



Department of Anesthesia, Pain Management
and Perioperative Medicine

Annual Report

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DALHOUSIE
UNIVERSITY

Vision

The patients and communities we serve benefit from the highest quality, evidence-based anesthesia, pain management and perioperative medical care by committed clinicians, researchers, educators, and staff.

Mission

We are leaders providing innovative, high-quality education, research, and patient and family-centred clinical care across the lifespan. In all that we do, we respect and value the diversity of the people and communities we work with and serve, with an ongoing commitment to responsible stewardship.

Values

Innovation

We embrace curiosity and evidence and seek new knowledge from diverse perspectives.

Quality

We strive to set the highest standard of quality in everything we do and constantly challenge ourselves to improve.

Integrity

We strive to be fair, ethical, and transparent in all that we do and in the decisions that we make; we strive to act in the best interests of patients.

Respect

We demonstrate to our patients, learners, and colleagues that we respect, value and appreciate them through our words, actions, and relationships.

Accountability

We responsibly use the Department's resources to provide the best quality service possible and strive to exceed expectations as we meet our obligations. We advocate for better health outcomes and understand the importance of giving back to our communities, both locally and globally.

Equity, Diversity, and Inclusion

In all our work and in the way we interact with each other, we strive to remove barriers to equity and create an environment that fosters diversity and inclusion.



Dalhousie University is located in Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq. We are all Treaty people.

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Greetings

Message from the Department Head, Associate Head and Chief Operating Officer



We are pleased to present to you the 2021-2022 Dalhousie University Department of Anesthesia, Pain Management and Perioperative Medicine annual report. This report is our opportunity to highlight the people, the projects, and the amazing work of our team.

As we reflect on the past year, the words transition, and transformation come to mind. The ongoing COVID pandemic continues to dominate our professional and our private lives. Yet, our Department members have continued to thrive in the face of adversity, learning to do things differently and living beyond the crisis that is COVID.

Clinically, this year was about exercising agility in the way we collaborate to organize surgical care across all sites. It was about being part of different patient care models – from innovations in robotic surgery, the shift to increase outpatient surgeries, to supporting our team members in what has been a challenging time for all. An exciting development this year was the completion of the expansion and renovation of Dartmouth General Hospital (DGH). In February, four new operating rooms opened at DGH, doubling the number of operating rooms and increasing the number of surgeries performed at that location. The redevelopment provides doctors, nurses, and other healthcare professionals with a modern place to work with advanced equipment and technology, which will also help recruit and retain healthcare professionals for years to come.

This year, we strived to continually improve and modernize our administrative processes to better reflect the size and complexity of the Department as it has evolved over many years. This meant challenging the ways in which things were always done in favour of exploring new ways of working that bring value and reduce inefficiencies. The Finance Office successfully rolled out a new module as a part of our physician scheduling software that enhances the way in which we track time and compensate physicians. Efforts were also made to improve billing processes by reducing unnecessary manual paperwork for most intraoperative procedures. We also continued to strengthen our financial reporting and budgeting processes as part of a Finance Renewal project.

This report is our opportunity to highlight the people, the projects, and the amazing work of our team.

(Con't.)

We know that staff
wellness is more
important than ever,
and we will work to
ensure that the
people within the
Department – faculty,
administrative staff,
learners – are
celebrated and
supported.

Academically, we continue to excel in training the next generation of anesthesia providers. This year, our Department's Office of Education had a record number of applicants for its highly sought-after anesthesia residency program. The Office also worked tirelessly to revamp the anesthesia residency curriculum following the Royal College's decision to split the oral and written final exams.

Our Department's Office of Research continues to lead the way in producing world-renowned research. Our researchers were published in 94 peer-review journals and received \$4.9 million in grants and industry funding to support impactful and relevant research. It was a year of many research-related appointments, including the renewal of Dr. Javeria Hashmi's tier II Canada Research Chair.

Despite all the challenges COVID brought to the table, we never lost focus on our patients and our purpose. The Department recognizes our social accountability role in advocating for better health outcomes and the importance of giving back to our communities, both locally and globally. That is why we renamed our Global Health office to Serving and Engaging Communities to help the Department build education and research capacity for safe, sustainable anesthesia, pain management and perioperative care in resource limited populations, globally and within Canada.

We also went forward with an extensive strategic plan renewal, which set our Department's strategic goals for the next five years. These goals will see us focus on including equity, diversity, and inclusion principles in all that we do.

In closing, we would like to thank the senior leadership team, medical directors, and all Department members and stakeholders for your resilience, compassion, and collaboration. Our future is bright because of the hard work that you do each day. Our goal going forward is to continue to build a workplace culture that is vibrant, supportive, and safe so that we can recruit and retain talent and continue to make a difference in the lives of those we serve. We are excited to see all the amazing accomplishments that are yet to come.

Sincerely,



Janice Chisholm, MD, FRCPC

Head and Professor,
Dalhousie University
Head, Central Zone,
Nova Scotia Health



André Bernard, MD, FRCPC

Associate Head and Assistant
Professor, Dalhousie University
Associate Head, Central Zone,
Nova Scotia Health



Carmelle d'Entremont, MA

Chief Operating Officer
Dalhousie University

About Us

Who We Are

We are a clinical and academic Department affiliated with Dalhousie University's Faculty of Medicine, including its Saint John, New Brunswick site, and primarily two health authorities in Nova Scotia: Nova Scotia Health and the IWK Health Centre. Some of our academic faculty are also located in regions across the Maritimes.

Working in collaboration with health authority clinical staff and leadership, our Department comprises:

- Over 200 Dalhousie faculty in PEI, Nova Scotia and New Brunswick, with approximately 100 working clinically as part of our Clinical Academic Funding Plan (CAFP) within NSH Central Zone, IWK Women's & Obstetric and IWK Pediatrics.
- More than 25 administrative staff, who are employees of the various partner institutions and support research, education, finance, and administration offices.

Our Executive Team

- **Dr. Janice Chisholm**, Dalhousie University Department Head, and NSH Central Zone Head
- **Dr. André Bernard**, Dalhousie University Department Associate Head and NSH Central Zone Associate Head
- **Dr. Narendra Vakharia**, Chief, Women's and Obstetric Anesthesia, IWK Health Centre
- **Dr. Scott Drysdale**, Chief, Pediatric Anesthesia, IWK Health Centre
- **Ms. Carmelle d'Entremont**, Chief Operating Officer

Cabinet

The Department's Cabinet Committee advises the Department Head on financial and academic matters and plays a central role in strategic planning, priority, and policy setting.

- **Dr. André Bernard**, Chair, Associate Head
- **Dr. Janice Chisholm**, Head

- **Dr. Narendra Vakharia**, Chief, Women's and Obstetric Anesthesia, IWK Health Centre
- **Dr. Scott Drysdale**, Chief, Pediatric Anesthesia, IWK Health Centre
- **Dr. Christian Lehmann**, Medical Director, Research
- **Dr. Robyn Doucet**, Program Director, Postgraduate
- **Dr. Andrei Khorovets**, Member at Large
- **Dr. Shannon Bradley**, Medical Director, Education
- **Dr. Allana Munro**, Member at Large
- **Dr. Parvinder Sodhi**, Member at Large

Staff who attend as ex-officio non-voting members include **Carmelle d'Entremont**, **Carl Stevens**, **Laura Harris Buffett**, **Dr. Heather Butler (PhD)**, **Wendy MacIntyre** and **Sarah Zwaan**.

Where We Work

Faculty who hold academic appointments with our Dalhousie University Department are based throughout the Maritimes.

Within Nova Scotia, members of our Clinical Academic Funding Plan deliver patient care at the following sites:

IWK Health Centre

NSH Central Zone

- QEII Health Sciences Centre
 - Halifax Infirmary (HI) site, Halifax
 - Victoria General (VG) site, Halifax
- Dartmouth General Hospital, Dartmouth
- Hants Community Hospital, Windsor
- Scotia Surgery, Dartmouth

About Us (Cont'd.)

What We Do

We Provide Patient Care

Working within quaternary and tertiary care centres, the Department provides a full spectrum of specialty anesthesia care to patients in Atlantic Canada, as well as nationally and internationally through outreach initiatives and innovation in airway management.

Our patient care services include:

- Administering leading-edge programs and services in perioperative medicine, perioperative blood management and chronic and acute pain management.
- Providing general, neuraxial, regional and monitored anesthesia care to patients undergoing surgery, including:

General	ENT
Obstetrics/Gynecology	Plastic
Orthopedics	Neuro
Ophthalmology	Thoracic
Oral and Maxillofacial	Transplantation
Cardiac	Urology
Vascular	

- Managing adult and pediatric trauma cases and administering epidural analgesia to mothers in labour
- Providing anesthesia care to patients receiving procedures outside of the operating rooms, such as:
 - Electrophysiological ablation procedures
 - Transcatheter aortic valve implants
 - Cardioversion
 - General and neuro-interventional radiologic procedures
 - Diagnostic imaging and radiotherapy

We Educate

To deliver our education mandate, the Department welcomes learners annually, who receive on-the-job clinical teaching from our clinical faculty. Learners include undergraduate medical students, postgraduate anesthesia residents, and health professions such as nurses, paramedics, and respiratory therapists. We also offer up to eight fellowship opportunities for anesthesiologists seeking additional sub-specialty training.

We Research

We are committed to fostering relevant research that leads to impactful patient care, with a research program that comprises over 20 researchers, including clinicians, scientists, and investigators at Dalhousie University and beyond. Much of the focus of our research efforts are in areas of pain, airway management and perioperative care, spanning bench to bedside and across all ages.

Strategic Plan 2022 - 2027

In the fall of 2021, the Department developed a new strategic plan to guide the future work. This was a consultative process that involved collecting input from faculty, staff and key partners. Over the span of seven months, an environmental scan of other strategic plans took place. Departmental members participated in online surveys and a series of three virtual engagement sessions were held to collect ideas and seek input on draft elements of the strategic plan. After much consultation, the plan was approved by the Department's Cabinet. The outcome was a detailed plan that set our Department's strategic directions for the next five years.

'Our goal with developing our strategic plan was to assess where we were and to set a compelling vision for the future, one that outlines our priorities and reflects our values and our strengths as leaders in anesthesia and pain management.' – **Dr. Janice Chisholm**, Head of the Department of Anesthesia, Pain Management & Perioperative Medicine

A Year in Review

TOTAL APPROXIMATE NUMBER OF SURGICAL CASES AND PROCEDURES BY SITE

10,000	Halifax Infirmary
14,000	Victoria General
4,300	Dartmouth General
1,000	Hants
3,954	Saint John Regional Hospital
2,269	St. Joseph's Hospital
1,096	Sussex Health Centre
4,500	IWK Women and Obstetrics
5,500	IWK Pediatrics
450	Scotia Surgery

PATIENT INTERACTIONS BY SUBSPECIALTY AND SPECIALIZED PROGRAM

1,119	Acute Pain Services consultations
2,418	Regional Anesthesia procedures
474	Pediatric Pain Management patient visits
1,263	Perioperative Blood Management patient visits

Adult Chronic Pain Services

9,826	Total appointments
1,766	Blocks
1,297	New patients
6,763	Return patients
155	Patients seen through the <i>Virtual Pain Self-Management Program</i>

EDUCATION

Dalhousie University Faculty

208	Faculty Members (comprised of primary, cross-appointed, and adjunct appointments)
25	Professors
28	Associate Professors
147	Assistant Professors
8	Lecturers

Fellowship Program

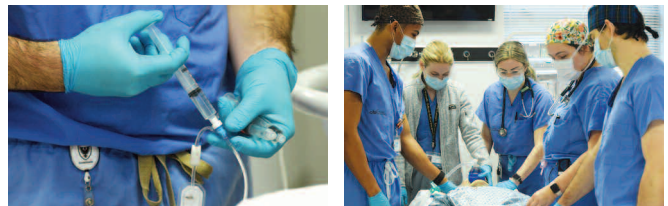
7	Fellows
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Postgraduate Education

34	Anesthesia Residents
30	Off-service and Visiting Elective Postgraduate Residents in NSH Central Zone
5	Off-service and Visiting Elective Postgraduate Residents at the IWK
4	Off-service Residents at Saint John, NB

Undergraduate Education

24	Year 1 and 2 Medical Students
31	Year 3 Medical Students
75	Year 4 Medical Students
35	Shadow and PREP students
119	Other Learners
39	Faculty Involved in Undergraduate Teaching
706	Undergraduate Teaching Hours Delivered



Continuing Professional Development for Faculty

42	Grand Round Sessions Delivered
2	Journal Clubs Hosted

RESEARCH

20	Faculty researchers (total equivalent protected time = 6.18 FTE)
\$4.9 M	Received in grants and industry funding
14	New research projects (4 funded and 10 unfunded)
93%	Collaborative projects
94	Peer-reviewed publications
39	Invited presentations



Ketamine mg/mL

Fentanyl mg/mL

Droperidol mg/mL

Rocuronium mg/mL

Naloxone mg/mL

Morphine mg/mL



Clinical Excellence

Meeting the Needs of Our Patients

New pain and addiction clinic offers a unique approach to health care

When the Pain Clinic at the Dartmouth General Hospital closed its doors in 2017, patients living with chronic pain and substance abuse issues were left struggling to gain access to the supports they so desperately needed. After many years of hard work and dedication, the Pain and Addictions Albino Lake (PAAL) clinic opened its doors to the public in this past year.

Since May 2021, the team at PAAL has successfully treated 1800 patients. The PAAL clinic is a therapeutic sanctuary where patients can feel safe, respected and supported in their recovery. The clinic was established in an area of Dartmouth that was identified as a high-needs location. It provides a place where patients can be treated for their pain and addiction without being judged or stigmatized.

"Due to the nature of their conditions, our PAAL patients face a great deal of uncertainty with respect to their living situations, their financial situations, and even their social situations with friends and family," said Dr. Ian Beauprie, Medical Director of Chronic Pain Management. "Our staff are a constant in their life, and they give our patients a sense of community-connectedness. The feeling of walking into our PAAL community clinic and being greeted by a friendly face in your own community, is a different feeling than navigating the confusing and overwhelming halls of a large hospital facility."

As a collaborative, inter-disciplinary clinic, PAAL is made up of three primary care physicians, nurses, and psychiatrists who specialize in addictions. Medical learners and residents also train at the clinic, gaining valuable experience from physicians who are specialists in their field.

PAAL offers a unique approach to health care. It is a naloxone site and mainline safe needle provider. Staff are educated on overdose prevention and intervention. They teach safe injection techniques, offer opioid agonist therapy, wound care assessment, and provide counselling to support patients during their most challenging times.

Prior to the opening of PAAL, individuals with pain and addiction were waiting up to a year or more to be seen by a physician specializing in chronic pain and substance use disorder. Thanks to PAAL, the wait is now less than six months.



The PAAL clinic is a therapeutic sanctuary where patients can feel safe, respected and supported in their recovery.



We have an incredible team across our Department... people stepped up with courage and compassion to support the system when it needed it most. That makes me deeply proud as a Department member and leader.

– Dr. André Bernard

New Chief Appointed to IWK's Department of Women's & Obstetric Anesthesia

This year, the Department welcomed **Dr. Narendra Vakharia** to the role of Chief of IWK Health Centre's Department of Women's & Obstetric Anesthesia.

Dr. Vakharia has been a valued and active member of our Department since 1998, having recently served as the associate chief at the IWK. Other leadership roles include the medical directors of simulation and the Office of Education, the program director for the anesthesia residency program and a Nucleus Member of the Specialty Committee in Anesthesiology at the Royal College.

"With the completion of the final stages of the extremely challenging process of the amalgamation of our Department's Academic Funding Plans, I would like to focus on forging strong bonds with Nova Scotia Health's central zone and IWK Pediatric Anesthesia departments," says Dr. Vakharia. "My goal is to see all three departments working collegially, collaboratively and constructively toward fulfilling the mandate of the Dalhousie Department of Anesthesia."

Redeployment of front-line staff

For the second year in a row, the global pandemic had a significant impact on the health system. Many of our physicians and front-line healthcare staff stepped up in a big way this year to help colleagues in other areas of the hospital when they needed it most.

An increase in patients due to Covid, coupled with extreme nursing shortages, left many clinical teams struggling to provide care. As surgeries were cancelled, many anesthesiologists volunteered to be redeployed to other parts of the health system in which they have not traditionally worked, to assist their colleagues in other disciplines. Clinical faculty took up shifts in the Covid inpatient units, the IMCU units, the vaccination clinics, the emergency department at QEII Halifax Infirmary, and overnight at the Cobequid Community Hospital.

As many as eight Anesthesia Assistants (AAs) volunteered for deployment during the third and fourth wave of the Covid-19 pandemic. They worked directly with Covid patients in the ICUs using their respiratory therapy knowledge to assist critical care teams.

Four Anesthesia Technicians (ATs) stepped out of their comfort zone and volunteered to be deployed to various floors to work as Licensed Practice Nurses.

The AA and AT staff that remained in their roles and were not deployed also had a significant impact of the entire department because *"they kept the anesthesia support services running smoothly as usual,"* said **Dr. Colin Audain**, Site Chief at the Victoria General Hospital. *"In many cases, you wouldn't even know these*

groups were suffering from staffing shortages due to their co-workers being deployed because they filled the gap and carried on like it was business as usual."

*"We have an incredible team across our Department," stated **Dr. André Bernard**, Associate Head, "Whether anesthesiologist, resident, nurse, AA, or AT, people stepped up with courage and compassion to support the system when it needed it most. That makes me deeply proud as a Department member and leader."*

Road to Redevelopment

This past year, the QEII New Generation Project reached a major milestone with the completion of the expansion and renovation of Dartmouth General Hospital (DGH). In February, construction was complete on four new operating rooms, doubling the number of operating rooms at DGH and increasing the number of surgeries performed.

In addition to the new surgical spaces, the redevelopment project also features a new Post-Anesthesia Care Unit (PACU) and Day Surgery Unit, new clinical space with more exam and procedure rooms, as well as more diagnostic imaging, ambulatory and inpatient capacity. New services at the DGH include extracorporeal shockwave lithotripsy, surgical robotics for orthopedic cases and ENT.

Doubling the number of operating rooms means doubling the clinical coverage. Prior to the redevelopment, there were as many as five Department anesthesiologists assigned to cover DGH on any given day; now there are seven. To assist, one anesthesia assistant and two anesthesia technicians were also hired to support the increase in anesthesia coverage at the DGH.

The project will improve access to care, reduce wait times, and improve patient privacy and accessibility.

"The goal of the redevelopment is also to provide doctors, nurses, and other healthcare professionals with a modern place to work with advanced equipment and technology which, in turn, we hope will help recruit and retain healthcare professionals," says Site Chief, **Dr. Kevin Bent**.





Prioritizing Wellness

The Department is developing a wellness strategy that addresses operational and structural barriers to wellness, including intentional actions to strengthen cohesion across all clinical and academic sites. Our Wellness Committee this past year worked to formalize its structure and focus priorities using a wellness framework developed by Stanford University staff.

One of the Wellness Committee's goals is to coordinate fitness-related activities to promote physical health and engagement. The first fitness challenge was a huge success with more than 60 department members taking part. The Outbreak Challenge was a game that was played collectively through an app where participants controlled their zombie avatar through real-world steps and exercise. The competition was a great way to build social connections and encourage physical activity!

*"I am proud of the wellness committee and the various projects that we have undertaken," said **Dr. Tracy Kok**, Chair, Wellness Committee. "Wellness is a nebulous grand idea that can be subjective, so we are tackling an enormous task of trying to engage and help others in the Department. Our committee is motivated and creative!"*

ANESTHESIA QI LEADS

Dr. Andrew Milne

NSH Co-Medical Director

Dr. Greg Dobson

NSH Co-Medical Director

Dr. Vanessa Sweet

NSH Associate Director

Dr. Ana Saus

IWK Women's and Obstetric
Director Quality Lead

Dr. Sally Bird

IWK Pediatric Quality Lead

Striving for Quality Improvement

The Department is committed to the ongoing fostering of an organizational culture of quality and patient safety. Designated anesthesia quality improvement medical leads at NSH and IWK are involved in a wide variety of activities to monitor and continuously improve the quality of anesthesia care delivery to patients. This includes key performance monitoring, structured peer reviews, adverse event reporting, morbidity and mortality reviews and detailed reviews of all critical incidents and deaths within 48 hours of anesthesia care.

The Quality Offices also monitor compliance with established practice guidelines and facilitate communications with patients or families who have concerns related to anesthesia care, including support and advice to staff members. They have a close relationship with the hospital quality programs and risk management. This year, **Dr. Vanessa Sweet** joined the team, ensuring enhanced focus on anesthesia quality within the Dartmouth General Hospital.



Reflecting on our Patient Care Achievements



IWK Health Centre

IWK Pediatric Anesthesia Department

Dr. Scott Drysdale, Chief

"Looking back over the past year, I am proud of the many accomplishments we have had as a Department. One such example is the development of an interdisciplinary pediatric anesthesia simulation program where nurses, anesthesia assistants and anesthesiologists are given the opportunity to practice life-saving skills during the simulation of rare but catastrophic emergencies."

We also introduced an anonymous adverse events reporting system this year, which allows our Department to gain important insight into our most common adverse outcomes. Early IV loss in PACU came up as an issue that requires attention. As a result, the Department has prioritized dissemination of ultrasound-guided vascular access skills to many providers across the health centre. This has resulted in fewer failed IV attempts, less patient discomfort, and fewer overnight calls for IV access that could have been resolved during daytime hours."

IWK Women's and Obstetric Anesthesia Department

Dr. Narendra Vakharia, Chief

"Looking back on the 2021-22 year, I'm glad that we have finally completed the successful amalgamation of the three Academic Funding Plans (AFPs) through a lot of determined effort on the part of many department members so that we can focus our energies on the future. In addition, we were able to secure funding to allow Dr. Allana Munro to join the IWK Pelvic Pain program in the spring of 2022 to help women suffering from chronic pelvic pain."

Nova Scotia Health - Central Zone)

Dartmouth General Hospital (DGH)

Dr. Kevin Bent, Anesthesia Site Chief

"As we learn to live with a prolonged pandemic, it has been remarkable the amount of flexibility demonstrated by colleagues who were faced with constant changes to the schedule. Despite a few delays, we have now began opening new operating rooms at DGH as part of the redevelopment project."

This means a constant variety of new personalities as more of the QEII-based anesthesiologists work regular

shifts at DGH. A highlight this year was Dr. Vanessa Sweet's all-encompassing DGH Periop Safety Rounds. Dr. Sweet successfully elicited input on improving patient care from doctors, housekeeping, nursing, personal care assistants and administration staff and has directed our ongoing goal to constantly improve the overall patient satisfaction, safety and efficiency of our periop experience."

Hants Community Hospital

Dr. Jocelyn Foran, Anesthesia Site Lead

"As the province continued to navigate care in the time of COVID, the Hants Community Hospital was able to serve our patient's needs with excellent utilization and no post operative admissions. To best use the OR resource, we have worked to assign some OR lists to specific surgeons, expanded our service to include urology and added late starts on Wednesdays to allow physician, surgical and nursing staff to access rounds, departmental meetings and educational opportunities."

QEII Health Sciences Centre, Halifax Infirmary Site

Dr. Blaine Kent, Anesthesia Site Chief

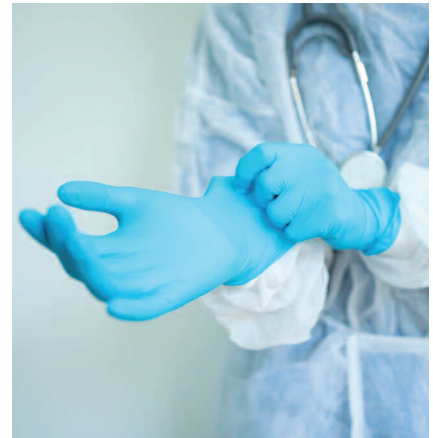
"The one word that I would use to sum up the last year is flexibility. The ongoing pandemic, and our response to it, has meant that we have all had to be flexible and open to last minute unexpected changes. Department members stepped up to cover last second sick calls and changes to schedules all to ensure that we pro-

vided the maximum amount of care to the most patients possible. Supply chain issues have resulted in changes in products, missing products, and best available substitutes for the equipment that we use daily. The entire HI team were able to pivot on a dime to ensure quality care and support was provided to all that required our services. Everyone involved played a critical role in our success, and we should be proud of our continued level of excellence in care, regardless of the internal and external challenges we faced."

QEII Health Sciences Centre, Victoria General Site

Dr. Colin Audain, Anesthesia Site Chief

"2022 has been a tremendously challenging year for everyone in health-care. Although there has been an effort for society to return to normal, unfortunately, we have not yet been able to achieve a sense of normalcy in the operating room. Despite this, we have worked hard to ensure that we continue to advocate for the patients of Nova Scotia and make sure that OR resources available to us are effectively utilized."



Everyone involved played a critical role in our success, and we should be proud of our continued level of excellence in care, regardless of the internal and external challenges we faced.



Horizon Health Network

Dr. Todd Chedore, Site Chief

"Under the guidance of **Dr. A. Tolu Alugo**, the Department has a second-to-none chronic pain clinic with state-of-the-art treatment modalities, such as neuromodulation and a whole host of other injections and techniques. The cardiac anesthesiology team continues to be a leader in innovative techniques and top of the line procedures for all types of open and minimally invasive cases despite recruitment struggles"

Anesthesia Subspecialties

Acute Pain Management and Regional Anesthesia

Dr. Kwesi Kwofie, Medical Director

"We completed our roll out of the new CADD Solis pumps, which replaced our previous IV Opioid infusion and peripheral nerve/epidural pumps. These new pumps bring an improved interface, along with new modalities, such as Programmed Intermittent Bolus (PIB) to maximize patient pain control without increasing the dose of local anesthetic. We have continued to increase the use of peripheral nerve catheters in outpatients to maximize perioperative patient care both in and out of hospital."



Adult Chronic Pain Management

Dr. Ian Beauprie, Medical Director

"I am so proud of our doctors and nurses who provide amazing care, particularly to those patients fighting both chronic pain and addiction. A shout out to our Pain Self-Management team who found such success doing virtual courses during Covid lockdowns, that the patients continue to ask for them."

Cardiac Anesthesia

Dr. Paula Kolysher, Chief

"This year, anesthesia assistants began covering overnights and weekends at the Halifax Infirmary. As this group traditionally didn't assist in cardiac, our team hosted a series of six lectures to get them up to speed on basic cardiac anesthesia topics so they can be better help to us on call. I think I am most proud of this non-core group. They have been willing to learn new skills and have thrived in this new environment."

Liver Transplantation Anesthesia

Dr. Arnim Vlaten, Chief

"This past year, the liver transplant group was involved in a multi-centre study coordinated by an anesthesiologist from the University of Montreal. I would like to thank our group for their meticulous charting."

Due to this study, we have been reviewing our outcomes and intra-operative practices and we hope to have some collaborative data in the near future. We were one of the first non-Montreal sites to be active and enroll patients in this study, thanks to our excellent research support. It has been great to see our centre amongst the major transplant centres across Canada!"

– **Dr. Adrienne Carr**, incoming Chief

Neuroanesthesia

Dr. Carlo Mariotti, Chief

"When I look back at the year, the thing I am most proud of is how well we get along with each other, nursing staff and surgeons. We all love working in the neuro ORs and many of us would only do neuroanesthesia, if that was possible – that says volumes on what an excellent working environment we have."

Blood Management Services

Dr. Blaine Kent, Medical Director

"The volume of surgeries delayed due to COVID-19, coupled with the number of patients who have limited to no access to primary care, has led to a significant increase in both the volume of patients we are seeing, and the degree of pre-operative anemia we are managing.

We are very thankful that these issues have been recognized and eased with the addition of a full-time staff RN

assigned to assist with assessment, flow and follow-up of patients in the Perioperative Blood Management Program. This has helped with the increased acute clinical workload, but we still have much to do with respect to education for patients and providers."

Perioperative Medicine

Dr. David MacDonald, Medical Director

"This past year we released our new preoperative health history questionnaire and the two corresponding nursing care directives. This allowed for standardization of both preoperative testing and medication instructions. It simplified the requirements for an anesthesiology consult and saved a lot of unnecessary trips to the hospital for patients. The entire team has done a great job with these changes."

Thoracic Anesthesia

Dr. David Watton, Chief

"My accomplishment this year was taking on and still learning this new role. Reaching out to both the anesthesia team and the surgeons and getting suggestions as to the direction going forward. I am looking forward to having this role for many years and enhancing patient care for patients getting thoracic surgery."





Transformational Education

The Office of Education coordinates anesthesia educational opportunities for undergraduate students, residents, fellows and faculty. We welcome various types of learners annually who receive on-the-job clinical teaching from our faculty. Whether you are a student, resident, fellow, or other health care provider, you can be sure that you will experience the highest quality anesthesia education.

Congratulations is in order

This past December, Department member **Dr. Patricia Livingston** received one of the country's highest civilian honours – membership in the *Order of Canada*. Dr. Livingston was recognized for her contributions to global health and anesthesia safety, and for her commitment to improving medical education in underserved communities around the world.

Dr. Livingston is widely recognized for establishing the Anesthesia Global Health Office at Dalhousie University and becoming the lead for Canadian Anesthesiologists' Society International Education Foundation program in Rwanda. In 2013, Dr. Livingston successfully opened the Faculty of Medicine Skills and Simulation Centre in Kigali, Rwanda. Currently, she is working with partners to bring simulation-based education to resource-limited and remote locations globally.

Thanks to her work, many Dalhousie University and Nova Scotia Health staff, fellows and residents have travelled to Rwanda to teach. The training and retention of even one skilled anesthesiologist in countries like Rwanda has had a lasting impact on thousands of lives. And, in turn, Rwandan residents have had the opportunity to come to Dalhousie for electives ranging from three to six months. It has been an opportunity of a lifetime for all involved.



"There are few joys in life as great as seeing keen learners learning. Some of my happiest days have been spent teaching residents in Rwanda," says Dr. Livingston. "My greatest goal now is to mentor and empower younger people to continue with what our team has developed."

Dr. Livingston is an associate professor and active researcher with the Department of Anesthesia, Pain Management & Perioperative Medicine. She is also a well-respected anesthesiologist at the QEII Health Sciences Centre at Nova Scotia Health, and the medical director of global health for our Department's Office of Education.

"I can't even begin to imagine how many patients' lives have been saved in countries like Rwanda thanks to Dr. Livingston's work," said Dr. Jan-ice Chisholm, Department Head. "We are proud of all that she has accomplished."

Leadership Team

Ms. Laura Harris Buffett,
Managing Director, Education

Dr. Shannon Bradley, Medical
Director, Education

Dr. Robyn Doucet, Program
Director, Postgraduate

Dr. Andrew Jarvie, Associate
Program Director, Postgraduate

Dr. Adrienne Carr, Medical
Director, Undergraduate

Dr. Cathy Delbridge, Medical
Director, Simulation

Dr. Patty Livingston, Medical
Director, Global Health

Dr. Tim Mullen, Medical Director,
Fellowship and Continuing
Professional Development

Dr. Karim Mukhida, Post Graduate
Program Scholarly Coordinator

Curriculum 2.0

The Royal College of Physicians and Surgeons changed the way the final specialty exams are administered to anesthesia residents. PGY5 residents used to complete their written and oral exams back-to-back in the Spring of their final year. But this past academic year, the exam process changed. PGY5 residents now write exams in the Fall and, if they pass, are then invited to complete their oral exams in the Spring.

In anticipation of the Royal College splitting the exams, the anesthesia academic curriculum was revamped, the academic curriculum condensed, and a thorough review was completed by the Office of Education in 2020.

"No concerns have been brought forward, evaluations of the sessions have been good," said **Cyndi Lushman**, Academic Manager. *"The residents are happy with the amount of study time, and it is also pretty consistent with the amount of study time for residents across the country."*

PGY4s now complete core curriculum in the Spring, allowing them to spend the remainder of their academic half day focusing on exam preparation for the Fall exam. Both foundation and core curriculum are 2 years in duration each. Result of the review saw a reduction of the number of sessions in some of the units in addition to restructuring the academic schedule with some core units now taught during the Spring with PGY2 & PGY3s cohorts as the audience. Although now completing the full anesthesia post graduate curriculum earlier than in previous years, these revisions ensured our residents had the opportunity to attend all academic sessions.



"Thank you to all who were involved in the restructuring of the academic half-day, especially Cyndi Lushman, who made it all work and ensured we were fitting everything into the altered schedule and that no group of residents would be left out," says **Dr. Robyn Doucet**, Residency Program Director.

Point of Care Ultrasound (POCUS)

This past year, the Department introduced a Perioperative Ultrasound Anesthesia Training (PULSATE) course to interested clinicians as part of our Continuing Professional Development program for faculty. This course is led by a group of three point of care ultrasound (POCUS) experts, **Drs. Genevieve McKinnon, Edmund Tan and Ana Sjaus**.

The course covers a wide range of POCUS topics and focuses on the assessment of cardiac function, lung pathology and fluid resuscitation. Assessment of airway anatomy and gastric volume is also covered in the course. Arranged in modules and supported by an online learning platform, the course runs for five months at a time with in-person group learning sessions and monthly virtual ultrasound case rounds.

"This is a very important course because upon completion, it is expected that graduates will become part of the POCUS teaching team and will dedicate time and energy into teaching trainees and colleagues," said **Dr. Genevieve McKinnon**, Assistant Professor.

Residents and Fellows

Congratulations to our 2021-2022 graduates.

FELLOWS



Dr. Nisreen Eltom
Global Health



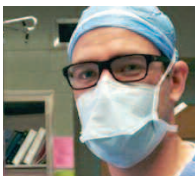
Dr. Hasaan Al-Salmi
Cardiac Anesthesia & Perioperative Transesophageal Echocardiography



Dr. Haneen Alnazzawi
Pediatric Anesthesia



Dr. Liem Ho
Regional Anesthesia & Acute Pain



Dr. Alex Poulton
Airway Management



Dr. Stephen Middleton
Academic Advanced Clinical Practice



Dr. Leo Fares
Chronic Pain Management

RESIDENTS



Dr. Garrett Barry



Dr. Marshall Ellis



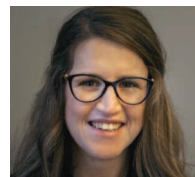
Dr. Darin Evoy



Dr. Emma Kehoe



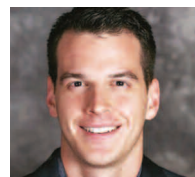
Dr. Kayla MacSween



Dr. Stephanie Power

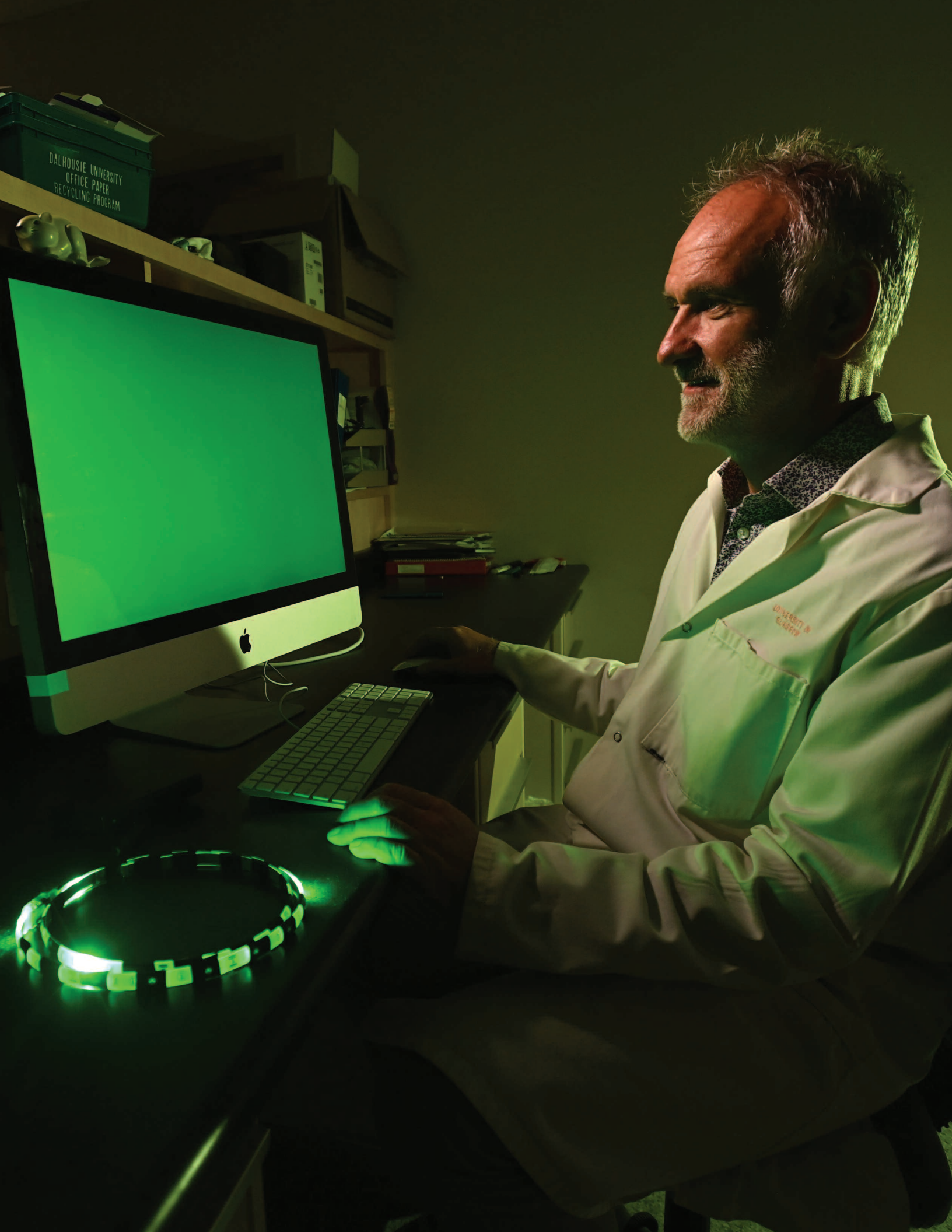


Dr. Karim Wafa



Dr. John Wright





Research, Innovation and Discovery

The Office of Research consists of a purpose driven team that strives for quality research, best ethics and equity, diversity, and inclusion practices. As researchers, they are committed to working together with research consultants and patients to find evidence-based solutions leading to the best possible pain management and perioperative care for our Maritime families and global communities.

Endometriosis and Chronic Pelvic Pain (E&CPP) Clinic

Chronic Pelvic Pain (CPP) affects approximately 15 percent of women of reproductive age. **Dr. Allana Munro** sees firsthand the devastating impact this condition can have a woman's quality of life. The Endometriosis and Chronic Pelvic Pain (E&CPP) Clinic at the IWK Women's and Obstetric Department opened in the Fall of 2021. Since then, Dr. Munro and her team have helped more than 33 women whose quality of life was deteriorating due to this painful condition.

"Being a part of this clinic is extremely rewarding," says Dr. Allana Munro, anesthesiologist, lead pain researcher and Department faculty member. *"We are the only interdisciplinary clinic for chronic pelvic pain in Atlantic Canada. Most of these women have waited years for access to diagnosis and treatment. We have had feedback from patients who have attended the clinic -- they feel validated and happy they are being seen by a team."*

Through her research funded by the IWK Health Translating Research into Care (TRIC) grant, Dr. Munro and her team were able to provide vital evidence that such a clinic was needed at the IWK. Research found that women suffering from CPP averaged two visits to the emergency department per year. It has been estimated that CPP is responsible



for \$1.8 billion in total annual health care costs in Canada. And many patients were waiting 6 months or more to be seen by a pain specialist.

The Endometriosis and Chronic Pelvic Pain Clinic is an interdisciplinary program where patients have access to specialists, counselling sessions, physiotherapy, and pain education. The team consists of Dr. Munro and four other health professionals: a gynecologist, a nurse practitioner, a physiotherapist, and a social worker.

"In addition to the important clinical work that is completed at clinic, we are also in the process of establishing a database of all patients who participate in the program," says Dr. Munro. *"The database will be extremely helpful as a research tool for future studies on diagnostics and therapeutics. We hope to use the database for collaborative research with other centres nationally."*

Dr. Allana Munro's chronic pain research provides evidence of need for IWK's first Endometriosis and Chronic Pelvic Pain Clinic.

Leadership Team

Dr. Heather Butler, PhD
Managing Director, Research

Dr. Christian Lehmann
Medical Director, Research

Dr. Tristan Dumbarton
Associate Director, Pediatric Anesthesia

Dr. Jason McDougall, PhD
Associate Director, Tupper site

Dr. Allana Munro
Associate Director, Women's and Obstetric Anesthesia

Dr. Vishal Uppal
Associate Director, Central Zone Adult



Dr. Hashmi and her research team are studying the structure and function of the parts of the brain that cause chronic pains.

Dr. Javeria Hashmi's Canada Research Chair renewed for another five-year term

Dr. Javeria Hashmi, PhD is investigating how negative expectations and thoughts can contribute to refractory chronic back pain. This past October, Dr. Hashmi's tier II Canada Research Chair in pain was renewed for another five-year term. Her team at the Brain Networks and Neurophysiology (Net-Phys) Lab within the Department continue to conduct important and life changing research for patients suffering with this debilitating condition.

Dr. Hashmi and her research team are studying the structure and function of the parts of the brain that cause chronic pains. Her lab uses MRI data and cognitive experiments to investigate the extent to which negative expectations can amplify perceived pain and reduce the effectiveness of treatment in people with chronic back pain. Her lab has reported that variability in brain structure and function explains why some individuals are susceptible to persistent pains. She is using this knowledge to identify key features for improving diagnosis and treatment for people suffering with chronic pain.

"Chronic pain is a poorly understood phenomenon that effects a large population of Canadians," says Dr. Hashmi. "The suffering caused by chronic pain is alarming, and needs to be directly addressed, and this cannot be achieved unless we can fully describe the underlying mechanisms that lead to this condition."

"I feel honoured and I see this Research Chair as an opportunity to serve our community," says Dr. Hashmi.

Shining light on an invisible illness

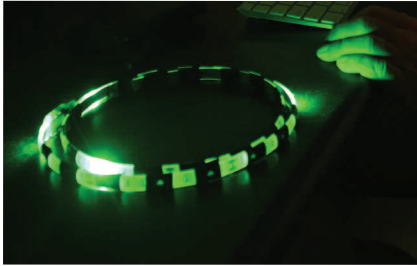
Can a colour cure a migraine? Improve one's mood? What about ease pain from chronic degenerative joint disease? **Drs. Jason McDougall** and **Karim Mukhida** are exploring the potential of using green light therapy to alleviate osteoarthritis pain.

Recent research shows illuminating a room with dim, green light can produce long-lasting pain reduction in people with chronic pain from fibromyalgia or migraines. McDougall and Mukhida will be the first to test green light therapy on osteoarthritis pain. This could have tremendous benefits as almost two-thirds of people living with osteoarthritis have reported they do not experience adequate pain relief.

"This research is innovative, and the rewards could be revolutionary," says Dr. McDougall, who is the primary investigator on this study and a professor in the Departments of Pharmacology and Anesthesia, Pain Management and Perioperative Medicine at Dalhousie University.

This past year, Drs. McDougall and Mukhida received funding support from the Arthritis Society's Ignite Research Grant, which is presented to innovative researchers for their out-of-the-box thinking. They also received funding through the Department of Anesthesia, Pain Management and Perioperative Medicine's Anesthesia Research Fund (ARF).

"Our initial preclinical studies are very promising," says McDougall. "Green light therapy was found to be at least as effective at relieving pain as non-steroidal anti-inflammatory drugs. The



mechanism of action is still being worked out but seems to involve endocannabinoid release in the central nervous system. The analgesia does not appear to be sex specific as it is equally effective in males and females."

While drug-based analgesics are important, McDougall says they come with a catalogue of side-effects. Green light therapy offers a cheap, safe, non-invasive, and easy-to-use approach to arthritis pain management. It may even be able to boost one's mood which may be related to endocannabinoid release.

"Our next steps are to see if it works in osteoarthritis patients and uncover the neural connections between the eye and pain processing regions of the brain".

Dr. Allen Finley Advocates for Pain Care on International Level

As a pediatric pain researcher, **Dr. Finley** considers advocacy his most important work. This year, Dr. Allen Finley was appointed Councilor of the International Association for the Study of Pain (IASP). He has helped launch and chair the Global Advocacy Working Group, which aims to build IASP's advocacy role with the World Health Organization (WHO) and promote pain research and pain care worldwide. His advocacy work is made possible due to the *Dr. Stewart Wenning Chair in Pediatric Pain Management*.



"I am quite proud of the fact that every one of my publications is authored by people from different disciplines. None of them are just in anesthesia as a discipline. That is a core principle because you have to work with other people – no one can know everything." Dr. Finley is also a member of the Permanent Council of the Global Alliance for Surgical, Obstetric, Trauma, and Anesthesia Care and is looking forward to work on an international perioperative pain management initiative to increase awareness, foster political will, shape policy, and mobilize resources to make pain care accessible to all.

Research Day a Success

Once again, Anesthesia Research Day was held virtually as per COVID-19 Public Health guidelines. And once again, Research Day was a success! More than 110 people attended. Presentations were made by residents, fellows, graduate, post doctorate and undergraduate students. The presentation topics were 70% clinical and 30% fundamental research.

We were honoured to host two keynote speakers – **Dr. Glenn Cohen** of Harvard Law School and Indigenous physician, **Dr. Jason McVicar** of University of Ottawa.

Anesthesia Research Funding

The Department provided \$141,100 through its Anesthesia Research Fund to support research projects, activities, and learner supports.



Patients say yes to research

One of the most challenging aspects of research is perhaps the recruitment of participants.

This year, the Office of Research saw a tremendous number of patients from various clinics take a participatory role in research. At the QEII's largest surgical centre, the Halifax Infirmary, 95% of patients said yes to research by completing a Patient Health Information Act (PHIA) form. The Pain and Addiction Albro Lake Clinic wasn't far behind. They reported that 93% of their patients signed PHIA forms inviting researchers from outside their circle of care to contact them for research purposes.

"The feeling of community that is fostered by our staff at PAAL, is what encourages our patients to take a participatory role in research," says **Vicky Mills**, Health Services Manager, Acute and Chronic Pain Services.

Research appointments

It has been a successful year of research-related appointments.



In December, **Dr. Christian Lehmann**, Medical Director of the Department's Office of Research, was appointed chair of the Association of the Canadian University Departments of Anesthesia (ACUDA) Research Committee.



In January, **Dr. Vishal Uppal**, Associate Director of the Department's Office of Research, was appointed Associate Editor of the Canadian Journal of Anesthesia (CJA) for a five-year term. Dr. Uppal is the first CJA Associate Editor to be based in Nova Scotia.

Celebrating Achievements

Teaching Awards of Excellence

Dr. Bukky Akindele

Undergraduate Teacher of the Year

Dr. Edmund Tan

Clinical Teacher of the Year Award

Dr. Charlotte Edwards

Clinical Teacher of the Year –
Community Award

Dr. Volker Eichhorn

Mentor/Role Model

Dr. Shannon Bradley

Resident Advocate of the Year

Dr. Stephanie Power

Resident Teacher of the Year

Dr. Jon Bailey

Certificate of Appreciation –
Daily Encounter Card

Dr. Rochelle MacLellan

Certificate of Appreciation –
In Training Assessment Report

Departmental Awards of Excellence

Ms. Vicki Christian

Individual Award of Excellence
(internal)

NSH Anesthesia Assistants and Anesthesia Technicians

Team Award of Excellence (internal)

Ms. Shirley Garnett

Dale Morrison Memorial Award for an
Anesthesia Technician

Ms. Ronda Copeland

Dale Morrison Memorial Award for an
Anesthesia Assistant

Perioperative Infectious Disease Team – Drs. Shelly McNeil, Lynn Johnston, Ian Davis and Todd Hatchette

Team Award of Excellence (external)

Occupational Health leads, Ms. Angela Keenan, NSH and Ms. Barbara Whynot, IWK

Individual Awards of Excellence
(external)

Academic Promotions

Congratulations to the following faculty
members who were promoted to asso-
ciate professor:

Dr. Victor Neira

Dr. Karim Mukhida

Dr. Ana Sjaus





Appendix A

2021-22 Research Projects

NEW Funded Projects

1. Haslam S, Law JA, Milne AD (2021-2022). Effects of endotracheal cuff volume on larynx extubation forces. An In-vitro study [Grant] – Dalhousie – \$268.
2. McDougall J (2022-2024). Management of osteoarthritis pain using green light therapy [Grant] – The Arthritis Society – \$110,000.
3. Sjaus A, Nicolls S (2021). IWK Summer Studentship – Sofia Nicolls – Feasibility Study of Application of Surface Electromyography and Electrodermal Activity for Assessing the Quality and Extent of Neuraxial Blockade [Grant] – IWK – \$5,000.
4. Wright J, Maksym G, Milne AD (2021-2022). Using Oscillometry to Quantify the Effects of Prone Positioning on Lung Mechanics [Grant] – Dalhousie – \$528.

NEW 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. Bonin K, Livingston P (2022). Can compassion reduce burnout for anesthesia providers while also helping patients? [Medical Education or Training]
3. ELIPTO-2 Group (Including Carr A) (2021-2022). Intraoperative hemodynamic management and postoperative outcomes in liver transplantation: a multicenter prospective cohort study [Clinical]
4. 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]

5. Hackmann T., Sami Jreige (AA) (2021-2022). The use of flow- volume loops to determine endotracheal tube cuff link [Clinical]
6. Ho L, Uppal V, Bailey J, Gyambib A (2021-2022). Patient Perspectives of Informed Consent for Regional Anesthesia for Ambulatory Surgery [Clinical]
7. Smyth M, Mukhida K (2021-2022). Evaluating the effect of preoperative cannabis use on pain management following orthopaedic surgery [Clinical]
8. 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]
9. Uwinza JB, Nyandwi JD, Nzarora J, Rutayisire L, Mvukiyehe JP, Szerb J (2021). Cost-effectiveness and safety of regional anesthesia versus general anesthesia for upper extremity surgery for patients at CHUK [Clinical]
10. Vlaten A (2021-2024). Comparison of pediatric airway training and available airway equipment in EMS [Clinical]

NEW Grants and Contracts

1. Haslam S, Law JA, Milne AD (2021-2022). Effects of endotracheal cuff volume on larynx extubation forces. An In-vitro study [Grant] – Dalhousie – \$268.
2. McDougall J (2022-2024). Management of osteoarthritis pain using green light therapy [Grant] – The Arthritis Society – \$110,000.
3. Sjaus A, Nicolls S (2021). IWK Summer Studentship – Sofia Nicolls – Feasibility Study of Application of Surface Electromyography and Electrodermal Activity for Assessing the Quality and Extent of Neuraxial Blockade [Grant] – IWK – \$5,000.

4. Wright J, Maksym G, Milne AD (2021-2022). Using Oscillometry to Quantify the Effects of Prone Positioning on Lung Mechanics [Grant] – Dalhousie – \$528.

CONTINUING Ongoing 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. Calkin C, Friedman A, Hashmi J (2019-2023). Neuroanatomical and neurofunctional assessment in acquired brain injury [Grant] – Global Affairs Canada – \$3,600,000.
3. 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.
4. Cheng Zhenyu, Lehmann Christian (2019-2023). Pseudomonas aeruginosa protease promotes chronic inflammation and immune evasion [Grant] – CIHR – \$963,900.
5. D'Entremont M, Milne AD (2020-2021). COVID Intubation Hood [Grant] – Springboard – \$25,000.
6. 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.
7. Fox-Robichaud A, Mark Ansermino, Catherine Cook, Kirsten Fiest, Patricia Fontela, Allan Garland, Michelle Kho, Paul Kubes, Manoj Lal, 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.
8. Hanly JG, Beyea S, Fisk JD, Friedman A, Hashmi JA (2018-2021). Characterization of brain dysfunction with multi-modal functional neuroimaging in patients with SLE and cognitive impairment [Grant] – NSHA – \$615,826.
 9. Hashmi J, Cane D, Matwin S, Beauprie 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.
 10. Hashmi JA (2016-2021). Canada Research Chair Tier II (Pain) [Grant] – CIHR – \$500,000.
 11. Hashmi JA (2017-2021). Title [Grant] – CFI – \$364,599.
 12. 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.
 13. Juan Zhou, Christian Lehmann, (2019-2021). Novel Treatments for bladder inflammation and pain [Grant] – Mitacs – \$186,666.
 14. 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.
 15. 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.
 16. Kwofie MK, Uppal V, Szerb J, Coles C, Colish J (2017-2022). A Randomized Controlled Trial of Regional Anesthesia Versus General Anesthesia for Promoting Independence After Hip Fracture (REGAIN Trial) [Grant] – Patient-Centered Outcomes Research Institute (PCORI) – \$56,566.
 17. Lalu MM, Fergusson DA, Fiest K, Gill S, Macala K, McDonald B, Fox-Robichaud A, Liaw P, Mendelson A, Lehmann C, Arora J, Bourque S, Cailhier J-F, Cepinskas G, Charbonney E, Ellis C, Kristof A, Kubes P, Marshall J, Mawdsley L, Medeiros S, Sharma N, Sohrabipour S, Stewart D, Tieu A, Vazquez-Grande G, Veldhuizen R, Welsh D, Winston B, Zarychanski R, Zhang H, Griffin G, Hendrick K, Kowalewska P, Sunohara-Neilson J, Zhou J (2020-2021). Sex differences in preclinical models of sepsis: a systematic review [Grant] – CIHR – \$112,500.
 18. Lehmann C (2019-2023). Interstitial Cystitis and IBD research [Grant] – CRA with Tetra Bio-Pharma – \$489,195.
 19. Lehmann C (2020-2022). Novel treatments for inflammatory bowel disease [Grant] – MITACS – \$100,000.
 20. Lehmann C (2020-2023). ARDS [Industry Contract] – Dalhousie – \$500,000.
 21. 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.
 22. MacCormick H, Johnson LT, Cyr JD, George RB, Bould MD, Munro A (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.
 23. McDougall J (2017-2022). Contribution of proteases and protease activated receptors to joint neuropathy and arthritis pain [Grant] – CIHR – \$761,175.
 24. McDougall J (2019-2023). Regulation of microglial pannexin-1 channels in arthritis pain [Grant] – CIHR – \$875,925.
 25. 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.
 26. McIsaac DI, Boland LS, Gill M, Hutton BE, Aucoin S, Carli F, et al, and the Umbrella Review Group including McKeen D (2021-2022). An umbrella review of prehabilitation interventions in surgery to inform policy and practice [Grant] – CIHR – \$103,275.
 27. Milne AD, Uppal V, Gillis A, Brousseau P (2021-2022). A comparative cost analysis of Memsorb and Dragersorb for routine anesthesia use at NSHA: A pragmatic observational study [Grant] – NSHARF – \$25,104.
 28. 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.
 29. Munro A (2020-2021). MDSAS IWK Health Leadership Grant 2020 [Grant] – IWK – \$3,000.
 30. Munro A, George RB, Andreaou P (2019-2022). A novel approach to optimize Programmed Intermittent Epidural Bolus (PIEB) for labour analgesia [Grant] – Dalhousie – \$3,044.
 31. Munro A, Randle E, Dryden T (2019-2021). Interdisciplinary approach to managing Chronic Pelvic Pain [Grant] – TRIC IWK – \$3,000.
 32. Ricciotti S, French D, Crocker C, Bailey JG, Simon P, Tibbo P (2021-2022). Investigation of outcomes after thoracic surgery for malignancy in patients with severe and persistent mental illness [Grant] – NSHRF – \$6,885.
 33. Schmidt M, Dunnington J, Eskes G (2021-2023). Computerized Assessment for Post-Operative Cognitive Decline (POCD) in Elderly Populations [Grant] – NSHA – \$59,771.
 34. Schmidt M, Roach D (2020-2021). Greening anaesthesia: reducing anaesthetic vapour use and release in a perioperative hospital setting through manufacturing scale-up of membrane based CO2 filter, memsorb™ [Grant] – Sustainable Development Technologies Canada (SDTC) – \$598,447.
 35. Sjaus A, d'Entremont M, Haelssig J (2020-2021). Development of airborne pathogen containment device for

airway instrumentation [Grant] – Nova Scotia Health Research Funding Coalition – \$30,000.

36. 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.
37. 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.
38. 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.
39. Stinson J, Noel M (Co-PI), Birnie K, Chonière M, Poulin P, Laloo C, Campbell F, Finley A, Lamontagne C, Ali S, Nicholas D, Oberlander T, Dick B, Rasic V, Baerg K, Findlay S, Baerveldt A, Poolacheria R, Doré M, Ingelmo P, Pagé G, Swidrovich J, Montgomery L, Mesaroli G, Killackey T, Kelly L, Smith A, Szatmari P, Battaglia M, Kopala Sibley D, Bélanger R, Victor C, Singh M, Mohabir V, Marianayagam J, Jordan I, Benayon M, Taylor A (2020-2021). Stepped care solutions to reduce the impact of the COVID-19 pandemic on pain, mental health, and substance use in youth living with chronic pain and their families: A pan-Canadian study [Grant] – CIHR – \$200,000.

CONTINUING Scholarly Projects (unfunded)

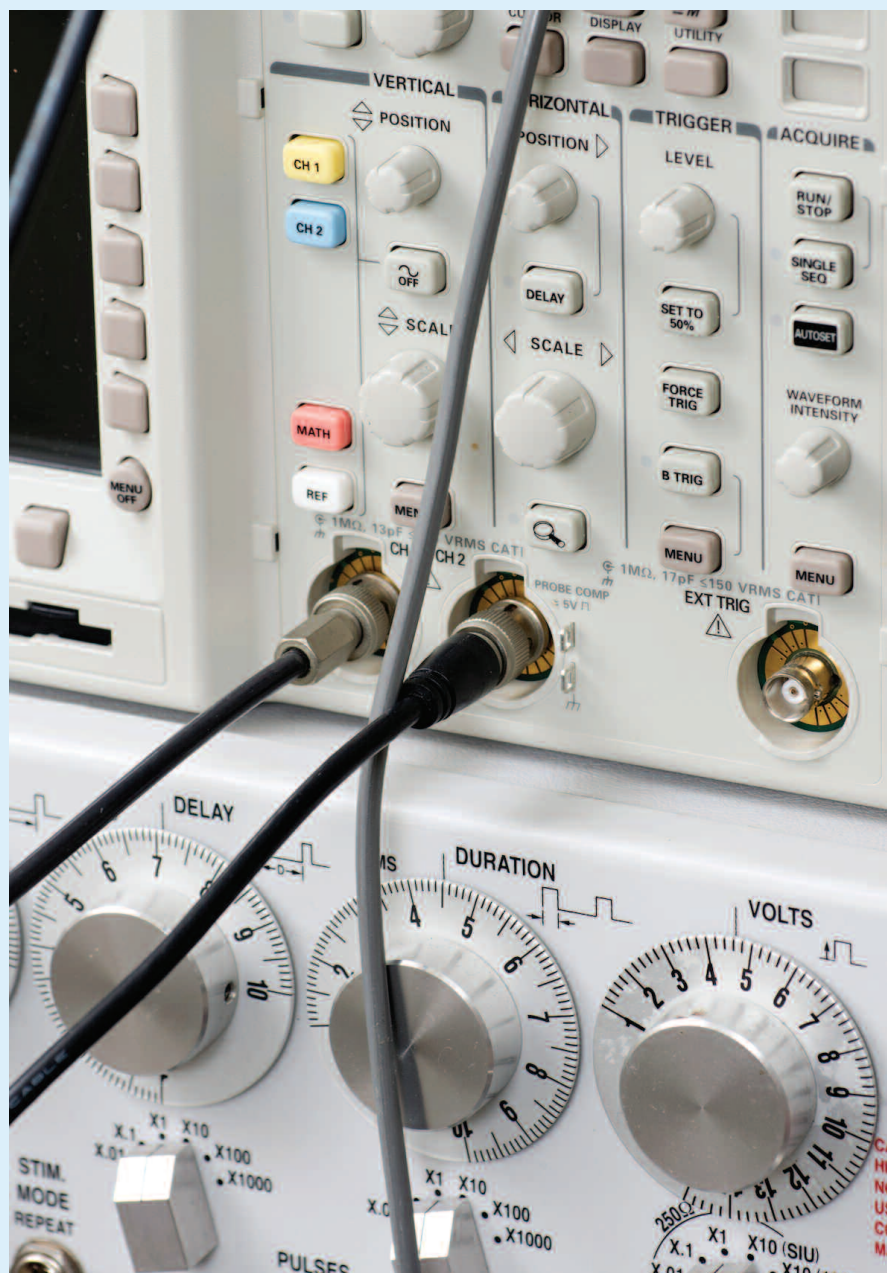
1. Atkins N, Mukhida K (2020-2022). The effect of socioeconomic status and COVID-19 on chronic pain management in Nova Scotia [Clinical]
2. Bailey J, Mossenson A, Nyirigira G, Whynot S, Livingston P (2021-2022).

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]

3. 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]
4. 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]
5. Bonin K, Oprea A, Mukhida K (2020-2021). The effects of COVID-19 on chronic pain management for patients with addictions [Clinical]
6. Ellis M, Meisner J, Mukhida K (2019-2021). Chronic pain post-craniotomy [Clinical]
7. 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]
8. Fomer D, Rigby M, Wiemer H, Bailey JG, Smyth D (2020-2021). Medical versus surgical treatment for peritonsillar abscesses [Clinical]
9. 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]
10. Ho L, Uppal V, Bailey J, Gyambib A (2021-2022). Patient Perspectives of Informed Consent for Regional Anesthesia for Ambulatory Surgery [Clinical]
11. King A, Mukhida K (2021). Patient Perspectives on Contributory Factors to Non-attendance at a Tertiary Academic Chronic Pain Clinic in Halifax, Nova Scotia [Clinical]
12. Kovacs GK, Goldstein J, Campbell S, Baro B, Sowers N, Law JA, Walker M, DeMone C, Hebert S (2021-2022). The

Use of Tracheal Clicks During Direct Laryngoscopy: A Cadaveric Simulated Study [Clinical]

13. Kwofie MK (2020-2022). COVID Airway Provider PPE Use and Outcomes Registry (IntubateCOVID.org) [Database]
14. Law JA (2016-2021). Project for the Universal Management of Airways (PUMA) [Clinical]
15. Law JA, Thana A, Milne A (2021-2022). Use of awake tracheal intubation in anesthetic practice is [decreasing?]: a database review of years 2011-2020 at a single tertiary-care institution [Database]
16. Lynch M (2020-2021). Development of a Transitional Pain Service [Development and Innovation]
17. Lynch M (2020-2021). National survey of pain clinic responses during Covid-19 [Clinical]
18. MacDonald S, Mukhida K (2019-2021). Pneumorrhachis complicating acute pain management using a thoracic epidural catheter [Clinical]
19. Maclean E, Verge A, Mukhida K (2021). Analysis of closed civil legal cases involving interventional pain management in Canada [Clinical]
20. Mossenson A, Bailey J, Tuyishime E, Livingston P (2020-2021). 4. Competency-based performance assessment of simulation facilitation in health professional education: a narrative review [Medical Education or Training]
21. Mukhida K (2014-2022). The influence of Wilder Penfield's experiments in Europe on the development of his surgical techniques [Clinical]
22. Mukhida K (2019-2022). iCanCope with Pain: an integrated smartphone and web-self-management program for adolescents and young adults with chronic pain [Clinical]
23. Poltarowicz J, Mukhida K (2021). Airway management for patients undergoing surgery for cervical myelopathy [Database]
24. 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]



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26. Sjaus A, Ritchie K (2019-2021). Cognitive skills for decision making in anesthesiology: Qualitative analysis of structured oral examinations [Medical Education or Training]
27. Smyth M, Mukhida K (2021-2022). Evaluating the effect of preoperative cannabis use on pain management following orthopaedic surgery [Clinical]
28. Stanzel R, Chedrawy E, Sardiwalla Y, Hirsch G, Dulong B, Henderson M, Schmidt M (2017-2021). The impact of deviations of mean arterial pressure during surgery on neurological/renal outcomes [Database]
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30. Vlaten A (2021-2024). Comparison of pediatric airway training and available airway equipment in EMS [Clinical]
31. Wafa K, Mukhida K (2020-2021). Emergency department management of patients with chronic pain [Clinical]
32. 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]
33. Wiseman L, Mukhida K (2020-2021). The effect of preoperative cannabis use on postoperative visceral pain [Clinical]

Appendix B

2021 Publications

1. Astapenko D, Ticha A, Hyspler R, Tomasova A, Navratil P, Maly O, Parizkova RC, Dana C, Huey SC, Lehmann C, Malbrain MLNG, Cerny V (2021). A porcine model of endothelial glycocalyx damage by enzymatic digestion: A pilot study. *Clinical hemorheology and microcirculation*. [Published] PubMed ID: 33843666.
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