

OFFICE OF RESEARCH

**2022 ACCOUNTABILITY REPORT**

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## Executive Summary

The Department of Anesthesia, Pain Management & Perioperative Medicine's **2022 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 2022 except for funding which corresponds to the period of April 1, 2022– March 31, 2023. For comparative purposes data from previous four years are presented. Targets that were met, or not met in 2022 are outlined below in the summary.

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### Areas in which the department *met its targets* in 2022:

- Twenty-four *new* research projects were initiated in 2022.
- The number and value of grants and industry contract funded research are 46 and \$4.9M, respectively (Figure 1 and Table 1), similar in value to 2021.
- The proportion of collaborative projects and publications remains high at 94%.
- Ninety one percent of researchers are members on research related administrative committees with 86%, 48% and 29% serving on local, national, and international committees, respectively.
- Thirty-eight percent of researchers chair research related committees with 33%, 5% and 14% serving on local, national, and international committees, respectively.
- Eighty six percent of researchers reviewed papers in 2022.
- Twenty-eight percent of researchers perform editorial activities with 14% and 29% serving on national and international committees, respectively.
- Seventy-one percent of researchers supervise learners as the primary supervisor and 14% supervise graduate students.
- There were 20 abstracts accepted in 2022, whereas 16 abstracts were accepted in 2021.
- Sixty-five percent of abstracts were presented as a podium.
- Five recognition awards were conferred in 2022.

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### Area in which the department *did not reach its targets* in 2022:

- Twenty four percent of researchers reviewed funding applications in 2022, whereas 30% of researchers reviewed funding applications in 2021. *The target is 80%.*
- Sixty-two percent 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 total number of publications reached is 78 in 2022, whereas 94 publications were published in 2021. All publications were peer reviewed.
- Forty-eight percent of all researchers presented an abstract in 2022, whereas 50% of researchers presented an abstract in 2020. *The target is 100%.*
- Forty-three percent of researchers were invited to present their work in 2022 as a keynote, plenary and symposium speaker. *The target is 50%.*

## Introduction

The annual **Research Accountability Report** reports on the Department's research activities in relation to predetermined targets outlined in the Anesthesia, Pain Management & Perioperative Medicine Research Accountability Framework. The **Research 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; 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 (2022) covers the time from January to December 2022 for all deliverables with the exception of funding which corresponds to the period of April 1, 2022– March 31, 2023, based on Department of Health and Wellness new documented requirements. 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 2022 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

<b>Indicator:</b>	Number of new proposals that are developed into research endeavours
<b>Target:</b>	New research projects reflects maintenance or increase from previous year (14 new projects in 2021)
<b>Result</b>	Twenty-four (24) <i>new</i> research projects are underway (funded and unfunded)

Twenty-four new research projects began in 2022: 18 funded and 6 unfunded. The main research areas include medical education (46%), chronic pain (25%) and perioperative research (17%) projects. Thirty-seven percent of new projects were led by a department member as the PI with the remaining projects including a department member as a co-investigator. (**Appendix B**).

To summarize:

### Medical education research

- Five medical education research projects examine simulation in resource limited settings. The foci include healthcare provider wellbeing, facilitator evaluation tool development and facilitation effectiveness.
- Two projects focus on anesthesia trainees in the examination of context in the process of curriculum development and preparation for residency exams.
- One project explores the social integration needs of refugee doctors. Another project examines the inter-professional (cardiac surgery, Cardiology and Anesthesia) development of emergency simulation scenario checklist.

### Chronic Pain research

- Two studies examine adult chronic pain using cutting edge neuroimaging assessment methods and innovative non-invasive treatment methods.
- One study assesses medical students' attitudes about supports for chronic pain management within their medical education curriculum.
- Three studies focus on adolescents with chronic pain and their experiences of loneliness during COVID, optimal opioid management and impact of virtual care while waiting for care.

### Perioperative research

- One study is patient led that examines the accuracy of a patient-centric questionnaire assessing satisfaction with shared decision making in healthcare consultations.
- Three perioperative clinical trials examine outcomes for lower limb revascularization, impact of dexamethasone after cesarean delivery and benzodiazepine influence on postoperative delirium.

### Additional research

- One pre-clinical study is assessing the structure and function of the lung.
- One study is examining patients' attitudes about consenting for publication of their medical information in social media.

The 2022 Anesthesia Research Day saw 20 research studies presented. These were generated by a variety of trainees, including ten residents/fellows: seven graduate/post doc students and three undergraduate students. The presentation topics were 70% clinical and 30% fundamental research.

## Engage in the process of research

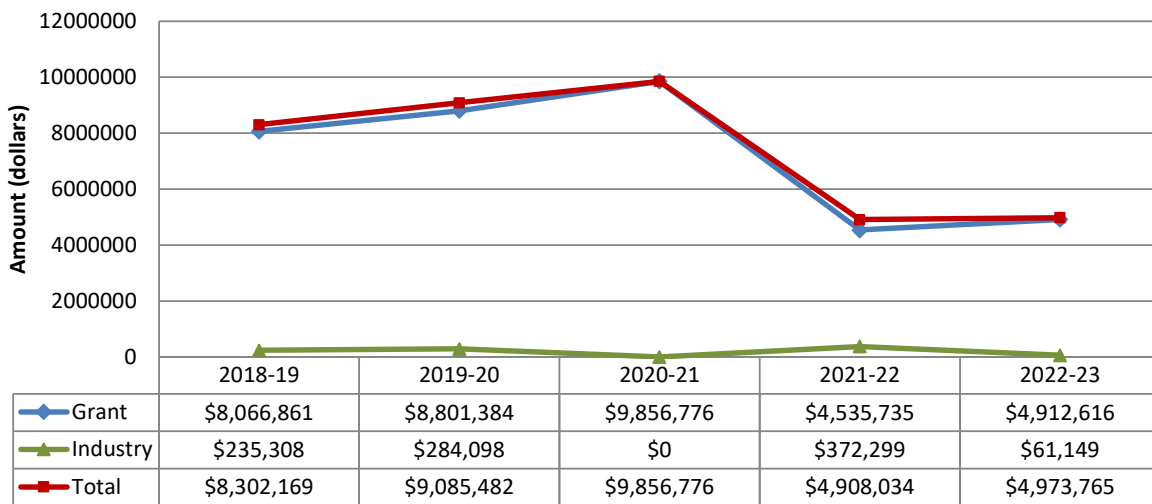
- Indicator:** Number & value (\$) of grants & industry contracts received
- Target:** Total annual funding (\$) reflects maintenance or increase from previous year (43 funded projects totaling \$4.9M in 2021-22)
- Result:** 46 funded projects totaling over \$4.9M annually

Please note for reporting purposes the fiscal calendar (April 1, 2022 – March 31, 2023) is used for research funding only based on Department of Health and Wellness requirements.

There are 46 ongoing and new grant/industry funded projects with annual totals over \$4.9M. Fifteen percent of this funding are led by department members (**Figure 1** and **Table 1**).

National and international funds make up approximately 52% of this total with remaining funds from regional, institutional and department organizations. Major contributors to this success are the availability of protected time (**Table 2** and **Appendix A**), national collaborations as well as the support provided by the Office of Research. Grant funded research underway in the Department includes 11 projects funded by the Tri-Council Agencies (CIHR, NSERC, SSERC), accounting for 64% of the total funds. Four (12%) Tri-Council funded projects are led by department members totaling over \$2.6M (\$394k annually). A list of the grants is found in **Appendix B**.

### Peer Reviewed Research Funding



**Figure 1:** The amount (\$) in external research grant/industry contract funding received in the past 5-years.

\*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.

**Table 1:** Number of grants and industry contracts received in the past 5-years.

	<b>2018-19</b>	<b>2019-20</b>	<b>2020-21</b>	<b>2021-2022</b>	<b>2022-2023</b>
Grant	48	47	44	41	44
Industry	4	3	0	2	2
Total	<b>52</b>	<b>50</b>	<b>44</b>	<b>43</b>	<b>46</b>

**Table 2:** Protected time (FTE) for research activities in the past 5-years.

	<b>2018-19</b>	<b>2019-20</b>	<b>2020-21</b>	<b>2021-2022</b>	<b>2022-2023</b>
Protected Time	6.1	5.7	5.9	5.9	6.3

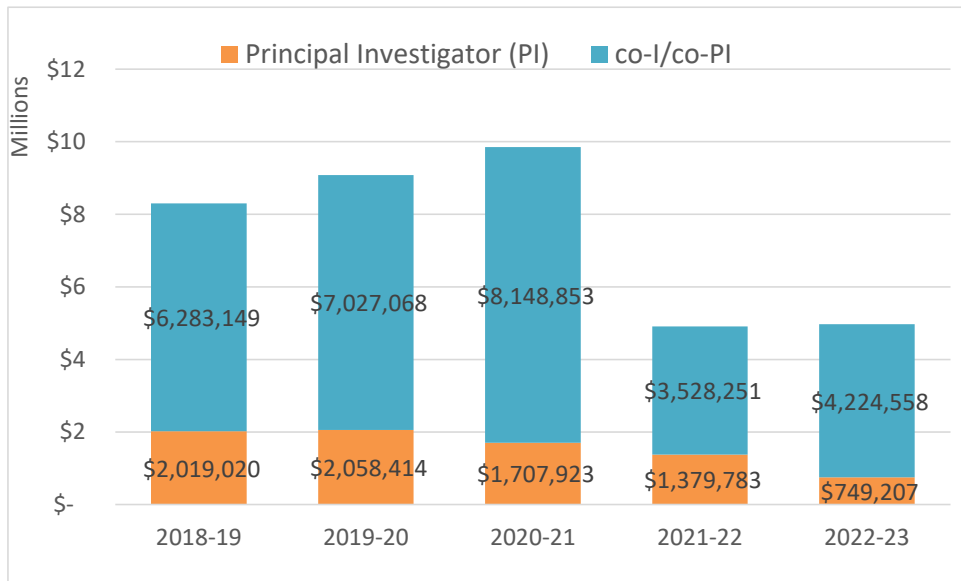
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**Indicator:** Annual value (\$) of grants and industry contracts received by departmental principal investigators

**Target:** External funding dollars obtained as a *principal investigator* reflects maintenance or increase from previous year (\$1.4M from department Principal Investigators in 2021-22)

**Result:** **\$749k was obtained by departmental principal investigators**

Twelve of 21 researchers with protected time were designated as principal investigators for 28 grants/contracts totaling \$749k annually (**Figure 2**). Sixty-four percent of the awarded grants and contracts were less than \$25k. See **Appendix A** for a list of funding.



**Figure 2:** The amounts (\$) of grant and contract funding received for the past 5 years segmented by Principal Investigators (PI) and co-Investigators/coPIs.

**Indicator:** Annual value (\$) of grants & industry contracts received by departmental co-investigators

**Target:** External funding obtained as a *co-investigator* reflects maintenance or increase from previous year (\$3.5M from co-investigators in 2021-22)

**Result:** **\$4.2M was achieved by departmental co-investigators**

An additional \$700k in external grants and contract funding was received by researchers with protected time designated as co-investigators compared to 2021-22. Five (10%) grants and contract were less than \$25k where 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:** **94% of all projects and publications are collaborative**

Of 78 publications, 77 have co-authors (99%). Of 48 funded grants and industry contracts, 41 have co-investigators (85%). Therefore, 118 out of 126 projects and publications are collaborative (94%).

## 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:** **91% of all researchers are members of research related administrative committees: 86% local, 48% national and 29% international**

Nineteen of 21 researchers are members of research related administrative committees (91%).

**Indicator:** Number of researchers who chair research related committees  
**Target:** 25% chair research related committees  
**Result:** **38% of researchers chair research related committees**

Eight of 21 researchers were invited to chair research related committees (38%): 33% local, 5% national and 14% international.

**Indicator:** Number of researchers who review journal articles  
**Target:** 80% review journal articles  
**Result:** **86% of researchers review journal articles**

Eighteen of 21 researchers were invited to review journal manuscripts (86%).

**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:** **24% review funding applications: 10% local, 10% national and 5% international**

Five of 21 researchers were invited to review funding applications (24%).

## Engage in the administrative process

**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:** **62% of all researchers are ranked as associate professor or higher**

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

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**Indicator:** Number of researchers who perform editorial activities

**Target:** 25% perform editorial activities

**Result:** **28% of researchers perform editorial activities: 14% national and 29% international**

Six of 21 researchers perform editorial activities (28%).

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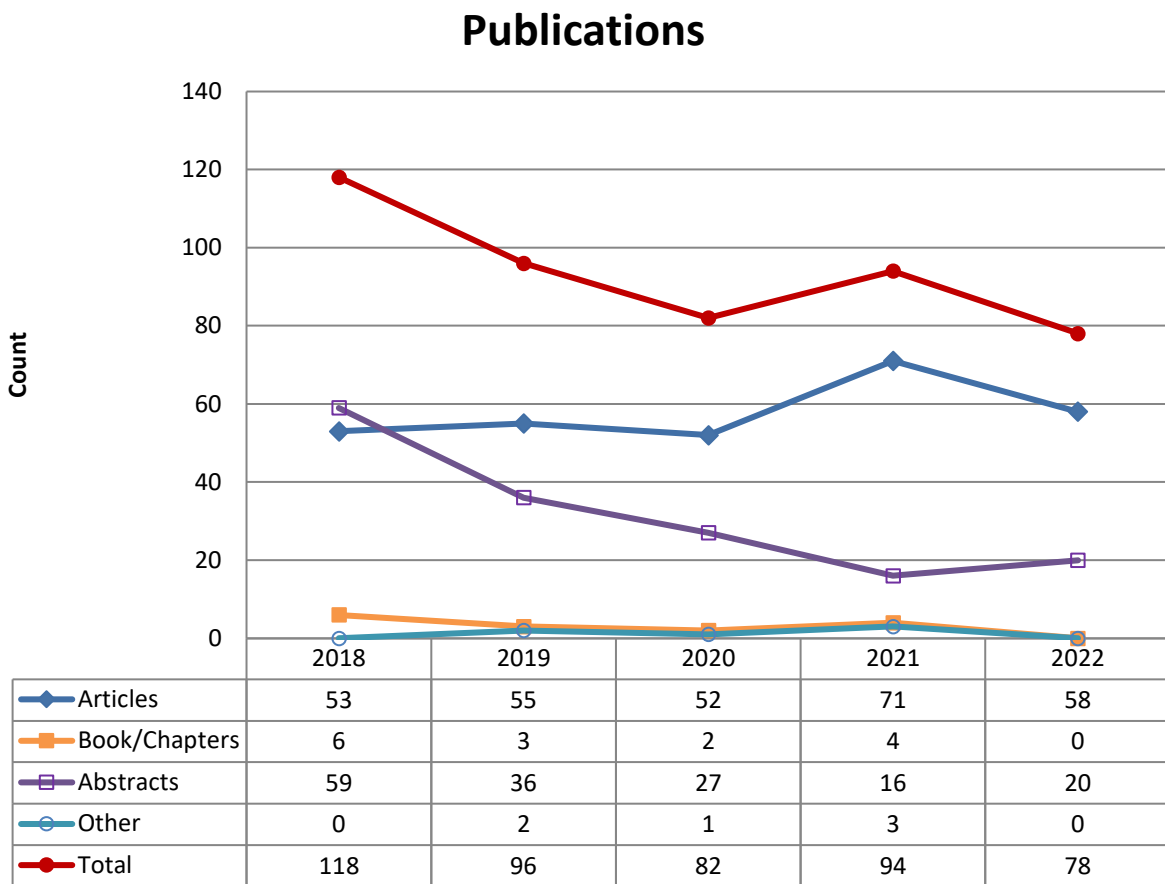
## Write and publish

**Indicator:** Number of accepted and published publications (peer reviewed & non-peer reviewed)

**Target:** Trending of accepted and published peer and non-peer review papers reflects maintenance or increase from previous year  
(94 publications in 2021)

**Result:** 78 publications have been submitted and accepted

In 2022, 78 publications have been submitted and accepted (**Figure 3**) with 58 peer-reviewed manuscripts published online (**Appendix C**). **Table 8** shows the relative protected time with respect to number of publications.



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

**Table 8:** Number of submitted and accepted publications (peer reviewed & non-peer reviewed) relative to FTE of protected time (**Table 2**) for research

	2018	2019	2020	2021	2022
Articles	9	10	9	12	9
Books/Chapters	1	1	0	1	0
Abstracts	10	6	5	3	3
Other	0	0	0	0	3
<b>Total</b>	<b>19</b>	<b>17</b>	<b>14</b>	<b>15</b>	<b>12</b>

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**Indicator:** Number of peer-reviewed publications  
**Target:** 90% of publications are peer-reviewed  
(100% publications were peer reviewed in 2021)  
**Result:** **100% of the articles were peer reviewed**

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**Indicator:** Number of accepted abstracts  
**Target:** Trending of accepted abstracts reflects maintenance or increase from previous year  
(16 abstracts accepted in 2021)  
**Result:** **20 abstracts were accepted**

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## 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  
(60% reported in 2021)  
**Result:** **71% of researchers supervise trainees as the primary supervisor**

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**Indicator:** Number of researchers supervising graduate students (MSc and PhD)  
**Target:** Number of graduate students reflects maintenance or increase  
(15% reported in 2021)  
**Results:** **14% of researchers are supervising graduate students.**

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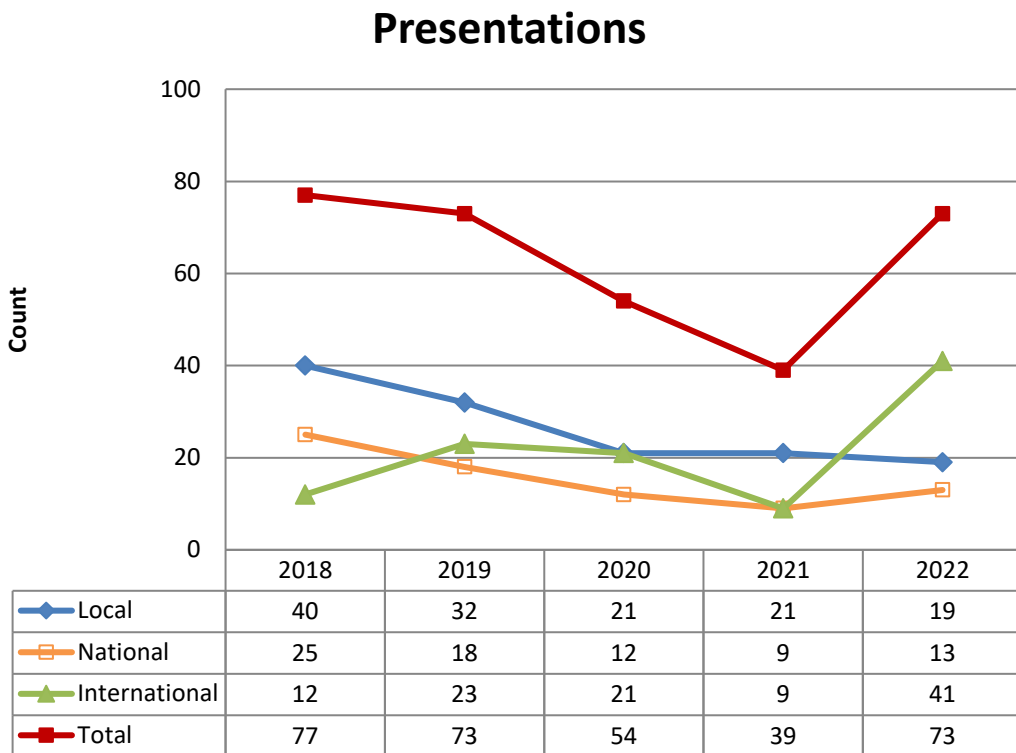
## Prepare and deliver presentations

**Indicator:** Number of all presentations (local, national, international)

**Target:** Trending of presentations reflects maintenance or increase from previous year (21 local, 9 national and 9 international invited presentations in 2021)

**Results:** 73 presentations; 19 local, 13 national and 41 international presentations

The total number of presentations by researchers is found in **Figure 4** with adjustments relative to protected time for research shown in **Table 9**. While the number of local and national presentations reflects maintenance, international level presentations have notably increased.



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

**Table 9:** Number of presentations relative to FTE protected time (**Table 2**) for research

	2018	2019	2020	2021	2022
Local	7	6	4	4	3
National	4	3	2	2	2
International	2	4	4	2	6
<b>Total</b>	<b>13</b>	<b>13</b>	<b>10</b>	<b>7</b>	<b>12</b>

**Indicator:** Number of **invited presentations**

**Target:** 50% of all researchers are invited to present (plenary, keynote or symposium)  
(35% of researchers were invited to present in 2021)

**Result:** **43% of all researchers are invited to present (plenary, keynote or symposium)**

Several researchers (43%) were invited to present their work in 2022 as a keynote, plenary or symposium speaker.

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**Indicator:** Number of abstracts presented annually

**Target:** 100% of all researchers have an abstract presented annually  
(50% of all researchers presented an abstract in 2021)

**Result:** **48% of all researchers presented an abstract in 2022**

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**Indicator:** Number of abstracts presented as a podium presentation

**Target:** 20% of abstracts are invited to present a podium  
(75% of abstracts were podium presentations in 2021)

**Result:** **65% of abstracts were invited to present a podium presentation**

Thirty-eight percent of all researchers presented a podium abstract presentation in 2022. There were 20 abstracts accepted in 2022 with 65% of abstracts invited to present as a podium presentation.

**SCHOLARLY COMMUNICATION**

**Strategically Engaging with External Stakeholders**

**Indicator:** Number of interviews provided to the media

**Target:** Number of media interviews reflects maintenance or increase  
(Two media interviews were provided in 2021)

**Result:** Five media interviews were provided by researchers

Members	Date	Type	Title	Scope
A Finley	2022-08-04	Podcast	Pain Research and Treatment	Regional
K Kwofie	2022-07-10	Online	A Scoring System For Learners to Stratify and Match Bleeding Risk of Peripheral Nerve Blocks to Expert Consensus	International
A Sjaus	2022-06-05	TV	IWK Telethon	Regional
K Kwofie	2022-04-30	Online	Does Periarticular Injection Reduce Pain After Knee Arthroplasty Among Patients Receiving Peripheral Nerve Blocks	International
J Bailey	2022-02-09	Online	Researcher in Action: Meet Dr. Jon Bailey, Anesthesiologist and Researcher	Organization

**Indicator:** Number of recognition awards

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

**Result:** Five research recognition awards were conferred in 2022

Members	Name	Type	Scope	Organization Name
P. Livingston	Queen Elizabeth II Platinum Jubilee Medal	Honorary Award	Regional	Lieutenant Governor of Nova Scotia
V. Uppal	Nominated-Clinical Teacher of the Year	Honorary Award	Department	Dalhousie Department of Anesthesiology, Pain Management & Perioperative Medicine
V. Uppal	Nominated-Resident Advocate of the Year	Honorary Award	Department	Dalhousie Department of Anesthesiology, Pain Management & Perioperative Medicine
C. Lehmann	Best paper of the year published in "Clinical Hemorheology and Micorcirculation"	Honorary Award	International	Clinical Hemorheology and Microcirculation
J. Bailey	Exceptional review	Honorary Award	National	Canadian Medical Association Journal

**Table 10:** Number of recognition awards in the past five years

2018	2019	2020	2021	2022
1	0	5	5	5

## Appendix A – 2022 Protected Time for Research

Central Zone - Adult	FTE	Pediatric	FTE	Women & Obstetrics	FTE
J. Bailey	0.20	T. Dumbarton	0.05	H. MacCormick	0.10
B. Dulong	0.20	A. Finley	0.36	A. Munro	0.30
J. Hashmi	1.00	A. Vlatten	0.05	A. Sjaus	0.25
O. Hung	0.40			V. Uppal	0.10
K. Kwofie	0.20				
A. Law	0.40				
C. Lehmann	0.50				
P. Livingston	0.30				
D. MacDonald	0.20				
J. McDougall	0.33				
A. Milne	0.20				
K. Mukhida	0.20				
V. Neira	0.20				
M. Schmidt	0.40				
V. Uppal	0.35				
A. Vlatten	0.05				
<i>Total</i>	<b>5.13</b>		<b>0.46</b>		<b>0.75</b>

*Please note the research deliverables captured in this report include 21 researchers (6.34FTE) that have protected time to conduct research in the Department of Anesthesia, Pain Management and Perioperative Medicine.*



## Appendix B – 2022-23 Research Projects

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

### NEW Funded Projects (18)

1. Bailey J, Nyirigira G, Mossenson A, Whynot S, Livingston P (2022 - 2024). The VAST Wellbeing Course for reducing burnout, anxiety and depression amongst healthcare providers working in resource-limited settings: a mixed methods study [Grant] - Anesthesia Research Fund, APMPM - \$16,844.
2. Chappe V, Lehmann C, Zhou, J (2022 - 2023). Structure-function study of the CFTR(ABCC7) chloride channel [Grant] - The Lung Association of Nova Scotia (LANS) Legacy Research Grant - \$50,000.
3. Christian Lehmann (2022 - 2023). Bridge funding [Grant] - Anesthesia Research Fund, APMPM - \$20,000.
4. Forgeron PA, Birnie K, Dick BD, Finley GA, Jordan A, Qualter P, Stinson J (2022 - 2024). Lonelier Than Ever: Examining the experiences of Loneliness amongst adolescents with chronic pain in the context of COVID-19: A mixed methods study [Grant] - CIHR - \$239,226.
5. Gower S, Mossenson A, Upadhye V, Elaibaid M, Mrutu S, Whynot S, Livingston P (2023). The Vital Anaesthesia Simulation Training (VAST) Foundation Year for anaesthesia trainees: case study research exploring the influence of context on curriculum delivery [Grant] - Curtin School of Nursing Strategic Funds Grant - \$9,300.
6. Hashmi JA (2016 - 2026). Canada Research Chair Tier II (Pain) [Grant] - CIHR - \$500,000.
7. MacDonald D, Banfield J, Panek I, Maguire M, Heggie C, Williams K, Bottomley T (2022 - 2024). Validation of a patient-centered questionnaire for assessing satisfaction with shared decision making in healthcare consultations [Grant] - Anesthesia Research Fund, APMPM - \$24,402.
8. McDougall J, Mukhida K (2022 - 2024). Management of Osteoarthritis Pain with Green Light Therapy [Grant] - Arthritis Society - \$99,652.
9. McIsaac D, Jerath A, Kidd G, Roberts D, Saha T, Taljaard M, Wijesundera D, Boet S, Bragg S, Bryson G, Carrier F, de Mestral C, Dubois D, Fergusson D, Flexman A, Grudzinski A, Kayssi A, Lalu M, Lee S, MacDonald D, McCartney C, McCluskey S, McKeen D, Nagpal S, Parotto M, Spence J, Thavorn K, Uppal V, van Walraven C (2022 - 2024). The Anesthesia for Lower limb revascularization to Optimize Functional Outcomes (ALOFT) Trial: a pilot multicenter randomized trial [Grant] - CIHR - \$202,725.
10. Mossenson A, Livingston P, Brown J (2023 - 2024). Developing a competency-based facilitation evaluation tool supporting health care simulation in resource-limited settings [Grant] - Australia and New Zealand College of Anaesthetists - \$115,715.
11. Mossenson A, Upadhye V, Livingston P, (2023). Implementation of VAST in Pune, India, including curriculum integration of the VAST [Grant] - ANZCA Health Equity Projects Fund - \$17,800.
12. Munro A, Kwofie MK (2022 - 2024). A randomized controlled trial evaluating the effect intravenous dexamethasone use has on the duration of spinal anesthesia as part of a

- multimodal antiemetic strategy for enhanced recovery after cesarean delivery [Grant] - IWK - \$25,000.
13. Neira V, Chedrawy E, Leslie R, Horne D, Elkhateeb O, Vician M (2022 - 2023). Crisis Management in Advanced Cardiac Care (C-MAC2): Cardiac Surgery and Interventional Cardiology. The use of in-situ high fidelity simulation for inter-professional curriculum development and evaluation [Grant] - Maritime Heart Centre (MHC) - \$38,782.
  14. Parlow J, Gregory K, Johnson A, Bould D, Nyirigira G, Banguti P, Nizeyimana F, Bailey J, Jaeger M (2022 - 2025). Developing a Fellowship and Residency Modules in Knowledge Translation in Anesthesiology and Pain Management in Low and Middle Income Countries [Grant] - International Development, Aid and Collaboration Grant - Royal College International - \$90,000.
  15. Ritchie CK, Sjaus A (2023 - 2024). Preparation for specialty examination is consolidation of routine and adaptive expertise acquired over the course of anesthesia residency: Or is it? [Grant] - Anesthesia Research Fund, APMPM - \$945.
  16. Solutions for Kids in Pain-SKIP: Birnie K, Chambers C, Ali S, Campbell F, Doré-Bergeron M-J, Finley GA, Gruenewoldt E, Stinson J, Trottier E, (2022 - 2023). Opioids and Our Youth: Solutions for safe, effective, and equitable opioid use for pain in youth in Canada [Grant] - Health Canada: Substance Use and Addictions Program - \$613,062.
  17. Spence J, Connolly S, Lee S, Belley-Côté E, Cameron M, D'Aragnon F, Deschamps A, Dulong B, Jacobsohn E, Mazer D, Pryor K, Rajamohan R, Whitlock R (2022 - 2023). Benzodiazepine-free cardiac anesthesia for reduction of postoperative delirium in the intensive care unit (B-Free): A multi-centre, randomized, cluster crossover trial [Grant] - CIHR - \$267,750.
  18. Stinson J, Noel M, Birnie K, Laloo C, Nishat F, Ahola Kohut S, Baerg K, Barwick M, Battaglia M, Campbell F, Cornish P, Dick B, Dore-Bergeron M, Findlay S, Finley A, Gill J, Ingelmo P, Killackey T, Lamontagne C, Oberlander T, Palermo P, Poolacherla R, Poulin P, Rash J, Rasic N, Soltani S, Chupick-Hall K, Harbour K, Kemp H, Oprea A, Rehmanji Y, Surrey L (2022 - 2026). Evaluating a virtual stepped care portal in youth awaiting tertiary chronic pain care: An Implementation-Effectiveness Hybrid Type III study [Grant] - CIHR - \$546,209.

### **NEW Scholarly Projects (unfunded)**

1. Gower S, Mossenson A, Upadhye V, Livingston P (2022 - 2023). Exploration of participants' experience following a global SIMposium focused on peri-operative simulation in low-resource settings [Medical Education or Training]
2. Mossenson A, Livingston P, Kemp S, Kelly M, Brown J (2023 - 2024). Delphi study exploring criteria for effective healthcare simulation facilitation in low-resource settings [Medical Education or Training]
3. Mossenson A, Livingston P, Kemp S, Kelly M, Brown J (2023 - 2024). Tools for evaluation of healthcare simulation facilitation or debriefing, with focus on utility in low-resource settings: A scoping review protocol [Medical Education or Training]
4. Oprea A, Mukhida K (2022 - 2023). Medical students' attitudes about supports for chronic pain management [Clinical]
5. Sjaus A, Ash S (2023 - 2024). Consenting for publication of medical information in social media: Patients' attitudes and opinions [Pre-Clinical]

6. Smith S, Tallentire V, Doherty J, Carney E, Livingston P (2022 - 2023). The social integration needs of refugee doctors: An integrative review [Medical Education or Training]

### **CONTINUING Ongoing Funded Projects (28)**

1. Calkin C, Friedman A, Hashmi J (2019 - 2023). Neuroanatomical and neurofunctional assessment in acquired brain injury [Grant] - Global Affairs Canada - \$3,600,000.
2. 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.
3. Dulong B, Neira V, Baskett R, Stanzel R, Thanapaalasingham A, Kwapisz M (2021 - 2022). Influence of oxygenator selection on platelet function and rotational thromboelastometry following cardiopulmonary bypass [Grant] - NSHARF - \$16,112.
4. Fok P, Dahn T, Campbell S, Kwofie MK, MacDonald K, Avery H, Coles C (2021 - 2023). A quality improvement (QI) initiative to increase the performance of femoral nerve blocks for acute hip fracture patients in the emergency department [Grant] - NSHA - \$3,000.
5. Fox-Robichaud A, Mark Ansermino, Catherine Cook, Kirsten Fiest, Patricia Fontela, Allan Garland, Michelle Kho, Paul Kubes, Manoj Lalu, Francois Lamontagne (Co-Director), Osama Loubani, Claudio Martin, Bradeon McDonald, Lauralyn McIntyre, Melissa Parker, Jeanna Parsons-Leigh, Jeff Perry, Bram Rochweg, Lisa Schwartz, Diana Sherifali, Orla Smith, Elizabeth Wilcox, Bryan Yipp, Lehmann C, Zhou J et al and the Canadian Sepsis Research Network (2020 - 2025). Canadian Sepsis Research Network: Improving care before, during and after sepsis [Grant] - CIHR - \$6,789,630.
6. Gyambibi A, Bailey J, Uppal V (2021 - 2023). Patient Perspectives of Informed Consent for Regional Anesthesia for Ambulatory Surgery [Grant] - Dalhousie - \$4,470.
7. Hashmi J, Cane D, Matwin S, Beuprie 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.
8. Haslam S, Law JA, Milne AD (2021 - 2022). Effects of endotracheal cuff volume on larynx extubation forces. An In-vitro study [Grant] - Dalhousie - \$268.
9. Juan Zhou, Christian Lehmann, (2019 - 2024). 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. Lehmann C (2019 - 2022). Interstitial Cystitis and IBD research [Industry Contract - Pre-clinical] - Tetra Bio-Pharma - \$489,195.
13. Lehmann C (2020 - 2022). ARDS [Industry Contract - Pre-clinical] - Tetra BioPharma - \$173,276.

14. Livingston P, Mossenson A, Bailey J (2020 - 2023). VAST faculty development: building capacity for sustainable delivery of simulation-based medical education in low-resource and remote settings [Grant] - Royal College International - \$90,000.
15. McDougall J (2017 - 2022). Contribution of proteases and protease activated receptors to joint neuropathy and arthritis pain [Grant] - CIHR - \$761,175.
16. McDougall J (2019 - 2023). Regulation of microglial pannexin-1 channels in arthritis pain [Grant] - CIHR - \$875,925.
17. McDougall J (2021 - 2022). Control of osteoarthritis pain in rats using green light therapy [Grant] - Department of Anesthesia, Pain Management and Perioperative Medicine - \$2,960.
18. Morgan B, Munro A, George B, Carvalho B (2020 - 2022). A Retrospective Cohort Review Comparing Catheter Failure Rates with Programmed Intermittent Epidural Bolus and Continuous Epidural Infusion [Grant] - Department of Anesthesia, Pain Management and Perioperative Medicine - \$4,840.
19. Mukhida K (2020 - 2022). Effects of COVID-19 on chronic pain management for patients with addictions [Grant] - Dalhousie - \$11,029.
20. Neira V, Al-Faraj A, Thorleifson M, Duncan K, Doucet R (2021 - 2023). Procedural Skills Workplace Assessment of Internal Jugular Vein Catheterization: A Generalizability Study [Grant] - Anesthesia Research Fund, APMPM - \$7,861.
21. Puts M, Alibhai S, Haase K, MacDonald D, et al (2021 - 2025). A mixed methods study to evaluate functional recovery, care needs and caregiver needs in older adults undergoing surgery: The Frail sub-study of the Fit for Surgery study [Grant] - CIHR - \$424,575.
22. Schmidt M, Dunnington J, Eskes G (2021 - 2024). Computerized Assessment for Post-Operative Cognitive Decline (POCD) in Elderly Populations [Grant] - NSHA - \$59,771.
23. Sjaus A, Munro A, D'Entremont M, Hung O, McKeen D (2020 - 2022). Preliminary evaluation of a novel COVID-19 containment device design: safety and acceptability during aerosol generating medical procedures [Grant] - Department of Anesthesia, Pain Management and Perioperative Medicine - \$24,961.
24. Sjaus A, Munro A, d'Entremont M, Hung O, McKeen D (2020 - 2022). Preliminary evaluation of a novel COVID-19 containment device design: safety and acceptability during aerosol generating medical procedures [Grant] - IWK - \$20,000.
25. Sjaus A, Munro A, Hung O, d'Entremont M, McKeen D (2020 - 2022). Preliminary evaluation of a novel airborne pathogen containment device; reduction of ambient contamination during aerosol generating medical procedures [Grant] - Canadian Anesthesiologists's Society - \$20,000.
26. Tuyishime E, Skelton T, Nyirigira G, Irakoze A, Mossenson A, Livingston P (2021 - 2022). Can the VAST Course enhance resuscitation skills in a resource-limited setting? [Grant] - ANZCA Health Equity Projects Fund 2022 - \$18,800.
27. Wijeyesundera DN, Juni P, Khadaroo R, MacDonald D, et al (2021 - 2025). FAST Walk (Functional Assessment for Surgery by a Timed Walk) study: A multicentre prospective cohort study of the six-minute walk test for improving preoperative risk stratification for major non-cardiac surgery [Grant] - CIHR - \$1,410,813.
28. Wright J, Maksym G, Milne AD (2021 - 2022). Using Oscillometry to Quantify the Effects of Prone Positioning on Lung Mechanics [Grant] - Dalhousie - \$528.

## CONTINUING Scholarly Projects (unfunded)

1. Bailey J, Mossenson A, Nyirigira G, Whynot S, Livingston P (2021 - 2022). The VAST Wellbeing Course for reducing burnout and improving wellbeing amongst healthcare providers working in resource-limited settings: a mixed methods study [Medical Education or Training]
2. Bailey J, Mossenson A, Skelton T, Nyirigira G, Livingston P (2021 - 2022). Competencies of Vital Anesthesia Simulation Training (VAST) facilitators for simulation-based education in resource-limited settings: course participants' perspectives [Medical Education or Training]
3. Bailey JG, Banfield J, Bailey K, Wong M, Barry G, Munro A, Kirkland S, & Lieter M (2020 - 2022). COVID Pandemic short interval National Survey gauging psychological distress among physicians (COPING survey): A longitudinal survey [Clinical]
4. Doverty J Tallantire V, Eltom N, Middleton S, Livingston P (2021 - 2023). Curriculum for refugee doctor adaption to practice in Scotland [Medical Education or Training]
5. Fakuade A, Mukhida K (2022 - 2023). The depiction of pain and addiction in contemporary Canadian hip hop and implications for medical education [Medical Education or Training]
6. 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]
7. Gower S, Mossenson A, Upadhye V, Elaibaid M, Mrutu S, Livingston P (2022 - 2024). The Vital Anaesthesia Simulation Training (VAST) Foundation Year for anaesthesia trainees: case study research exploring the influence of context on curriculum delivery [Medical Education or Training]
8. Ho L, Uppal V, Bailey J, Gyambib A (2021 - 2022). Patient Perspectives of Informed Consent for Regional Anesthesia for Ambulatory Surgery [Clinical]
9. Kwofie MK (2020 - 2022). COVID Airway Provider PPE Use and Outcomes Registry (IntubateCOVID.org) [Database]
10. Lehmann C (2022 - 2024). CIDS [Pre-Clinical]
11. Mukhida K (2014 - 2022). The influence of Wilder Penfield's experiments in Europe on the development of his surgical techniques [Clinical]
12. Mukhida K (2019 - 2022). iCanCope with Pain: an integrated smartphone and web-self-management program for adolescents and young adults with chronic pain [Clinical]
13. Panzarasa J, Mukhida K (2022 - 2023). The depiction of female physicians in Hollywood films and implications for equity, diversity and inclusion [Clinical]
14. Smyth M, Mukhida K (2021 - 2022). Evaluating the effect of preoperative cannabis use on pain management following orthopaedic surgery [Clinical]
15. Tuyishime E, Skelton T, Nyirigira G, Irazkoze A, Mossenson A, Livingston P (2021 - 2022). Can the VAST Course enhance resuscitation skills in a resource-limited setting? [Medical Education or Training]
16. Verge A, Kocum L, Mukhida K (2018 - 2022). Barriers to and facilitators of workplace accommodation for patients with complex regional pain syndrome [Clinical]
17. Vlatten A (2021 - 2024). Comparison of pediatric airway training and available airway equipment in EMS [Clinical]



## Appendix C – 2022 Publications

Note that this list of publications includes *peer-reviewed* articles that are currently *published* and accessible online by ALL members of the department (58).

1. Abadeso C, Pacheco S, Céu Machado M, Finley GA (2022). Health-related Quality of Life assessments by children and adolescents with sickle cell disease and their parents in Portugal. *Children*, 9, 283. [Published] DOI: 10.3390/children9020283.
2. Aristi G, Kamintsky L, Ross M, Bowen C, Calkin C, Friedman A, Hashmi JA (2022). Symptoms reported by Canadians posted in Havana are linked with reduced white matter fibre density. *Brain communications*, 4(2), fcac053. [Published] PubMed ID: 35505689.
3. Aristi G, O'Grady C, Bowen C, Beyea S, Lazar SW, Hashmi JA (2022). Top-down threat bias in pain perception is predicted by intrinsic structural and functional connections of the brain. *NeuroImage*, 258, 119349. [Published] PubMed ID: 35690258.
4. Astapenko D, Tomasova A, Ticha A, Hyspler R, Chua HS, Manzoor M, Skulec R, Lehmann C, Hahn R, Malbrain ML, Cerny V (2022). Endothelial glycocalyx damage in patients with severe COVID-19 on mechanical ventilation - a prospective observational pilot study. *Clinical hemorheology and microcirculation*. [Published] PubMed ID: 35342082.
5. Atkins N, Mukhida K (2022). The effects of income and education on patients' access to pharmacological chronic pain management: a scoping review. *Canadian Journal of Pain*, 6, 142-170. [Scoping Review - Published] PubMed ID: 36092247.
6. Bailey JG, Miller A, Richardson G, Hogg T, Uppal V (2022). Cost comparison between spinal versus general anesthesia for hip and knee arthroplasty: an incremental cost study. *Canadian journal of anaesthesia = Journal canadien d'anesthesie*. [Published] PubMed ID: 35982355.
7. Bailey JG, Uppal V (2022). Fascial plane blocks: moving from the expansionist to the reductionist era. *Canadian journal of anaesthesia = Journal canadien d'anesthesie*. [Editorial - Published] PubMed ID: 35999333.
8. Barry G, Uppal V (2022). Sedation during regional anesthesia: less is more. *Canadian journal of anaesthesia = Journal canadien d'anesthesie*, 69(12), 1453-1458. [Editorial - Published] PubMed ID: 36289152.
9. Bartlett EM, Emsley JG, Kiberd MB (2022). Pediatric vascular access in major bleeding: how much is enough? *CJEM*, 24(7), 793-794. [Editorial - Published] PubMed ID: 36074300.
10. Bednarek OL, Morgan BE, Khorovets A, Plourde MM, French DG (2022). Congenital adult tracheoesophageal fistula repair with transthoracic ventilation: a case report. *Canadian journal of anaesthesia = Journal canadien d'anesthesie*, 69(9), 1174-1177. [Case Report - Published] PubMed ID: 35469041.
11. Brandts-Longtin O, Lalu MM, Adie EA, Albert MA, Almoli E, Almoli F, Bryson GL, Dony C, Dunleavy D, Grudniewicz A, Lehmann C, Lhoest R, Moher D, Montroy J, Pitts M, Ricketts A, Thirion P, Cobey KD (2022). Assessing the impact of predatory journals on policy and guidance documents: a cross-sectional study protocol. *BMJ open*, 12(4), e059445. [Published] PubMed ID: 35379645.
12. Chrimes N, Higgs A, Hagberg CA, Baker PA, Cooper RM, Greif R, Kovacs G, Law JA, Marshall SD, Myatra SN, O'Sullivan EP, Rosenblatt WH, Ross CH, Sakles JC, Sorbello M, Cook TM (2022). Preventing unrecognised oesophageal intubation: a consensus guideline

- from the Project for Universal Management of Airways and international Airway Societies. Anaesthesia. [Narrative Review - Published] PubMed ID: 35977431.
13. Dassieu L, Choinière M, Saint-Jean L, Webster F, Peng P, Buckley N, Gilron I, Williamson OD, Finley GA, Baerg K, Janelle-Montcalm A, Hudspith M, Boulanger A, Di Renna T, Intrater H, Lau B, Pereira J (2022). Frequency and characteristics of patient exclusion criteria in Canadian Multidisciplinary Pain Treatment Facilities: A cross-sectional study. *Can J Anesthesia*. [Published] DOI: 10.1007/s12630-022-02241-0.
  14. Forgeron PA, Chambers C, Dick BD, Cohen J, Lamontagne C, Finley GA (2022). Are they still friends? Friendship stability of adolescents with chronic pain: 1 year follow up. *Frontiers in Pain Research*, 2, 767236. [Published] DOI: 10.3389/fpain.2021.767236.
  15. Forgeron PA, Chambers CT, Dick BD, Cohen J, Finley GA, Lamontagne C (2022). Dyadic analysis of adolescent friendships behaviours during pain: Comparison of those with chronic pain versus those without chronic pain. *Eur J Pain*, 26(2), 428-444. [Published] DOI: 10.1002/ejp.1869.
  16. Fotopoulou C, Khan T, Bracinek J, Glasbey J, Abu-Rustum N, Chiva L, Fagotti A, Fujiwara K, Ghebre R, Gutelkin M, Konney TO, Ng J, Pareja R, Kottayasamy Seenivasagam R, Sehouli J, Surappa STS, Bhangu A, Leung E, Sundar S, CovidSurg Collaborators, Munro A (2022). Outcomes of gynecologic cancer surgery during the COVID-19 pandemic: an international, multicenter, prospective CovidSurg-Gynecologic Oncology Cancer study. *American journal of obstetrics and gynecology*, 227(5), 735.e1-735.e25. [Published] PubMed ID: 35779589.
  17. Hall S, Faridi S, Euodia I, Tanner S, Chojnacki AK, Patel KD, Zhou J, Lehmann C (2022). Intravital Widefield Fluorescence Microscopy of Pulmonary Microcirculation in Experimental Acute Lung Injury using a Vacuum-Stabilized Imaging System. *Journal of visualized experiments : JoVE*, (182). [Published] PubMed ID: 35467666.
  18. Hall S, Faridi S, Trivedi P, Sultana S, Ray B, Myers T, Euodia I, Vlatten D, Castonguay M, Zhou J, Kelly M, Lehmann C (2022). Selective CB Receptor Agonist, HU-308, Reduces Systemic Inflammation in Endotoxin Model of Pneumonia-Induced Acute Lung Injury. *International journal of molecular sciences*, 23(24). [Published] PubMed ID: 36555499.
  19. Hanly JG, Legge A, Kamintsky L, Friedman A, Hashmi JA, Beyea SD, Fisk J, Omisade A, Calkin C, Bardouille T, Bowen C, Matheson K, Fritzler MJ (2022). Role of autoantibodies and blood-brain barrier leakage in cognitive impairment in systemic lupus erythematosus. *Lupus science & medicine*, 9(1). [Published] PubMed ID: 35705307.
  20. Harding A, George RB, Munro A, Coolen J, Snelgrove-Clarke E, Carvalho B (2022). Patient Preferences for Outcomes Associated With Labor Epidural Analgesia. *Cureus*, 14(2), e22599. [Published] PubMed ID: 35355544.
  21. Islam s, Hoque N, Nasrin N, Hossain M, Rizwan F, Biswas K, Asaduzzaman M, Rahman S, Hoskin D, Sultana S, Lehmann C (2022). Iron overload and breast cancer: Iron chelation as a potential therapeutic approach. *Life*, 12(7), 963. [Narrative Review - Published] PubMed ID: 35888054.
  22. Ke JXC, McIsaac DI, George RB, Branco P, Cook EF, Beattie WS, Urquhart R, MacDonald David (2022). Postoperative mortality risk prediction that incorporates intraoperative vital signs: development and internal validation in a historical cohort. *Canadian journal of anaesthesia = Journal canadien d'anesthésie*, 69(9), 1086-1098. [Published] PubMed ID: 35996071.

23. Khan S, Hashmi JA, Mamashli F, Hämäläinen MS, Kenet T (2022). Functional Significance of Human Resting-State Networks Hubs Identified Using MEG During the Transition From Childhood to Adulthood. *Frontiers in neurology*, 13, 814940. [Published] PubMed ID: 35812111.
24. Khayat W, Lehmann C (2022). The Endocannabinoid System: A potential therapeutic target for coagulopathies. *Metabolites*, 12(6), 541. [Published] DOI: 10.3390/metabo12060541.
25. Kiberd MB, Dumbarton T (2022). A novel approach to obtaining large-bore access in pediatrics. *Canadian journal of anaesthesia = Journal canadien d'anesthesie*, 69(12), 1554-1555. [Letter to the Editor - Published] PubMed ID: 36180653.
26. Killackey T, Baerg K, Dick BD, Lamontagne C, Poolacherla R, Finley GA, Noel M, Birnie KA, Choinière M, Pagé MG, Dassieu L, Lacasse A, Laloo C, Poulin P, Ali S, Battaglia M, Campbell F, Harris L, Mohabir V, Nihat F, Benayon M, Jordan I, Stinson J (2022). Experiences of Pediatric Pain Professionals Providing Care during the COVID-19 Pandemic: A Qualitative Study. *Children*, 9(2), 230. [Published] DOI: 10.3390/children9020230.
27. Law JA, Thana A, Milne AD (2022). The incidence of awake tracheal intubation in anesthetic practice is decreasing: an historical cohort study of the years 2014-2020 at a single tertiary care institution. *Canadian Journal of Anesthesia*. [Published] PubMed ID: 36289151.
28. Lehmann C, Alizadeh-Tabrizi N, Hall S, Faridi S, Euodia I, Holbein B, Zhou J, Chappe V (2022). Anti-inflammatory effects of the novel iron chelator, DIBI, in experimental acute lung injury. *Molecules*, 27(13), 4036. [Published] PubMed ID: 35807282.
29. Lehmann C, Zhou J (2022). Cannabinoid effects in the microvasculature - CB, or not CB? That is the question! A mini-review. *Clinical hemorheology and microcirculation*. [Narrative Review - Published] PubMed ID: 36591655.
30. Livingston P (2022). Blog: Approaching the chronic pain patient: learning from 33 years in the field. *Canadian Family Physician*. [Letter to the Editor - Published] Available here.
31. Livingston P, Nyirigira G, Mossenson A (2022). Curriculum design for the global setting. Update in Anesthesia. [Published] DOI: doi: 10.1029/WFSA-D-21-00002.
32. MacDonald S, Mukhida K (2022). Pneumorrhachis complicating acute pain management using a thoracic epidural catheter. *Dalhousie Medical Journal*, 48. [Case Report - Published].
33. MacKenzie NE\*, Chambers CT, Parker JA, Aubrey E, Jordan I, Richards D, Marianayagam J\*, Ali S, Campbell F, Finley GA, Gruenwoltd E, Stevens B, Stinson J, Birnie KA (2022). Bridging the gap: Identifying diverse stakeholder needs and barriers to accessing evidence and resources for children's pain. *Canadian Journal of Pain*, 6(1), 48-64. [Published] DOI: 10.1080/24740527.2022.2045192.
34. McDougall JJ, McKenna MK (2022). Anti-Inflammatory and Analgesic Properties of the Cannabis Terpene Myrcene in Rat Adjuvant Monoarthritis. *International journal of molecular sciences*, 23(14). [Published] PubMed ID: 35887239.
35. McDougall JJ, Reid AR (2022). Joint Damage and Neuropathic Pain in Rats Treated With Lysophosphatidic Acid. *Frontiers in immunology*, 13, 811402. [Published] PubMed ID: 35185905.
36. Milne AD, Dobson GR, Forbes SJ (2022). Observational Analysis of Criteria for a Difficult Airway Alert. *Journal of Head and Neck Anesthesia*, 6(2), e44. [Published] DOI: DOI: 10.1097/HN9.0000000000000044.
37. Mukhida K, Sedighi S, Hart C (2022). "Give my daughter the shot!": A content analysis of the depiction of patients with cancer pain and their management in Hollywood films. *Current Oncology*. [Published].



38. Mukhida K, Sedighi S, Hart C (2022). Popcorn in the pain clinic: a content analysis of the depiction of patients with chronic or cancer pain and their management in motion pictures and implications for cinemeducation. *Canadian Journal of Pain*. [Published].
39. Munro A, MacCormick H, Aidemouni M, Nash CM, George RB (2022). A retrospective cohort comparison of programmed intermittent epidural bolus (PIEB) and continued epidural infusion (CEI) on delivery mode. *Canadian Journal of Anesthesia*. [Published] PubMed ID: 35508576.
40. Nani A, Hashmi JA (2022). Editorial: The Interplay Between Consciousness and Attention in Atypical Contexts of Experience. *Frontiers in neuroscience*, 16, 913913. [Editorial - Published] PubMed ID: 35573315.
41. Neira VM, Baghaffar A, Doggett N, Chen Ke JX, Stewart K (2022). Coagulopathy Management of An Acute Type A Aortic Dissection in a Patient Taking Apixaban. *Journal Cardiothoracic & Vascular Anesthesia*., (6), 1720-25. [Case Report - Published] DOI: 10.1053/j.jvca.2021.03.028.
42. Neuman MD, Feng R, Ellenberg SS, Sieber F, Sessler DI, Magaziner J, Elkassabany N, Schwenk ES, Dillane D, Marcantonio ER, Menio D, Ayad S, Hassan M, Stone T, Papp S, Donegan D, Marshall M, Jaffe JD, Luke C, Sharma B, Azim S, Hymes R, Chin KJ, Sheppard R, Perlman B, Sappenfield J, Hauck E, Hoefl MA, Tierney A, Gaskins LJ, Horan AD, Brown T, Dattilo J, Carson JL, REGAIN (Regional versus General Anesthesia for Promoting Independence after Hip Fracture) Investigators\*, Looke T, Bent S, Franco-Mora A, Hedrick P, Newbern M, Tadros R, Pealer K, Vlassakov K, Buckley C, Gavin L, Gorbatoov S, Gosnell J, Steen T, Vafai A, Zeballos J, Hruslinski J, Cardenas L, Berry A, Getchell J, Quercetti N, Bajracharya G, Billow D, Bloomfield M, Cuko E, Elyaderani MK, Hampton R, Honar H, Khoshknabi D, Kim D, Krahe D, Lew MM, Maheshwer CB, Niazi A, Saha P, Salih A, de Swart RJ, Volio A, Bolkus K, DeAngelis M, Dodson G, Gerritsen J, McEniry B, Mitrev L, Kwofie MK, Belliveau A, Bonazza F, Lloyd V, Panek I, Dabiri J, Chavez C, Craig J, Davidson T, Dietrichs C, Fleetwood C, Foley M, Getto C, Hailes S, Hermes S, Hooper A, Koener G, Kohls K, Law L, Lipp A, Losey A, Nelson W, Nieto M, Rogers P, Rutman S, Scales G, Sebastian B, Stanciu T, Lobel G, Giampiccolo M, Herman D, Kaufman M, Murphy B, Pau C, Puzio T, Veselsky M, Apostle K, Boyer D, Fan BC, Lee S, Lemke M, Merchant R, Moola F, Payne K, Perey B, Viskontas D, Poler M, D'Antonio P, O'Neill G, Abdullah A, Fish-Fuhrmann J, Giska M, Fidkowski C, Guthrie ST, Hakeos W, Hayes L, Hoegler J, Nowak K, Beck J, Cuff J, Gaski G, Haaser S, Holzman M, Malekzadeh AS, Ramsey L, Schulman J, Schwartzbach C, Azefor T, Davani A, Jaberri M, Masear C, Haider SB, Chungu C, Ebrahimi A, Fikry K, Marcantonio A, Shelvan A, Sanders D, Clarke C, Lawendy A, Schwartz G, Garg M, Kim J, Caruci J, Commeh E, Cuevas R, Cuff G, Franco L, Furgiuele D, Giuca M, Allman M, Barzideh O, Cossaro J, D'Arduini A, Farhi A, Gould J, Kafel J, Patel A, Peller A, Reshef H, Safur M, Toscano F, Tedore T, Akerman M, Brumberger E, Clark S, Friedlander R, Jegarl A, Lane J, Lyden JP, Mehta N, Murrell MT, Painter N, Ricci W, Sbrollini K, Sharma R, Steel PAD, Steinkamp M, Weinberg R, Wellman DS, Nader A, Fitzgerald P, Ritz M, Bryson G, Craig A, Farhat C, Gammon B, Gofton W, Harris N, Lalonde K, Liew A, Meulenkamp B, Sonnenburg K, Wai E, Wilkin G, Troxell K, Alderfer ME, Brannen J, Cupitt C, Gerhart S, McLin R, Sheidy J, Yurick K, Chen F, Dragert K, Kiss G, Malveaux H, McCloskey D, Mellender S, Mungekar SS, Noveck H, Sagebien C, Biby L, McKelvy G, Richards A, Abola R, Ayala B, Halper D, Mavarez A, Rizwan S, Choi S, Awad I, Flynn B, Henry P, Jenkinson R, Kaustov L, Lappin E, McHardy P, Singh A,

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