channels in arthritis pain [Grant] – CIHR – \$875,925.
 24. McDougall JJ, Marshall J, Bezuhly M, Legare JF, Lin TJ (2014-2019). Restitution Enhancement in Arthritis and Chronic Heart Disease [Grant] – CIHR – \$2,337,154.
 25. McKeen D, Dryden T, Snelgrove-Clarke E, Van Eyk N (2017-2019). Research translated into Evidence based Care: improving outcomes in urogynecology surgery thru Enhanced Recovery: The RECOVER study [Grant] – QE II Health Sciences Centre Foundation & IWK Foundation Nova Scotia's Healthcare Improvement Research Program – \$136,960.
 26. Milne AD, Hung OR, d'Entremont M (2019-2020). A pilot study comparing a new prototype Lightwand and Glidescope video laryngoscope for tracheal intubation in a cadaver with simulated reduced mouth opening using a cervical spine collar [Grant] – Dalhousie – \$3,000.
 27. Munro A, George R, Andreou P (2018-2020). A novel approach to optimize Programmed Intermittent Epidural Bolus (PIEB) delivery for labour analgesia [Grant] – Dalhousie – \$19,918.
 28. Power-MacDonald S, Sjaus A, Ritchie K, Vakharia N, George R (2019). Simulation compared to interactive classroom training in interdisciplinary communication for high risk obstetric teams – a prospective randomized mixed-methods study of impact on behaviors and longitudinal retention [Grant] – Dalhousie \$4,983.
 29. Rosen N, George RB, Chorney J, Snelgrove-Clarke E, Pirece M, Andreou P, Binik Y (2016-2019). A longitudinal study of biopsychosocial predictors of postpartum genito-pelvic pain: 12 and 24 months later [Grant] – NSHRF – \$150,000.
 30. Rosen NO, Chorney JE, George RB, Lee-Baggley DL, Pukall CF, Snelgrove-Clarke EE (2017-2020). Biopsychosocial predictors of postpartum genito-pelvic pain: A two-year follow-up [Grant] – CIHR – \$256,274.
 31. Schmidt M, Eskes G, Roach DC, George R, MacDonald D, Matwin S, Hung O (2018-2020). Computerized assessment for Post-Operative Cognitive Decline (POCD) in elderly surgical populations [Grant] – Centre for Aging and Brain Health Innovation (CABHI) – \$349,947.
 32. Snelgrove-Clarke E, Cashen N, O'Reilly D, Tomblin-Murphy G, West J, Lezama B, Walsh C, Casey C, Mann C, Woolcott C, McKeen D, Carson G, Scott H, Piccinini-Vallis H, McLeod L, George R, Scott S, Bleasdale E, Fiander E, Paynter M, Bernard M, Sims M, LeDrew M, Kolanko M, Mills S (2018-2019). Building a research team: Caring for women who live with obesity during pregnancy, birthing, and postpartum [Grant] – IWK – \$3,000.
 33. Uppal V, Ke J, Shanthanna H, Kwofie K, Trenholm A (2017-2019). Preventing Rebound Pain after Arthroscopic Rotator Cuff Repair under General Anesthesia and Interscalene Block: A Randomized Controlled Trial of Pre-emptive Opioid Treatment Compared to Placebo (\$24,353) [Grant] – CDHA – \$24,353.
 34. Wijeyesundera DN, Alibhai S, Jüni P, McIsaac DI, Scott Beattie W, Breau R; Chan V, Choi P, Choi S, Clarke H, Dhalla I, El Beheiry H, George RB, Isaranuwachai W, Johnson S, Kennedy E, Ladha K, Lalu M, Lebovic G, Mazer D, McCluskey S, Puts M, Wei A, Herridge M, Morris W, Nathens A (2018-2021). Functional Improvement Trajectories After Surgery (FIT After Surgery) Study: A Multicentre Prospective Cohort Study to Evaluate the Incidence, Trajectories, Risk Factors, Impact and Healthcare Costs Related to Significant New Disability after Major Elective Surgery [Grant] – CIHR – \$1,388,474.

CONTINUING SCHOLARLY PROJECTS (UNFUNDED)

1. Bailey J, Morgan C, Christie R, Ke J, Kwofie K, Uppal V (2016-2019). Continuous peripheral nerve blocks (CPNBs) compared to thoracic epidurals or multimodal analgesia for midline laparotomy: a systematic review and meta-analysis [Clinical]
2. George RB, Munro A, Nash CM, Carvalho B (2018-2022). A pragmatic single centre randomized controlled trial of programmed intermittent epidural bolus (PIEB) compared to continuous epidural infusion (CEI) for labour analgesia [Clinical]
3. Harding A, George RB, Munro A, Coolen J, Snelgrove-Clarke E, Carvalho B (2018-2020). Patient preferences for outcomes associated with a labour epidural analgesia [Clinical]
4. Jin S, Munro A, George RG, Wolcott C (2018-2020). A retrospective cohort study of the association between labour epidural analgesia and postpartum depression in primiparous women [Clinical]
5. PS Myles, O Boney, M Botti, AM Cyna, TJ Gan, MP Jensen, H Kehlet, A Kurz, GS De Oliveira Jr, P Peyton, DI Sessler, MR Tramèr, CL Wu the StEP–COMPAC Group [Including George RB], Paul Myles, Michael Grocott, Bruce Biccard, Jane Blazeby, Oliver Boney, Matthew Chan, Elisabeth Diouf, Lee Fleisher, Cor Kalkman, Andrea Kurz, Ramani Moonesinghe, Duminda Wijeyesundera (2016-2020). Systematic review and consensus definitions for the Standardised Endpoints in Perioperative Medicine (StEP) initiative [Clinical]
6. Robichaud Celia, Lynch M (2018-2019). Impact of stigma on the experience of prescription opioid-using adults with chronic noncancer pain in the mental health system: a qualitative comparison of patient and clinician experiences [Clinical]
7. Stanzel R, Chedrawy E, Sardiwalla Y, Hirsch G, Dulong B, Henderson M, Schmidt M (2017-2020). The impact of deviations on mean arterial pressure during surgery on neurological/renal outcomes [Database]
8. Stanzel R, Chedrawy E, Schmidt M, Dulong B, Henderson M (2018-2021). Transcranial Doppler Assessment of Cerebral Gaseous Microemboli During Cardiopulmonary Bypass: Quality Assurance Initiative [Clinical]
9. Snow S, Chorney J, Bird S, Wright S (2016-2019). B.A.L.A.N.C.E, Building ALiances for Autism Needs in Clinical Encounters: Surgery Edition [Medical Education or Training]
10. Vlatten A, Bird S, Drysdale S, Grudzinski A, Casey M (2017-2019). A randomized comparison of the AIRTRAQ versus direct laryngoscopy in a Pierre Robin manikin [Clinical]
11. Vlatten A, Bird S, Drysdale S, Grudzinski A, Casey M (2017-2019). A randomized comparison of the STORZ Miller CMAC to direct laryngoscopy in a Pierre Robin manikin [Clinical]
12. Vlatten A, Dumbarton T (2019-2021). A comparison of the STORZ CMAC Dblade versus direct laryngoscopy in a restricted access pediatric motor vehicle accident victim [Clinical]
13. Vlatten A, Grudzinski A (2017-2019). Survey: Availability of airway devices and management of the difficult pediatric airway in lifeflight helicopters in Germany, Austria, Switzerland and Canada [Clinical]
14. Wiseman L, Lynch M (2015-2019). The use of universal precautions in the assessment and management of chronic pain, an assessment of the value of urinary drug screening [Clinical]

Appendix C – 2019 PUBLICATIONS

This list of publications includes peer-reviewed articles that are currently published by researchers with protected time (55) and accessible online. An additional 13 peer-reviewed articles were published by other Department members (for a total of 68).

1. Astapenko D, Benes J, Pouska J, Lehmann C, Islam S, Cerny V (2019). Endothelial glycocalyx in acute care surgery – what anaesthesiologists need to know for clinical practice. *BMC Anesthesiology*, 19(1), 238. [Review – Published] PubMed ID: 31862008.
2. Astapenko D, Ticha A, Tomasova A, Hyspler R, Zadak Z, Lehmann C, Cerny V (2019). Evaluation of endothelial glycocalyx in healthy volunteers – An observational study. *Clinical Hemorheology and Microcirculation*, 30(10), 3233/CH-190581. [Published] PubMed ID: 31683466.
3. Astapenko D, Turek Z, Dostal P, Hyspler R, Ticha A, Kaska M, Zadak Z, Skulec R, Lehmann C, Cerny V (2019). Effect of short-term administration of lipid emulsion on endothelial glycocalyx integrity in ICU patients – A microvascular and biochemical pilot study. *Clinical Hemorheology and Microcirculation*, 73(2), 329-339. [Published] PubMed ID: 31306112.
4. Barnes J, Hunter J, Harris S, Shankar-Hari M, Diouf E, Jammer I, Kalkman C, Klein AA, Corcoran T, Dieleman S, Grocott MPW, Mythen MG, the StEP-COMPAC group [including George RB] (2019). Systematic review and consensus definitions for the Standardised Endpoints in Perioperative Medicine (StEP) initiative: infection and sepsis. *British Journal of Anaesthesia*, 122(4), 500-508. [Published] PubMed ID: 30857606.
5. Bauchat JR, Weiniger CF, Sultan P, Habib AS, Ando K, Kowalczyk JJ, Kato R, George RB, Palmer CM, Carvalho B (2019). Society for Obstetric Anesthesia and Perinatology Consensus Statement: Monitoring Recommendations for Prevention and Detection of Respiratory Depression Associated With Administration of Neuraxial Morphine for Cesarean Delivery Analgesia. *Anesthesia and Analgesia*. [Published] PubMed ID: 31082964.
6. Bautista L, George RB (2019). Dexmedetomidine for every Cesarean delivery... maybe not? *Canadian Journal of Anesthesia = Journal canadien d'anesthésie*, 66(7), 751-754. [Editorial – Published] PubMed ID: 30919235.
7. Berger G, Arora N, Burkovskiy I, Xia Y, Chinnadurai A, Westhofen R, Hagn G, Cox A, Kelly M, Zhou J, Lehmann C (2019). Experimental Cannabinoid 2 Receptor Activation by Phyto-Derived and Synthetic Cannabinoid Ligands in LPS-Induced Interstitial Cystitis in Mice. *Molecules* (Basel, Switzerland), 24(23), 4239. [Published] PubMed ID: 31766439.
8. Chinnadurai A, Berger G, Burkovskiy I, Zhou J, Cox A, Lynch M, Lehmann C (2019). Monoacylglycerol lipase inhibition as potential treatment for interstitial cystitis. *Medical Hypotheses*, 131, 109321. [Published] PubMed ID: 31443753.
9. Colish J, Milne AD, Brousseau P, Uppal V (2019). Factors Associated With Failure of Spinal Anesthetic: An 8-Year Retrospective Analysis of Patients Undergoing Elective Hip and Knee Joint Arthroplasty. *Anesthesia and Analgesia*. [Published] PubMed ID: 31306240.
10. Curry L, Pike M, Lynch M, Marcon D, Sawynok J (2019). Case Series of multiple health benefits in those undertaking extended Qigong practice as a complementary self-care practice in an outpatient pain clinic. *OBM Integrative and Complementary Medicine*, 4(2). [Case Series – Published] DOI: 10.21926/obm.icm.1902040.
11. Dickson K, Lehmann C (2019). Inflammatory Response to Different Toxins in Experimental Sepsis Models. *International Journal of Molecular Sciences*, 20(18), 4341. [Published] PubMed ID: 31491842.
12. Dol J, Tutelman PR, Chambers CT, Barwick M, Drake EK, Parker JA, Parker R, Benchimol EI, George RB, Wittman HO (2019). Health Researchers' Use of Social Media: Scoping Review. *Journal of Medical Internet Research*, 21(11), e13687. [Published] PubMed ID: 31719028.
13. Fergusson DA, Avey MT, Barron CC, Bocock M, Bieffer KE, Boet S, Bourque SL, Conic I, Chen K, Dong YY, Fox GM, George RB, Goldenberg NM, Gragasin FS, Harsha P, Hong PJ, James TE, Larrigan SM, MacNeil JL, Manuel CA, Maximos S, Mazer D, Mittal R, McGinn R, Nguyen LH, Patel A, Richebé P, Saha TK, Steinberg BE, Sampson SD, Stewart DJ, Syed S, Vella K, Wesch NL, Lalu MM (2019). Reporting preclinical anesthesia study (REPEAT): Evaluating the quality of reporting in the preclinical anesthesiology literature. *PLOS One*, 14(5), e0215221. [Published] PubMed ID: 31120888.
14. Friedman A, Calkin C, Adams A, Suarez GA, Bardouille T, Hacoheh N, Green LA, Gupta RR, Hashmi JA, et al (2019). Havana Syndrome in Canadian Diplomats: Brain Imaging reveals acquired neurotoxicity. Preprint: *medRxiv*. [Published].
15. George RB, Boyd C, McKeen D, Abdo IS, Lehmann C (2019). Possible Impact of Spinal Anesthesia and Phenylephrine on Sublingual Microcirculation of Cesarean Delivery Patients. *Journal of Clinical Medicine Research*, 11(8), 543-549. [Published] PubMed ID: 31413765.
16. Goel A, Azargive S, Weissman JS, Shanthanna H, Hanlon JG, Samman B, Dominicus M, Ladha KS, Lamba W, Duggan S, Di Renna T, Peng P, Wong C, Sinha A, Eipe N, Martell D, Intrater H, MacDougall P, Kwofie K, St-Jean M, Rashid S, Van Camp K, Flamer D, Satok-Wolman M, Clarke H (2019). Perioperative Pain and Addiction Interdisciplinary Network (PAIN) clinical practice advisory for

- perioperative management of buprenorphine: results of a modified Delphi process. *British Journal of Anaesthesia*. [Published] PubMed ID: 31153631
17. Hagn G, Westhofen R, Burkovskiy I, Holbein B, Zhou J, Lehmann C (2019). Iron Chelation as Novel Treatment for Interstitial Cystitis. *Pharmacology*, 103(3-4), 159-162. [Published] PubMed ID: 30695781.
 18. Haller G, Bampoe S, Cook T, Fleisher LA, Grocott MPW, Neuman M, Story D, Myles PS on behalf of the STEP-COMPAC Group [including George RB] (2019). Systematic review and consensus definitions for the Standardised Endpoints in Perioperative Medicine initiative: clinical indicators. *British Journal of Anaesthesia*, 123(2), 228-237. [Published] PubMed ID: 31128879.
 19. Hancock Friesen C, Lockhart A, O'Blenes S, Moulton D, Finley JP, Warren AE (2019). A Risk Management Strategy for Managing Critical Human Resource Changes in a Pediatric Heart Program. *CJC Open*, 1(5), 219-224. [Review – Published] DOI: <https://doi.org/10.1016/j.cjco.2019.05.009>.
 20. Hanley M, Shearer C, Livingston P (2019). Faculty perspectives on the transition to competency-based medical education in anesthesia. *Canadian Journal of Anesthesia*. [Published] DOI: <https://doi.org/10.1007/s12630-019-01412-w>.
 21. Harris EP, MacDonald DBS, Boland L, Boet S, Lalu MM, Mclsaac DI (2019). Personalized perioperative medicine: a scoping review of personalized assessment and communication of risk before surgery. *Canadian Journal of Anesthesia*, 66(9), 1026-1037. [Published] PubMed ID: 31240608.
 22. Hatheway, OL, Dobson GR, Milne AD (2019). A survey of anesthesia quality programs in Nova Scotia community hospitals. *Canadian Journal of Anesthesia*. [Published] PubMed ID: 31845293.
 23. Hendy A, Hall R (2019). Cardiac surgery and the blood-brain barrier. *Anesthesiology Clinics*, 37(4), 787-800. [Published] DOI: 10.1016/j.anclin.2019.08.009.
 24. Higgins KS, Chambers CT, Rosen NO, Sherry S, Mohammadi S, Lynch M, Campbell-Yeo M, Clark AJ (2019). Testing the intergenerational model of an empirical investigation of social transmission pathways. *Pain*, 160(11), 2544-2553. [Published].
 25. Higginson A, Forgeron PA, Harrison D, Finley GA, Dick BD (2019). Moving On: Transition experiences of young adults with chronic pain. *Canadian Journal of Pain*, 3(1), 85-97. [Published] DOI: 10.1080/24740527.2019.1587707.
 26. Ho M, Livingston P, Bould D, Nyandwi J, Nizeyimana F, Uwineza JB, Urquhart R (2019). Barriers and facilitators to implementing a regional anesthesia service in a low-income country: a qualitative study. *Pan African Medical Journal*, 32. [Published].
 27. Hung O, Malpas G, Wong C (2019). Concern regarding the use of extracorporeal membrane oxygenation in the anticipated difficult airway. *Canadian Journal of Anesthesia*, 66(9), 1117-1118. [Letter to the Editor – Published].
 28. Husbands-Anderson D, Szerb J, Harvey A (2019). Improving the Quality of Care for Acute Pain Management in Recovery Room at the Georgetown Public Hospital Corporation. *Journal of Advances in Medicine and Medical Research*, 30 Issue (12), 13-14. [Published] DOI: 10.9734/jammr/2019/v30i1230258.
 29. Islam S, Ahmed N, Rivu SF, Khalil M, Tanjia N, Lehmann C (2019). Challenges for microcirculation research in developing countries. *Clinical Hemorheology and Microcirculation*, 73(4), 599-607. [Published] PubMed ID: 31156150.
 30. Islam S, Chisti MJ, Ahmed M, Anwar N, Lehmann C (2019). Bacterial Resistance in Pneumonia in Developing Countries – A Role for Iron Chelation. *Tropical Medicine and Infectious Disease*, 4(2), 59. [Published] PubMed ID: 30974759.
 31. Jessula S, Atkinson L, Casey P, Kwofie K, Stewart S, Lee MS, Smith M, Herman CR (2019). Surgically positioned paravertebral catheters and postoperative analgesia after open abdominal aortic aneurysm repair. *Journal of Vascular Surgery*. [Published] PubMed ID: 31153699.
 32. Jewer JK, Wong MJ, Bird SJ, Habib AS, Parker R, George RB (2019). Supplemental perioperative intravenous crystalloids for postoperative nausea and vomiting. *The Cochrane Database of Systematic Reviews*, 3, CD012212. [Published] PubMed ID: 30925195.
 33. Jung F, Connes P, Lehmann C (2019). A.L. Copley Best Paper Prize 2018. *Clinical Hemorheology and Microcirculation*, 72(2), 117-118. [Published] PubMed ID: 31306116.
 34. Ke J, MacDonald DBS, Mclsaac D (2019). Perioperative Acute Care of Older Patients Living with Frailty. *Current Anesthesiology Reports*, 9, 369–379. [Review – Published] DOI: <https://doi.org/10.1007/s40140-019-00355-8>.
 35. Ke JXC, George RB, Wozney L, Chorney JL (2019). Patient-centred perioperative mobile application in Cesarean delivery: needs assessment and development. *Canadian Journal of Anesthesia = Journal canadien d'anesthésie*, 66(10), 1194-1201. [Published] PubMed ID: 31087270.
 36. Kintu A, MacCormick H, George RB (2019). Establishing an epidural service for labour analgesia in a variable resource environment. *Update in Anaesthesia*, 34, 35-40. [Published] DOI: 10.1029/WFSA-D-18-00022.37.
 37. Kwapisz MM, Kent B, DiQuinzio C, LeGare JF, Garnett S, Swyer W, Whynot S, Mingo H, Scheffler M (2019). The prophylactic use of fibrinogen concentrate in high-risk cardiac surgery. *Acta anaesthesiologica Scandinavica*. [Published] PubMed ID: 31889306.

Appendix C – 2019 PUBLICATIONS (CONT'D)

38. Kwofie MK, Launcelott G, Tsui BCH (2019). Determination of thoracic epidural catheter placement: electrical epidural stimulation (Tsui test) is simple, effective, and under-utilized. *Canadian Journal of Anesthesia = Journal canadien d'anesthésie*. [Published] PubMed ID: 30675686. Update in *Anaesthesia*, 34, 35-40. [Published] DOI: 10.1029/WFSA-D-18-00022.
39. Kwofie MK, Wilson JA (2019). A potential risk from under-recognized perioperative anticoagulation from dalteparin used for extracorporeal circuit anticoagulation during hemodialysis. *Canadian Journal of Anesthesia = Journal canadien d'anesthésie*. [Letter to the Editor – Published] PubMed ID: 31396861.
40. Lafreniere JD, Lehmann C (2019). The curative effect of a cannabinoid 2 receptor agonist on functional failure and disruptive inflammation caused by intestinal ischemia and reperfusion. *Fundamental & Clinical Pharmacology*. [Published] PubMed ID: 31774568.
41. Law JA, Duggan LV (2019). The airway evaluation has come of age – or has it? *Anaesthesia*. [Editorial - Published] PubMed ID: 30963548.
42. Li Y, Zhou J, Burkovskiy I, Yeung P, Lehmann C (2019). ATP in red blood cells as biomarker for sepsis in humans. *Pharmacology*, 124, 84-86. [Published] PubMed ID: 30798924.
43. Lunardi Baccetto S, Lehmann C (2019). Microcirculatory Changes in Experimental Models of Stroke and CNS-Injury Induced Immunodepression. *International Journal of Molecular Sciences*, 20(20), 5184. [Published] PubMed ID: 31635068.
44. Lynch ME, Moulin D, Perez J (2019). Methadone vs Morphine for treatment of neuropathic pain: A randomized controlled trial and challenges in recruitment. *Canadian Journal of Pain*, 3(1), 180-189. [Published].
45. MacLean MA, Mukhida K, Shankar JJS, Schmidt MH, Clarke DB (2019). Complete recovery following transorbital penetrating head injury traversing the brainstem: case report. *Journal of Neurosurgery. Pediatrics*, 1-5. [Published] PubMed ID: 31491753.
46. Matharoo G, Hashmi JA (2019). Spontaneous back-pain alters randomness in functional connections in large scale brain networks: A random matrix perspective. *Physica A: Statistical Mechanics and its Applications*, 123321. [Published].
47. McDougall JJ (2019). Treating osteoarthritis as a neurological disease. *Osteoarthritis and Cartilage Open*, 1, 100005. [Published].
48. McKeen DM, Bryson GL, Lundine J (2019). Underrepresentation of women in Canadian Journal of Anesthesia publications: no surprise – take the pledge! *Canadian Journal of Anesthesia = Journal canadien d'anesthésie*, 66(5), 485-490. [Published] PubMed ID: 30815782.
49. Moonesinghe SR, Jackson AIR, Boney O, Stevenson N, Chan MTV, Cook TM, Lane-Fall M, Kalkman C, Neuman MD, Nilsson U, Shulman M, Myles PS on behalf of the StEP-COMPAC Group [including George RB] (2019). Systematic review and consensus definitions for the Standardised Endpoints in Perioperative Medicine initiative: patient-centred outcomes. *British Journal of Anaesthesia*. [Published] PubMed ID: 31493848.
50. Mossenson A, Mukwesi C, Livingston P (2019). The Vital Anaesthesia Simulation Training (VAST) Course – Immersive simulation designed for low-resource settings. *Update in Anaesthesia*, 33, 45-61. [Published].
51. Mossenson A, Tuyishime E, Rawson D, Mukwesi C, Whynot S, MacKinnon S, Livingston P (2019). A VAST improvement: Promoting anaesthetists' non-technical skills through the Vital Anaesthesia Simulation Training Course in a low-resource setting. *British Journal of Anaesthesia*, 124(2), 206-213. [Published] DOI: 10.1016/j.bja.2019.10.022.
52. Munro A, McKeen D, Coolen J (2019). Maternal respiratory distress and successful reversal with sugammadex during intrauterine transfusion with fetal paralysis. *International Journal of Obstetric Anesthesia*. [Published] PubMed ID: 30770210.
53. Neira VM, Al Madhoun W, Ghaffari K, Barrowman N, Berrigan P, Splinter W (2019). Efficacy of the Malignant Hyperthermia Association of the United States – Recommended methods of preparation for Malignant Hyperthermia susceptible patients using Drager Zeus Anesthesia Workstations and associated costs. *Anesthesia & Analgesia*, 129, 74-83. [Published].
54. O'Brien M, McDougall JJ (2019). A comparison of age and frailty as risk factors for the development of osteoarthritis. *Mechanisms of Aging and Development*, 180, 21-28. [Published].
55. Phipps S, Meisner J, Watton D, Malpas G, Hung O (2019). The role of ECMO in the 'at-risk' tracheal extubation. *Anesth Analg Pract*, 12(2), 41-43. [Published] DOI: 10.1213/XAA.0000000000000838.
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Appendix D – 2018-21 RESEARCH ROADMAP FOR SUCCESS

RESEARCH ROADMAP			
Strategic DIRECTIONS	2018-21 Research ACTIONS	2018-21 Research SUB-ACTIONS	2019-20 Research PRIORITIES
GROW RESEARCH	1. Attract significantly more funding for research	1.1 Making more, higher quality proposals 1.2 Taking advantage of alternate funding sources (e.g., industry, team grants) 1.3 Produce more, high-impact research findings	1. Take advantage of funding opportunities for building collaborative research teams, emphasizing internal collaborations
	2. Generate more/better collaborations	2.1 Being more deliberate and focused where there are already clinical relationships (e.g., general surgery, cardiac surgery) 2.2 Foster collaborations between basic scientists and clinical trialists for enhanced knowledge translation 2.3 Participate in national multi-centre trials & networks (e.g., PACT)	2. Cultivate junior investigator research partnerships for enhanced national/international clinical trial participation
BUILD RESEARCH CAPACITY	1. Attract, hire and retain highly qualified personnel	1.1 Recruiting more research-oriented faculty/trainees/patient advisors with a proven track record in research 1.2 Explore opportunities for creating research positions (e.g. research fellowship, research assistants, Endowed Chair, graduate program, CIP)	1. Implement targeted research training opportunities and mentorship support for junior investigators and trainees
	2. Foster a culture of continuous learning and inquiry	2.1 Identify gaps/skill development opportunities targeted to meet the educational needs of the various groups 2.2 Provide mentorship and support 2.3 Celebrate research success and information exchange among stakeholders	2. Advocate with key stakeholders for integrating research into optimal HR, space and information management decision-making
	3. Expand infrastructure & supports	3.1 Optimize department research supports that would benefit research 3.2 Build a pool of expert consultants to support a variety of research endeavours (e.g., statistician, patient advisor, trialist) 3.3 Establish information management processes & opportunities for research support/analytics	
FOSTER PATIENT ENGAGEMENT	1. Generate greater engagement of patients in research	1.1 Build a group of diverse patient advisors 1.2 Researchers have access to excellent patient advisors	1. Integrate patient advisors into the department's research activities while nurturing uptake from investigators
	2. Strive for a patient engagement culture	2.1 Supporting a patient-led funded research project 2.2 Build researcher and patient advisor capacity in patient engagement 2.3 Support patient representation throughout department 2.4 Integrate patients into all research events e.g., Club, Research Day 2.5 Create a framework of best practices for patient engagement in research	



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