

Department of Anesthesia, Pain Management and Perioperative Medicine

Annual Report

2016-2017



**DALHOUSIE
UNIVERSITY**

FACULTY OF MEDICINE
Department of Anesthesia,
Pain Management and
Perioperative Medicine

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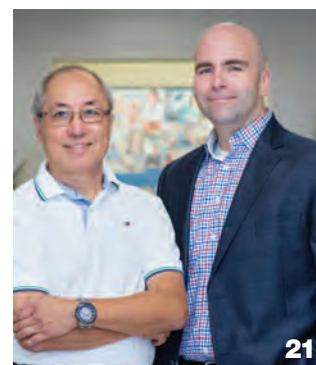
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Message from the Head & Chief

It is impossible for me to reflect on the past year without acknowledging my own personal health challenges and triumphs. This past year allowed me to experience our healthcare system first hand as a patient. In thinking back, I am reminded of how privileged I am to be surrounded by skilled and compassionate colleagues. In addition to being incredibly appreciative of my care providers and my devoted wife, I was fortunate to witness my leadership team and colleagues within the Department skillfully and graciously fulfill my duties, allowing me the time I needed to recover. For that, I am deeply grateful.

It was a pivotal year for the Department as we secured a new academic funding plan. While we continue to have work to do in achieving competitive compensation, this brought us much needed short-term financial stability. It also marked the merge of our three anesthesia groups – adult, pediatric and women and obstetrics – under one financial agreement. I have been nothing but impressed by the leadership and professionalism brought forward by our leadership group as we navigated this uncharted territory and co-created new financial and governance models that will lead us to success today and tomorrow.

It has always been my vision to lead our Department to a place where we are a truly unified academic Department. We are well on our way.

While undergoing internal restructuring, the Department continues to be a leader in patient care, medical education and research. This year our highly-competitive residency program became only the third department in Canada to offer competency based medical education. We are also creating a reputation as a sought-after Fellowship destination, gaining interest from Fellows across the world. On the research front, I am proud to have colleague **Javeria Hashmi, PhD** receive a Canada Research Chair as well as watch our external research funding double in the past year, exceeding \$10 million.

I have also been and continue to be pleased to play a role with the Nova Scotia Health Authority's plan for the QEII redevelopment and its provincial perioperative program. This huge undertaking will transform how care is provided in Nova Scotia and will create a new and modern infrastructure that supports improved patient care.

I would be remiss if I did not recognize the tremendous contribution of former Associate Head, **Dr. David Milne**. His leadership, perseverance and hard work were a significant factor in our success. I would also like to thank my leadership team of site chiefs, Cabinet members and staff for their sound advice, commitment and expertise. As we are consistently told by our new recruits and residents, our Department excels in creating a collegial and supportive work environment. Their leadership fosters that culture.

I encourage you to read this annual report and meet some of the Department's high calibre professionals and learn about our innovative work.

Romesh Shukla, MBBS, DABA, FRCPC

Professor and Head, Dalhousie University Department of Anesthesia, Pain Management & Perioperative Medicine



It has always been my vision to lead our Department to a place where we are a truly unified academic Department. We are well on our way.

Leadership & Governance

New Cabinet focused on enhancing and continuing to build robust Department



2017 Cabinet: Drs. Scott Drysdale; André Bernard (Chair), Claudio DiQuinzio, Jane Henderson, Narendra Vakharia, Robyn Doucet, Colin Audain, Orlando Hung, Adam Law, Bruce MacAulay, Robert Nunn, Romesh Shukla (Department Head) and Mr. Carl Stevens. *Missing:* Drs. John Chisholm, Janice Chisholm and Ms. Marilyn Girouard

In 2016, the Department restructured its governance framework which saw the creation of a peer-populated Cabinet.

The governance refresh was in response to the Department bringing its three groups under one financial model – adult anesthesia, women's and obstetrics and pediatric anesthesia.

This updated governance structure ensures the Department is acting and making decisions that reflect the integrated Department's best interests. The most significant change was the creation of a Cabinet. A 15-person leadership team – partially elected by peers – provides guidance to the Department Head, **Dr. Romesh Shukla**.

Dr. André Bernard was selected as the Cabinet Chair.

"Making good decisions for the right reasons, is absolutely critical to creating a positive and productive work environment," said Dr. Bernard. *"Cabinet representatives are taking that responsibility very seriously."*

In its first year, Cabinet has been focused on creating good decision-making processes, collecting and validating information that supports those decisions and realigning the Department's operational and financial structures to reflect the new integrated structure.

The group is also focused on the long term.

"We are always trying to think ahead. We ask ourselves, where do we want to be in two, five and 10-years' time and try to make decisions today that will help us get to where we want to be tomorrow," said Dr. Bernard.

As part of its long-term thinking, it is also over-seeing an effort to create a Department-wide human resource succession plan.

"The calibre and strength of a leadership team is paramount to the Department's overall success; in not only its day-to-day operations, but also in creating an environment that recruits and retains top talent," says **Dr. Scott Drysdale**, Cabinet member and Co-Chair of the Succession Planning Committee.

"We know people come and go. If we want our leadership roles to be held by skilled and qualified people, we need to think ahead, plan for potential vacancies and support our promising early-career leaders today," said Dr. Drysdale. *"We are building that plan now."*

The Department Head and Cabinet continue to rely on its Department members for input and insight. This is partly accomplished through an annual Department-wide strategic planning session which takes place each Fall.

Farewell to two influential Department leaders

The Department said good-bye to two leaders who played significant roles in shaping the Department and the people who work within it.

Dr. David Milne
Associate Department Head



Dr. David Milne, Associate Head, has been a driving force behind the Department's growing reputation in its strategic and creative problem-solving abilities.

Dr. Milne was with the Department for 14 years, in leadership roles for much of that time. His diplomatic, logical and visionary leadership style, helped shape what the Department is today and will be in the future. He has also been a strong and credible voice for the medical profession and the Department in other provincial and national roles.

Best wishes to Dr. Milne in his new career in Calgary where he will be working and living closer to family.

Dr. Ian Morris
Victoria General Site Chief



Dr. Ian Morris has served in multiple formal leadership roles over his long career with the Department; most recently as VG Site Chief. While his formal senior titles have made important contributions to the Department, it is his quiet yet profound informal leadership style that has left the most significant and lasting impression.

Dr. Morris is lauded by his students and sought-after by his colleagues. His clinical practices, expertise and knowledge are a living example of the Department's culture of excellence. After a career that spanned three decades, Dr. Ian Morris retired in 2017.

His colleagues and friends wish him all the best in his retirement.

Cabinet

Dr. André Bernard (Chair)

Dr. Romesh Shukla, Head and Chief

Dr. David Milne, Associate Head

Dr. Adam Law (effective July '17)

Dr. John Chisholm, Saint John Regional Hospital, Site Chief

Dr. Janice Chisholm, Program Director - Postgraduate

Dr. Robyn Doucet (effective July '17)

Dr. Claudio Diquinzio (Member-at-Large)

Dr. Scott Drysdale, Pediatric Anesthesia, IWK Health Centre, Chief

Dr. Adam Law, Halifax Infirmary Site, QEII Sciences Centre, Site Chief

Dr. Blaine Kent (effective July '17)

Dr. Bruce Macaulay (Member-at-Large)

Dr. Ian Morris, Victoria General Site, QEII Sciences Centre, Site Chief

Dr. Janice Chisholm (effective April '17)

Dr. Rob Nunn, Women's and Obstetrics, IWK Health Centre, Chief

Dr. Orlando Hung, Medical Director Research

Dr. Narendra Vakharia, Medical Director Education

Ex-Officio Members

Dr. Colin Audain, Scheduler for adult services

Ms. Marilyn Girouard, Executive Director

Dr. Jane Henderson, Human Resource Advisor

Mr. Carl Stevens, Administrator

Who We Are & What We Do

Patient Care



Where We Do It

QEII Health Sciences Centre

IWK Health Centre

Dartmouth General Hospital

Saint John Regional Hospital

Hants Community Hospital

78,000+ procedures provided

88 anesthesiologists

32 anesthesia technicians and assistants

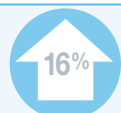
The Department supports thousands of surgeries and procedures across various disciplines. **For example:**

	Orthopaedic surgeries	6,621
	Ear, Nose Throat (ENT)	1,616
	Ophthalmology	8,141
	Urology	5,887
	Plastic Surgery	1,613

6%

Increase year-over-year

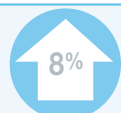
Cases By Subspecialty



Liver Transplantation
29 cases



Cardiac
2,160 cases



Neuroanesthesia
1,219 cases



Pediatric anesthesia
6,061 cases



Thoracic
998 cases



Women's and Obstetrics
9,302 cases



Blood Management Services
1,956 cases

Pain Management

- **Chronic Pain (Adult and Pediatrics)**
10,684 visits, consults + new patients
- **Acute Pain Services (Adult)**
1,256 new consults
- **Acute Pain Service (Pediatrics)**
771 new and subsequent visits

Education

181
Faculty

15%
w/ professorship status)

30
Residents

6
entering first year

*There were 137
applications for the
6 residency seats.*

125
Medical
Undergrad
Learners

103
other learners

5
Fellowships



Did you know? 55% of the Med 4, Dalhousie medical students who complete an anesthesia elective applied for the Dalhousie anesthesia residency program

Undergraduates



843 undergraduate teaching hours
29 off-site remote rotations

Postgraduates



67 off-service or visiting elective residents
Combined **213** weeks of rotations in general anesthesia, airway, pediatric anesthesia or chronic pain

Professional Development



59 CPD sessions
30 Grand Rounds Sessions

Research



20 Researchers
(total of **6.5** full time equivalent protected time)



\$10.5 million in grants & industry funding*
(+**91%** from last year) 
**Includes Principal and Co-investigators.*



50 New Projects



88% Collaborative Projects



102 Publications



85 Invited Presentations



Excellence in Patient Care

What We Do

Our Patient Care service delivery includes:

Specialized anesthetic services in:

- Chronic Pain Management
- Acute pain management, including regional block
- Cardiac
- Neurosurgery
- Pediatric
- Thoracic
- Transplantation
- Women's and obstetric anesthesia
- Blood Management
- Preadmission Clinics

Anesthesiology Surgery support for:

- Orthopedics
- Plastics
- Vascular
- General

Off-site support for:

- electrophysiological ablation procedures
- transcatheter aortic valve implants
- cardioversions
- interventional neuro-radiologic procedures
- MRI and radiotherapy

The Department's 88 anesthesiologists – using 40 operating rooms – provide general, regional and local anesthesia care for all types of surgery and other procedures at the QEII Health Sciences Centre, the IWK Health Centre, the Dartmouth General Hospital, Hants Community Hospital and the Saint John Regional Hospital in New Brunswick. The Department also offers pain management services to support thousands of people across the Maritime provinces in managing their pain.

The complex and demanding role of overseeing the operations and activities of each site belongs to a talented team of Site Chiefs. They must work closely with their colleagues and leadership team to identify and forecast issues, problem solve and plan both in the short and long-term.

The Department's Chiefs and Site Chiefs are:

Dr. Ian Morris, Victoria General Site, QEII Sciences Centre, Site Chief

Dr. Janice Chisholm
(effective April 2017)

Dr. Adam Law, Halifax Infirmary Site, QEII Sciences Centre, Site Chief

Dr. Blaine Kent
(effective July 2017)

Dr. Rob Nunn, Women's and Obstetrics, IWK Health Centre, Chief

Dr. Scott Drysdale, Pediatric Anesthesia, IWK Health Centre, Chief

Dr. John Chisholm, Saint John Regional Hospital, Site Chief

Dr. Alison Kelland, Hants Community Hospital, Site Chief

Dr. Kevin Bent, Dartmouth General Hospital, Site Chief



The complex and demanding role of overseeing the operations and activities of each site belongs to a talented team of Site Chiefs.



Equipment updates; planning ongoing for new facilities

Working with up-to-date equipment and in a safe and modern space helps create a positive and productive work environment.

The Nova Scotia Health Authority (NSHA) has launched a massive project where various facilities will be upgraded or replaced in the coming years. The QEII redevelopment plan will see renovations to the Halifax Infirmary building and updates to the operating room at the Hants Community Hospital. In addition, renovations are underway at the Dartmouth General.



Site Chiefs and Department members are actively participating in the planning and look forward to the much-needed upgrades.

While the real change will come with major renovations and rebuilds, the Department continues to make adjustments that will optimize the current space and introduce modern equipment that supports best patient care and patient safety.

At the **Halifax Infirmary**, CARESCAPE monitors were installed in all operating rooms not previously equipped, AMBU Ascope single-use flexible bronchoscopes were obtained, and further CMAC video laryngoscope blades were deployed.

At the **Victoria General** there were various equipment upgrades, including updating or installing: anesthesia monitors to the GE B850, Innovian workstations, new sevoflurane and desflurane vaporizers, a CMAC video laryngoscope, a new difficult airway cart for the PACU, and fluid warming cabinets.

The multiyear renovation of all acute care inpatient beds is nearing completion at the **Dartmouth General** while work continues to renovate fifth floor beds and create a new ICU and step down unit. The Department is also fully involved in planning for the build of new operating suites at the Dartmouth General where five operating rooms will be replaced with eight new rooms.

The **Hants Community Hospital** is under renovations which will see improvements to the existing operating room and a second operating room opening in November 2017.

An expansion of the **Pediatric Complex Pain Clinic** has been endorsed by IWK Health Centre which will bring a faster response to referrals and expanded outreach.

In the short-term, Department staff work diligently to ensure quality patient care continues to be delivered in the current space and during the active renovations – which can be disruptive – with a view to the substantive long-term benefits.

Subspecialty Care

Throughout the various facilities, the Department provides unique skills and expertise in eight subspecialty areas and two programs. Each year, progress is made to improve the delivery of care, find efficiencies and introduce new processes and policies to improve quality and patient safety.

Adult Acute Pain Management and Regional Anesthesia

The Acute Pain and Regional Anesthesia services are led by Subspecialty Chief **Dr. Kwesi Kwofie**. Working with Dr. Kwofie Acute Pain nurses, **Paula Hammond** and **Lynn Langille**, are teaching pain management to patients throughout the hospital. Meanwhile, the continuation of the Highly Opioid Tolerant (HOT) program helps identify patients in the clinic to improve specialized acute pain management plans. Shifts in the block room have lengthened to 10-hours to extend coverage and allow blocks for cases later in the day.



2,203 regional anesthesia
in the block room



539 new consults at the
Infirmary Acute Pain Service



717 new consults at the VG
Acute Pain Service

Blood Management Services

Perioperative Blood Management Services, led by Subspecialty Chief, **Dr. Blaine Kent**, provides perioperative anemia screening and treatment for major surgeries. Team members also counsel patients who decline blood products and coordinate intra-operative

surgical and anesthetic blood management techniques. Expansion of the Blood Management Service patient referral to Dartmouth General started in 2017. The group is also developing and implementing a perioperative anemia screening and treatment program for the effective treatment of perioperative anemia, by using advanced screening, diagnosis and initiation of therapy weeks before treatment.



1,956 cases

Cardiac anesthesia

The Cardiac group, under the guidance of Subspecialty Chief **Dr. Myron Kwapisz**, provides anesthesia care for all patients undergoing cardiac surgery, including: coronary revascularization, valve replacement, thoracic aortic surgery, cardiac pacemaker/defibrillator/resynchronization implants, transplants and mechanical assist insertion (ECMO and VADS). They are also frequently called upon to assist with care for patients with significant cardiac disease undergoing non-cardiac surgeries. This year's "Blood and Beyond" workshop had more than 70 participants with speakers from around the world covering diverse topics from Perioperative Anticoagulant Management to Point of Care Coagulation Management.



2,160 cases

Neurosurgery

The neuroanesthesia subspecialty anesthesia group, led by **Dr. Carlo Mariotti**, provides 24/7 coverage 365 days-a-year for elective and on-call cases, with a group of core and non-core anesthesiologists.



Elective procedures include a full array of major spine, intracranial, and functional neurosurgeries. The neuro-anesthesia group provides anesthetic services in the interventional neuroradiology suite for coil embolization of cerebral aneurysms, neuro-interventional management of acute thrombotic stroke patients and various other procedures on an elective and emergency basis. The past year the group has been focused on improving patient flow and efficiency by implementing a plan that prioritizes neuro patients at the same level as cardiac patients, working to ensure an early start in the operating rooms.



Pain Services

Adult Chronic Pain

Subspecialty Chief **Dr. Ian Beauprie** continues to lead his team through the challenging task of meeting the growing clinical demands for chronic pain services. Demand continues to be a challenge as referrals have increased substantially since new opioid guidelines were put in place and the province experiences a family physician shortage.

Significant efforts were made to increase patient in-take and flow, by introducing new processes such as a Group Medical Visit Process for (non-urgent/non-fast-track) patients which has significantly reduced the waitlist and wait time for QEII/Hants. This change also brought positive patient feedback. The approach for appointment booking and confirming attendance was also updated to decrease the number of “no show” appointments.



Demand increase by year-over-year.

7,809 clinic visits
1,243 new patients
1,193 consults

Pain Services

Pediatric Pain Service

The Pediatric Pain Service works with children from birth to adolescence to help ease their pain. As part of a larger interdisciplinary team at the IWK Health Centre, members provide acute and chronic pain consultation and treatment/management options. The Pediatric Pain Service is only one of three such clinical and research programs in Canada, where its expertise is sought from hospitals across Canada and the United States. The past year procedural sedation practices at the IWK were reviewed as a quality and safety initiative. **Dr. Sally Bird**, chair of the Centre Wide Procedural Sedation Committee, led a large group of clinicians through an appraisal of the current state of procedural sedation leading to significant improvements to the assessment of patients, procedure documentation and delivery of sedation.

Pediatric Anesthesia

The pediatric anesthesia team, led by Chief **Dr. Scott Drysdale**, provides anesthesia care to children and youth in the Maritime provinces. While much of their expertise supports surgical activity, the team is active outside of the operating theatre where cases can also be complex and require extended support. Operating room hours’ availability continues to increase, leading to significant improvements in wait times for some services, most notably for children requiring diagnostic imaging procedures





6,061 OR cases



Increase in operating room hours over five years

Preadmission Clinic

The Same Day pre-assessment clinics, at the Halifax Infirmary and Victoria General, evaluate patients for same day admission prior to surgery and assess medically complex surgical patients who are ambulatory. The program is led by Medical Director **Dr. André Bernard**. The Halifax Infirmary Clinic adopted kiosk registration to enhance the efficiency of the flow of patients in clinic. Both clinics have continuously sought out ways to maximize clinic efficiency, with the HI Clinic taking specific steps to help address patient complexity. The preadmission clinics have increased their participation in perioperative research through the initiative of Department anesthesiologists and researchers and highly engaged nurses, administrative staff and other healthcare providers. Both clinics continue to work to implement Choosing Wisely Canada guidelines through rationalizing some of the preoperative testing being undertaken for low risk procedures.



8,649 patients seen

Thoracic

Thoracic anesthesia is led by Subspecialty Chief, **Dr. George Kanellakos**, and supports surgeries for treatment of conditions affecting the lungs, chest wall and diaphragm requiring general anesthesia and, at times, one-lung ventilation. Anesthesia care for thoracic surgeries at the QEII Health Sciences

Centre is provided by a specialized group of anesthesiologists. They also conduct research, primarily in post-operative pain following thoracic surgery, and provide specialized education and training to residents, attending physicians and medical students.



998 cases

Transplantation

Anesthesia care for liver transplantation is among the most complex of the specialties. At the QEII Health Sciences Centre, the anesthesia liver transplantation program is led by Subspecialty Chief, **Dr. Arnim Vlaten**. A small group of very specialized anesthesiologists work with Dr. Vlaten to deliver the intricate care required by these patients. Over the past year, cases continue to present an unpredictable variability in blood loss. To improve the management of hemodynamic instability during liver transplantations, efforts are underway to increase the use and expertise in transesophageal echocardiography (TEE). TEE guides blood volume requirements in real time. Expertise in TEE has grown in the past year as most staff have participated in an extensive hands-on transesophageal simulation workshop on perioperative TEE, and three members are fully trained in perioperative transesophageal echocardiography.



29 cases



Dr. André Bernard

Women’s and Obstetric anesthesia

Women’s and Obstetric anesthesia, led by Chief **Dr. Rob Nunn**, provides comprehensive anesthesia services for maternal, breast health and non-oncology gynecology patients at the IWK Health Centre and the QEII Health Sciences Centre, including tertiary high-risk obstetric and neonatal referrals for the Maritime provinces. The department provides in-house 24/7 anesthesia care for its patients. This past year there were 4506 deliveries (3334 vaginal and 1172 cesareans) with the overall labour epidural rate for vaginal deliveries (combined primiparous and multiparous) around 70 per cent. An active Acute Pain Service (APS), Anesthesia Consultation Service and Same Day Ambulatory Clinic round out the services offered. In addition, as an integral part of the Cardiac Arrest Team, the Women’s and Obstetrics anesthesiologists provide resuscitation services to the women’s program. To continually improve quality patient care this past year, the group instituted a series of planned mock code simulation exercises to access the integrity of its systems and are developing quality metrics to improve operating room efficiency.

The Women’s and Obstetric anesthesia department provides in-house 24/7 anesthesia care for its patients.



Quality Matters

The Department recognizes the need and importance of dedicating resources to continuously monitor and enhance the quality of patient care and safety. Its Office of Quality Improvement and Patient Safety, led by **Dr. Greg Dobson**, has been recognized as a leader in quality improvement, both locally and nationally. In addition to monitoring the quality and safety of all anesthesia care delivered through outcome and adverse event data collection, the group also hosts morbidity and mortality conferences and develops practice guidelines. As opportunities for improvement are recognized, recommendations are made to change current procedures and policies. The Office of Quality Improvement and Patient Safety actively strives to share their expertise with the rest of the Department, by issuing quality safety alerts or showcasing their latest data at Grand Rounds. This past year, the office has also been participating in the new hospital and province-wide ‘Safety Improvement and Management System” (SIMS).

Full scope of team expertise valued

Teamwork is a given in any healthcare environment, especially in complex care settings. However, the quality of collaboration can vary greatly. The Department of Anesthesia, Pain Management and Perioperative Medicine takes pride in its positive and collegial work environment.

Site and subspecialty chiefs consistently report on the value and positive impact each type of care provider has on the entire care experience for both the patients and colleagues.

*“Our nurses are the bedrock of our Acute Pain Services,” said **Dr. Kwesi Kwofie**, Subspecialty Chief of Acute Pain and Regional Anesthesia. “The quality of the care is largely due to the leadership, skill and hard work of the nurses. They consistently move us forward by formulating, updating and implementing policies and procedures.”*

The roles of anesthesia coordinators, technicians and assistants are often the backbone of anesthesia care.

Anesthesia coordinators are applauded for their ability to bring efficiencies, timely problem solving and coordination to the ever-evolving operating room lists, while the anesthesia technicians offer integral support and provide a wide range of services that address equipment preparation and troubleshooting. The skilled team of anesthesia assistants are experts in airway management for out of operating room airway emergencies, on the Cardiac Arrest Team and in the Post Anesthesia Care Unit (PACU). They also provide important support during high-acuity situations.



In 2016-17 there were 52 cardiac arrests at the Victoria General, 25 required intubation/airway management. AAs provided endotracheal intubations on 13.

Anesthesiology attending staff are also primarily responsible for patients recovering from anesthesia in the PACU. The significant improvements in the number and total hours of holds awaiting a PACU berth at the Halifax Infirmary site are largely attributed to the successful recruitment and retention of PACU nursing staff.



The total number of holds in the PACU decreased by 64%, while the hours on hold decreased by 75%, compared to the previous fiscal year.

Residents are not only gaining skill and expertise, but share the patient care delivery work load, by providing 24/7 coverage, conducting initial evaluations on inpatient anesthesia consults and responding to both trauma-team activations in the emergency department and cardiac arrests called elsewhere in the hospital.

The Department recognizes the importance of the diverse expertise and skill each care provider brings to the team. This cohesive and collegial team-based approach to care, increases the quality of patient care while creating a positive and productive work environment.



Dr. Kwesi Kwofie

The Department recognizes the importance of the diverse expertise and skill each care provider brings to the team.



Excellence in Education

The Office of Education continues to produce excellent results in its teaching, mentorship and continuing professional development programs.



Dr. Narendra Vakharia

"It's been an incredibly productive and rewarding year for the Office of Education," said Medical Director **Narendra Vakharia**. *"In addition to launching our competency based medical education curriculum, we are offering an internationally-competitive fellowship program and our Med 4 undergraduate students continue to flock to our Department in response to our reputation for offering high-quality elective programming."*

Ensuring access to meaningful and up-to-date continuing professional development (CPD) programming is another Department priority. In 2016-17 the Department hosted 30 grand rounds sessions (with 10 visiting professors), four journal clubs and supported 17 conferences and special events.

Updated and enhanced learning opportunities were also introduced in simulation education, with a new Advanced Surgical Management session for PGY3 and PGY4s and refreshed simulation activities and cases for residents.

The Department's commitment to education was highlighted this year with numerous awards of excellence (see page 28).

Global Health

Dalhousie's Department of Anesthesia, Pain Management and Perioperative Medicine was the first department in Canada to offer education and training to anesthesia professionals practicing in low- and middle-income countries. That was in 2009. Its success and enthusiasm has not waned. Engagement with the program is high, with nearly half of the residents involved, or expected to be involved, in global health initiatives. In 2016-17, residents **Dr. Jon Bailey** (PGY 4), **Dr. Kitt Turney** (PGY 4), and **Dr. Kyle Jewer** (PGY 4) completed a one-month elective in Rwanda. Program lead **Dr. Patty Livingston** and colleague, **Dr. Ruth Covert** delivered the Teaching and Learning Course for Medical Professionals in Rwanda. This included a train-the-trainer program to build education capacity.

Drs. Alcade Rudakemwa and **Eugene Tuyishime** from the University of Rwanda completed four months of anesthesia electives in the Department.



Drs. Eugene Tuyishime (left) and Alcade Rudakemwa (right) from the University of Rwanda arrive at the Halifax Stanfield International Airport.

This year, **Dr. Matthew Ho** completed his Global Health Fellowship, becoming the first graduate of a Global Health Fellowship in Canada.

Leadership Team

Dr. Narendra Vakharia, Medical Director, Education and Simulation

Dr. Janice Chisholm, Program Director, Postgraduate

Dr. Robyn Doucet, Associate Program Director, Postgraduate

Dr. Jane Henderson, Medical Director, Fellowship

Dr. Patty Livingston, Medical Director, Global Health

Dr. Ben Schelew, Medical Director, Undergraduate

Dr. Bruce Macaulay, Medical Director, Continuing Professional Development

Ms. Laura Harris Buffett, Managing Director, Education

National leader in Competency Based Medical Education

The Dalhousie's Department of Anesthesia, Pain and Perioperative Medicine blazed a trail when it launched its Competency Based Medical Education (CBME) program in July 2016. At that time, it was only the second anesthesia program in Canada to do so.

CBME is Canada's new gold standard for medical education. The Royal College of Physicians and Surgeons of Canada requires all medical academic programs in Canada to transition to CBME by 2022.

*"In 2012, we knew we wanted to overhaul our residency education program," said then Postgraduate Program Director, **Dr. Janice Chisholm**. "We knew CBME was on the horizon and we had a choice to make; we could pause or push ahead and be leaders. We chose to lead."*

The six residents that completed their first year under the new curriculum are pleased with that decision.



The Department's first group of residents to be part of competency-based medical education curriculum. L-R: Drs. Stephen Middleton, Stephanie Power-MacDonald, Emma Kehoe, Leo Fares, Chrison Wong and Haotian Wang.

*"The program has really pushed us to be more independent," said resident **Dr. Stephanie Power-MacDonald**. "It has placed more responsibility on us to drive our own learning success and at the same time has raised the bar of accountability for faculty, as their feedback is critical to our ability to demonstrate we have learned a skill."*

The huge undertaking to bring this program to life was a department-wide effort.

*"The leadership shown by our Department, not only by those who led its implementation but by the faculty and residents who demonstrated enthusiasm to teach and learn differently to support this new model was inspiring and impressive," said Medical Director of Education, **Dr. Narendra Vakharia**. "I was also pleased to see such active participation from both our residents and faculty, it was an essential part of the program's success."*

As the Department celebrated its one year anniversary with CBME, it has become a go-to expert for the rest of the nation and beyond.

Dr. Chisholm is now the CBME faculty development lead for Dalhousie University, supporting others in bringing CBME to their respective departments. The Department's advice is also sought-after across the globe, including meeting with researchers in Australia, United Kingdom, Ireland and the Netherlands who plan to launch a study on CBME.

Dr. Robyn Doucet is now the Postgraduate Program Director. She was integral to the CBME launch and is deeply committed to continuing to learn from the experience and further evolve the program to ensure it offers a rich and high-quality education experience for all residents.

Best wishes to 2017 graduating Residents and Fellows

On June 16, the Department hosted a send-off event to offer best wishes to its 2017 graduating residents. The group of exceptional physicians have completed an important milestone in their learning journey.



2017 Graduating Residents, L-R: Drs. Mike Vargo, Tristan Dumbarton, Ainslie Gilchrist, Josh Robert and Amélie Pelland.

2016-17 Fellows:

Dr. Patricia Doyle
Women's and Obstetric Anesthesia

Dr. Taniga Kiatchai
Pediatric Anesthesia

Dr. Gemma Malpas
Airway Management

Dr. Susanne Retter
Regional Anesthesia and Acute Pain

Dr. Sushil Sancheti
Regional Anesthesia and Acute Pain



Excellence in Research

Doubled external research funding – tipping \$10 million, 50 new projects and an active and engaged group of researchers have fostered a productive and vibrant research environment this past year.

“We’ve been primarily focused on ensuring the Office of Research supports the research strategic priorities of our Nova Scotia health partners and national research funding bodies,” said Dr. Orlando Hung, Medical Director of Research for the Department. “Our priorities lie with supporting areas such as collaborative research teams, impactful clinical research and increased patient engagement in research.”

This past year, the Department has expanded its services and support for its researchers. Support ranges from practical services, such as project management and help in completing grant submissions, to education sessions for new researchers.

Two notable areas of growth are the Office of Research’s gained knowledge in patient engagement and the launch of seven research standard operating procedures, or SOPs.

Recognizing the power of patient engagement to improve the execution and uptake of research, the Office of Research staff has sought professional development in this area. With this knowledge, staff is better positioned to support and advise researchers about how to incorporate patient engagement in their projects. *BALANCE* (featured on page 24) is an excellent example of patient engagement becoming an integral part of a research project.

The SOPs offer the Department’s research teams a guide and education tool to support quality clinical research. The SOPs help ensure research com-



Dr. Orlando Hung and Dr. Ronald George with the Office of Research.

plies with relevant regulations and receives streamlined ethic boards’ approvals, to name only a few benefits. The use of the SOPs has already received excellent uptake.

The past year marked a growing research presence for the Department, which supported 20 active researchers.

“I continue to be impressed by both the volume and quality of the research happening right here in our Department,” said Dr. Hung. “We are home to many talented and innovative researchers.”

Leadership Team

Dr. Orlando Hung
Medical Director

Dr. Ronald George
Associate Medical Director

Heather Butler, PhD
Managing Director, Research

The past year marked a growing research presence for the Department, which supported 20 active researchers.

The internal research application process is being overhauled for 2017. The researcher awards will be increased from \$5,000 to \$20,000. Other key changes include new categories for researchers and trainees, an increased emphasis on patient engagement which also includes adding patients to the revamped peer-review committee.

\$30,000 invested to support Department researchers

The Anesthesia Research Fund (ARF) is an internal, peer-reviewed grant program that has been successful in gathering pilot data to facilitate national grant submissions. The 2016 awardees were:

- **Drs. Margaret Casey and Patricia Livingston**, \$5,000, Faculty experience in the transition to CBME in Anesthesia.
- **Dr. Kwesi Kwofie**, \$5,000, Diaphragmatic Dysfunction after Ultrasound-guided Supraclavicular Brachial Plexus Block with Single or Double Injection Technique.
- **Dr. Dolores McKeen**, \$5,000, A randomized controlled trial comparing intrathecal morphine with quadratus lumborum block as part of a multimodal analgesia strategy for post-caesarean delivery analgesia.
- **Dr. Karim Mukhida**, \$5,000, "Does work have to be so painful?": barriers to and facilitators of workplace accommodation for patients with complex regional pain syndrome.
- **Drs. Janny Ke and Vishal Uppal**, \$5,000, Single dose controlled release hydromorphone as preemptive analgesia to prevent rebound pain after single shot interscalene block for rotator cuff repair surgery: a placebo RCT.
- **Dr. Dolores McKeen**, \$5,000, Person-centered care (PCC) in the Post Anesthetic Care Unit (PACU).

Researchers Spotlight

Javeria Hashmi, PhD was awarded the prestigious Canada Research Chair Tier II. Dr. Hashmi's research is supported by grants from the Natural Sciences and Engineering Research Council of Canada, Nova Scotia Health Authority and the Canadian Foundation for Innovation grants totaling over \$300,000. Her research focuses on the predictive role of brain networks in pain modulation in a variety of pain populations, e.g. fibromyalgia. She has obtained three cross appointments (Psychology and Neuroscience, Physics and Atmospheric Sciences, and Medical Neuroscience) and been invited to present her work to various departments.

Drs. Allen Finley and Mary Lynch and their research teams are partnering in Canada's Strategy for Patient-Oriented Research Chronic Pain Network. The objective of the Network is to improve chronic pain management through high-impact research collaborations among patients, researchers, healthcare professionals, and other stakeholders speeding up the translation of the most recent research to the reality of care. The team led by **Dr. Norm Buckley**, professor and chair of anesthesia for McMaster University, was awarded \$25 Million (inclusive of matching funds) for the Chronic Pain Network. Several projects are underway at both the IWK and NSHA.

\$1 million in CIHR grants support Department researchers. Three Department researchers are working on projects that have received more than \$1 million from the Fall 2016 Canadian Institutes of Health Research (CIHR) grant awards. Principal Investigator **Jason McDougall, PhD** received \$761,175 for his research in arthritis pain. Co-investigators **Jill Chorney, PhD** and **Dr. Ron George** received \$256,274

for their research on postpartum genitopelvic pain. Natalie Rosen, PhD, with Department of Psychology and Neuroscience is the Principal Investigator.

The regional anesthesia research group, including **Drs. Vishal Uppal, Kwesi Kwofie, Susanne Retter and Jennifer Szerb**, has completed one industry-sponsored clinical trial and will be recruiting soon for another. The latter study is focused on important patient centered outcomes. Several PI-led clinical trials involving residents and fellows are ongoing and internally funded by ARF. In addition, the research team asks basic research questions involving cadaver investigations, as well as publishing impactful systematic reviews and invited editorials.

Two faculty-led businesses are dedicated to transferring research innovation and discovery to improved patient care. DMF Medical, led by **Dr. Michael Schmidt**, is sponsoring a large medical device clinical trial led by **Dr. Orlando Hung** to investigate the efficiency of a novel medical device to remove toxins from the anesthesia circuit delivery system. **Dr. Mary Lynch**, as president, leads Panag Pharma Inc., a bio-tech company focused on the development of novel cannabinoid based formulations for the treatment of pain and inflammation (see page 25). Along with **Drs. Orlando Hung and Christian Lehmann** as founding members, Panag is sponsoring their first clinical trial led by **Dr. Karim Mukhida**.

Dr. Dolores McKeen and her research team were awarded a Translating Research into Care (TRIC) level-3 grant titled Research Translated Into Evidence Based Care: Improving Outcomes In Urogynecology Surgery Through Enhanced Recovery (RECOVER). The team including researchers, clinicians and health service providers will work with

IWK Health Centre senior administrators to implement evidence-based practices and strategies to optimize patient recovery from urogynecological surgery. The goal of the research team is to demonstrate the efficacy of the approach for eventual widespread surgical use at the IWK.

MARTInI Anyone?

The Department and Dalhousie University hosts an unusually high concentration of individuals who have established national and international track records in airway management teaching and research. Founded by **Dr. Adam Law**, the MARTInI group – Maritime Airway Research & Teaching Investigators' Initiative – was created to explore synergies across disciplines that will facilitate and increase academic productivity. The concept is based on a desire to create a fun, social and collaborative setting where the group meets to support one another in forming solid research studies. Providing support and guidance to young researchers to encourage their curiosity and boost their confidence is another key outcome of the group. This is already proving to be effective as junior researchers such as **Drs. Tim Mullen, Edmund Tan and Gemma Malpas** begin to actively build their research careers in airway management.

The group plans to evolve in the coming years to host more discussions and develop education sessions to share their expertise with the broader Department.



BALANCE improves care experiences for children with autism and their healthcare providers



A few members from the BALANCE team: Carolyn Doucet, Dr. Jill Chorney, Dr. Isabel Smith, and Dr. Stuart Wright.

Core Research Team

Stephanie Snow, Graduate Student

Dr. Jill Chorney, PhD, Supervisor
(Anesthesia, Psychology and Neuroscience)

Dr. Isabel Smith, PhD, Co-Supervisor
(Pediatrics, Psychology and Neuroscience)

Dr. A Stuart Wright, Collaborator
(Anesthesia)

Dr. Sally Bird, Collaborator
(Anesthesia)

Nancy Walker, Collaborator
(Physiotherapist, Mother of a son with ASD)

Carolyn Doucet, Collaborator
(Manager, IWK Perioperative Services)

Leigh-Anne Marshall, Collaborator
(Clinical Educator, IWK Day Surgery)

Kate Stone, Collaborator (Child Life Specialist, IWK Day Surgery)

Healthcare providers do not always feel comfortable and equipped to care for children with autism spectrum disorder (ASD). In turn, the healthcare experience for the child and their family can be emotional and stressful.

A research project called **BALANCE** – Building Alliance for Autism Needs in Clinical Encounters – is about supporting clinicians to create positive experiences for children with ASD and their families.

“It became clear early on that our healthcare providers actually know a lot about the core characteristics of ASD and potentially effective care strategies, so we knew more ASD education could not be the sole solution,” said Dr. Jill Chorney, Associate Professor and Psychologist. “There were additional barriers that were important to address, including healthcare providers feeling nervous, challenging interprofessional communication, and needing to build strong partnerships with the families.”

The program, trialed at the IWK Health Centre’s day surgery unit, provides interactive, online education modules to

healthcare providers. The modules offer strategies and tools such as how to assess a patient’s sensory, emotional, and communication needs. Modules also provide visual supports, interprofessional communication strategies, and coping skills for healthcare providers. The content was co-created with families and healthcare providers.

Program evaluation has demonstrated that healthcare providers are feeling more confident and families are reporting a marked difference in the care experience.

“As word of the program’s early success spreads, healthcare providers from across the country are telling us that this type of support is needed in many disciplines,” said Dr. Chorney.

The Department has been an early supporter of the research project. In 2015, it awarded BALANCE one of its \$5,000 Anesthesia Research Fund grants.

Plans are in place to grow the program. The group is now seeking Canadian Institutes of Health Research (CIHR) funding to test BALANCE at sites across the country and explore commercialization opportunities.

Department home to national leaders in cannabinoid research

While the use of cannabis for medicinal purposes has only become part of mainstream discussions in recent years, Department pain and inflammation researchers **Drs. Mary Lynch, Orlando Hung, Christian Lehmann** and **Melanie Kelly** have been focused on researching and developing novel cannabinoid-based formulations for the treatment of pain and inflammation for decades.

"The endocannabinoid system is part of the body's built-in defense network that fights pain and inflammation, and the agents that activate it are cannabinoids like the active agents in marijuana," explain Dr. Lynch. "We are developing products that will activate this system and relieve the pain and inflammation, yet without the side effects of using marijuana, such as the psychotropic "high"."

Realizing the strength of their combined expertise, in 2013, the group formalized their team by creating a corporation, Panag Pharmaceuticals Inc. (www.panagrx.com). This decision also opened new doors for funding and attracting industry partners to help get products to market faster.

Panag already has one over-the-counter topical cream approved by Health Canada as a natural health product and are seeking licensing for two more prescription topical products. Other products are at the clinical trials stage.

The team is also one of two sites in Canada participating in an industry-funded trial exploring the effects of vaporized cannabis plant containing several different concentrations of THC and CBD (cannabidiol) for osteoarthritis. This research is the first of its kind in the world.

The group has a combined 100 years' experience in research regarding cannabinoids for treatment of pain and inflammation. This along with their unique mix of academic and industry related research makes them a leader in cannabinoid research in Canada and around the world.

While incorporating their work has opened new doors for their research, their focus and end goal has remained unchanged.



"We are determined to make the lives for people suffering with pain and inflammation better," said Dr. Mary Lynch. "I am confident we will do that."

Jason McDougall explores how cannabinoids can control joint pain

Department member **Jason McDougall, PhD** (Departments of Pharmacology and Anesthesia) is also a noted expert on the use of cannabis in treating various kinds of chronic pain, with a focus on gaining a deeper understanding of the mechanisms behind arthritis pain. He is currently investigating how the body's endocannabinoid system functions to relieve arthritis pain naturally, and how cannabinoids and opioids can best be used to control joint pain. He is also exploring the potential of topical analgesics containing THC-free synthetic cannabinoids to deliver local pain relief with no psychotropic side-effects.



Panag Pharma Inc. team, L-R: Ms. Sara Whynot, and founders Dr. Christian Lehman, Dr. Mary Lynch, Melanie Kelly, PhD, and Dr. Orlando Hung.

*Anesthesia, Pain Management
& Perioperative Medicine*

Awards of Excellence

April 26, 2017



Celebrating Excellence

The Department of Anesthesia, Pain Management and Perioperative Medicine is home to award-winning clinicians and scholars. Throughout the year, students, colleagues and institutions have recognized Department members for their talent and expertise.

A sample of provincial and national awards included **Dr. Ian Morris** receiving the Royal College of Physicians Surgeons of Canada with the Prix d'Excellence Specialist of the Year Award Region 5; **Dr. Romesh Shukla**, the Distinguished Service Award from Doctors Nova Scotia; **Dr. Brian MacManus** the IWK Dr. D.A. Gillis Award and **Dr. Mary Lynch** received the Dr. Helen Hays Award for Excellence in Pain Management, Chronic Pain Association of Canada.

Awards of Excellence Gala

In April the Department hosted its 5th Annual Awards of Excellence Gala where it showcased and celebrated its 2017 honourees. The award winners were nominated by their colleagues for their expertise, commitment to innovation and advocacy and unwavering dedication to their patients.

Dr. Jennifer Szerb

Dr. Tom Marrie Leadership Award

Dr. Szerb championed the Department's world-class Regional Anesthesia program, spearheaded the Dalhousie Regional Anesthesia Fellowship program, recently developed a mentorship project, and provided ongoing service to improving patient care in the developing countries Bolivia and Rwanda.

Mr. Gill Hatton, Anesthesia Assistant Dale Morrison Award

Gill Hatton is a champion of children's health. He routinely goes above and beyond to ensure care is provided when and where it is needed. He is a quiet leader and mentor, deeply committed to creating safe, organized and smooth running clinical care.

Ms. Kim Betts, Anesthesia Technician Dale Morrison Award

Known for her skill, professionalism and humour, Kim demonstrates an innate ability to anticipate the needs and preferences of her colleagues, respond to crises and set priorities. In addition to her exemplary clinical expertise, she interacts with all patients with great warmth and a positive attitude.

Ms. Kathryn Ingram, Anesthesia Assistant

Individual Internal Award of Excellence

As the Lead Anesthesia Assistant in the Regional Block Room at the Halifax Infirmary, Kathryn has used determination, skill, diplomacy and humour to help make the Regional Block Program an internationally renowned academic service. From administration to education to patient care her kind, sensitive and diplomatic nature brings comfort and confidence to all she works with.

Drs. Margaret Casey, Stewart Forbes, Charlotte Edwards and Richard Roda (residents)

Team Internal Award of Excellence

These four anesthesia residents took the initiative to review and revitalize the medical student teaching curriculum for anesthesia rotation and elective. Exemplifying the Department's commitment to excellence in education, this refreshed curriculum established a standardized



Dr. Ian Morris receives the Royal College of Physicians Surgeons of Canada with the Prix d'Excellence Specialist of the Year Award Region 5. L-R: Drs. Robert LaRoche (Royal College), Ian Morris and Gordon Launcelott (nominator).

learning experience and offered teachers an improved understanding and preparedness for what was expected of them.

VG Preadmission Clinical Staff

Team (External) Award of Excellence

The VG Preadmission Clinical staff were instrumental in successfully integrating research into clinical care. Going above and beyond their job descriptions, they effectively recruited patients into a research study, and significantly contributed to the study's operation, by welcoming the research into their work space, offering solutions to problems and collaborating with clinicians and staff.



Research Day Winners 2017

Hamed Hanafi - Top Poster

A high-throughput zebrafish system for analysis of long term effects of anesthesia on learning and memory [Hamed Hanafi, Nancy Kilcup, Florentin Wilfart, Z. Ford, D. Roach, & Michael Schmidt]

Matthew Ta - Undergraduate – 1st

Anesthesia residents' experiences with standardized feedback to assess clinical competencies [Matthew Ta, Ana Sjaus, Krista Ritchie, Allana Munro, & Ron George]

Emma Cameron - Undergraduate – 2nd

Exploring Parent-Reported Perioperative Distress Behaviours in Children with Autism Spectrum Disorder [Emma Cameron, Stephanie Snow, Isabel Smith, & Jill Chorney]

Ian Burkovskiy - Graduate – 1st

Attenuation of CNS Damage and Prevention of Post CNS-Injury Immune Consequences by Cannabinoid 2 Receptor Activation [Ian Burkovskiy, Juan Zhou, & Christian Lehmann]

Melissa O'Brien - Graduate – 2nd

Cannabidiol attenuates the activity of joint nociceptors in a rat model of osteoarthritis [Melissa O'Brien & Jason J. McDougall]

Dr. Sushil Sancheti - Resident/Fellow – 1st

Efficacy and safety of intrathecal fentanyl for caesarean delivery: A systematic review and meta-analysis of randomized controlled trials [Margaret Casey, Sushil Sancheti, Susanne Retter, Vishal Uppal, & Dolores M. McKeen]

Dr. Derek Wong -Resident/Fellow – 2nd

Pharmacy-Prepared Emergency Medication for Cardiac Anesthesia - A Quality Improvement & Cost Study [Derek Wong, Vivian Wang, & Victor Neira]

Award Winning Educators

The Department places great importance on medical education and offers high-quality medical education programs. Its success is largely due to its talented group of educators.

Dr. Rochelle MacLellan

Undergraduate Teacher of the Year

Dr. André Bernard

Clinical Teacher of the Year

Dr. Karim Mukhida

Resident Mentor

Dr. Shannon Bradley

Resident Advocate

Dr. Sylvie Aucoin

New Brunswick Teacher of the Year

Dr. Margaret Casey (PGY3)

Anesthesia Resident Teacher of the Year

Dr. Janice Chisholm

2017 Dalhousie Faculty of Medicine Excellence in Education Award

Oliver Hatheway

Undergraduate Student Award

Appendix

Appendix A

2016 New Funded Research Projects

1. Lehmann C, Lynch M, Arora N, Xia Y, Zhou J, Kelly M (2016-2017). Cannabinoids in experimental cystitis [Grant] – Innovacorp – \$43,000.
2. Hashmi JA (2016-2021). Title [Grant] – CFI – \$364,599.
3. Noel M, Chorney J, Graham S, Rasic N. (2016-2017). The Sociolinguistic Context of Pain Memory Development in Young Children [Grant] – American Pain Society (Future Leaders in Pain Research Grant) – \$33,333.
4. Rosen N, George RB, Chorney J, Snelgrove-Clarke E, Pirece M, Andreou P, Binik Y (2016-2019). A longitudinal study of biopsy chosocial predictors of postpartum genito-pelvic pain: 12 and 24 months later [Grant] – NSHRF – \$150,000.
5. Schmidt M, Roach DC (2016-2017). Technical verification of memsorb device performance against industry standard devices [Industry Contract] – NRC-IRAP – \$47,097.
6. Hashmi JA (2016-2021). Canada Research Chair Tier II (Pain) [Grant] – CIHR – \$500,000.
7. Uppal V, McKeen D, Doyle P, Allen V, Kwofie K (2016-2017). A randomized controlled trial comparing intrathecal morphine with quadratus lumborum block as part of a multimodal analgesia strategy for post-cesarean delivery analgesia [Grant] – Dalhousie – \$5,000.
8. Uppal V, Shanthann H, Prabhakar C, McKeen DM (2016-2017). Intrathecal Hyperbaric Versus Isobaric Bupivacaine For Adult Non-Caesarean Delivery Surgery: Systematic Review And Meta-Analysis [Grant] – IWK – \$3,000.
9. Wozney L, Hong P, Chorney J (2016-2018). Tonsil-Text-To-Me (Tonsillectomy): utilizing a short message service (SMS) to improve perioperative tonsillectomy care [Grant] – IWK – \$60,000.
10. Curran J, Chorney J, Ritchie K, Lawrence L, Helwig M (2016-2017). Mapping the evidence supporting parent engagement in designing health interventions for a paediatric context [Grant] – NSHRF – \$14,996.
11. Uppal V, Kwofie K, Retter S, Ke J, Trenholm A (2016-2017). Single dose controlled release hydromorphone as preemptive analgesia to prevent rebound pain after single shot interscalene block for rotator cuff repair surgery: a randomized placebo controlled trial [Grant] – Central Zone – \$5,000.
12. Hung O, Milne A, d'Entremont M (2016-present). Lightwand prototype [Industry Contract] – Innovacorp Early Stage Venture Capital (Productivity and Innovation Voucher) – \$15,000.
13. Chorney J., Allen S., Smith I (2016-2017). Identifying Ways to Improve the Perioperative Experience for Children with Autism Spectrum Disorder [Grant] – Department of Anesthesia, Pain Management and Perioperative Medicine – \$5,000.
14. Lehmann C (2016-2017). pulmo-PROTECT – Multimodal concepts for pulmonary protection and treatment of lung injury [Grant] – Department of Anesthesia – \$15,000.
15. Lehmann C (2016). Cellular physiology of iron in inflammation and infection processes: Novel Fe chelator responses in experimental model systems [Grant] – MITACS – \$5,000.
16. McDougall J (2016-2017). Assessment of Pharmin USA formulation in the control of osteoarthritis pain [Industry Contract] – Pharmin USA – \$22,890.
17. Mullen TJ, Law JA, Malpas G, Tan CH (2016-2017). Apneic Oxygenation via Nasal Cannulae: 15 L/min vs High-Flow [Grant] – Dalhousie – \$5,000.
18. Lehmann C, Zhou J, Hoskin DW (2016-2019). Iron-related mechanisms in immune cell function [Grant] – NSERC CRD – \$478,602.
19. Noel M, Chorney J, Rasic N. (2016-2017). The sociolinguistic context of pain memory development in young children [Grant] – University of Calgary – \$15,000
20. Chorney J, Hong P, Curran J. (2016-2017). Developing an Electronic Decision Aid Tool [Grant] – NSHRF – \$10,000.
21. Buckley DN, Hudspeth M, Choinière M, Davis K, Diatchenko L, Finley GA, Fréchette P, Gilron I, Iorio A, Latimer M, MacDermid J, Poulin P, Schneider C, Stevens B, Stinson J (2016-2021). SPOR Network: Caring for patients with chronic pain: Connecting patient needs with research and treatment across the lifespan [Grant] – CIHR – \$25,000,000.
22. Lehmann C (2016). Automated video analysis of immune cell activation and microvascular blood flow in the inflamed microcirculation [Grant] – NSERC – \$25,000.

23. Mukhida K (2016-2017). Barriers to and facilitators of workplace accommodation for patients with complex regional pain syndrome [Grant] – Dalhousie University Department of Anesthesia Internal Fund – \$5,000.
24. Kelly M, Lynch M (2016-2017). Novel formulations for ocular pain and inflammation [Grant] – Early Stage Commercialization Fund (ESCF) – Phase 2 – \$50,000.
25. Lehmann C (2016-2019). Strategies of Lung Protection in Acute Lung Injury [Grant] – CFI – \$308,467.
26. Chorney J, El-Hawary R, Campbell L, Taylor K. (2016-2017). Understanding family psychosocial needs to prevent postsurgical pain in children [Grant] – Department of Anesthesia, Pain Management and Perioperative Medicine – \$5,000.
27. Beyea S, Hashmi JA (2016-2017). Creating a new algorithm for data-driven processing of resting-state fMRI Networks [Grant] – Radiology Research Foundation – \$5,000.
28. Hanly J, Hashmi JA (2016-2017). Cognitive dysfunction in systemic lupus erythematosus: a pilot neuroimaging study [Grant] – NSHRF – \$15,000.
29. Kocum L, Loughlin C, Robinson L, Kehoe S, Maheu C, Mukhida K, Parkinson M, Younis T (2016-2018). Partnership for a Healthy Workplace Response to Breast Cancer [Grant] – CIHR – \$140,823.
30. Hung OR (2016-present). Difficult and Failed Airway Videos [Industry Contract] – McGraw-Hill Video Production Grant – \$15,000.
31. Hashmi JA (2016-2021). Predictive role of brain networks in pain modulations [Grant] – Natural Sciences and Engineering Research Council (NSERC) Discovery Grants Program – \$150,000.
32. Hong P, Chorney J, Bezuhly M, Roma R, El-Hawary R (2016-2018). Shared Decision Making in Pediatric Surgery: Development, Testing and Implementation of Decision Aids [Grant] – Department of Surgery, Dalhousie University – \$150,000.

Appendix B

Publications - 2016

Note that this list of publications only includes those peer-reviewed articles that are currently published and accessible online.

1. Hung O, Law JA, Morris IR, Murphy MF (2016). Incomplete airway assessment. *Anesth Analg*, 123(5), 1341. [Letter to the Editor – Published].
2. Emsley J, Hung O (2016). A "VL Tube" for endotracheal intubation using video laryngoscopy. *Canadian Journal of Anesthesia*, 63(6), 782-3. [Published].
3. Emsley JG, Hung OR (2016). Rationale for a modified endotracheal tube for intubation using video laryngoscopy. *Canadian Journal of Anesthesia*, 63(8), 989-90. [Letter to the Editor – Published].
4. Borbely E, Sandor K, Markovics A, Kemeny A, Pinter E, Szolscanyi J, Quinn JP, McDougall JJ, Helyes Z (2016). Role of capsaicin-sensitive nerves and tac1 gene-derived tachykinins in mast cell tryptase-induced inflammation of murine knees. *Inflammation Research*, 65, 725-736. [Published].
5. Botz B, Kemeny A, Brunner SM, Locker F, Csepregi J, Mocsa A, Pinter E, McDougall JJ, Helyes Z (2016). Lack of galanin 3 receptor aggravates murine autoimmune arthritis. *Journal of Molecular Neuroscience*, 59, 260-269. [Published].
6. Botz B, Brunner SM, Kemeny A, Pinter E, McDougall JJ, Kolfer B, Helyes Z (2016). Galanin 3 receptor-deficient mice show minor alteration in the oxazolone-induced contact dermatitis phenotype. *Experimental Dermatology*, 25, 725-727. [Published].
7. Betsch TA, Gorodzinsky AY, Finley GA, Sangster M, Chorney J (2016). What's in a Name? Healthcare Providers' Perceptions of Pediatric Pain Patients Based on Diagnostic Labels. *The Clinical journal of pain*. [Published] PubMed ID: [27922842](#).
8. Kiberd MB, Clarke SK, Chorney J, d'Eon B, Wright S (2016). Aromatherapy for the treatment of PONV in children: a pilot RCT. *BMC complementary and alternative medicine*, 16(1). [Published] PubMed ID: [27829428](#).
9. Doyle JM, Merovitch N, Wyeth R, Stoyek MR, Schmidt M, Wilfart F, Fine A, Croll RP (2016). A simple automated system for appetitive conditioning of zebrafish in their home tanks. *Behavioural Brain Research*, (317), 444-452. [Published] DOI: [10.1016/j.bbr.2016.09.044](#).
10. Maguire E, Hong P, Ritchie K, Meier J, Archibald K, Chorney J (2016). Decision aid prototype development for parents considering adenotonsillectomy for their children with sleep disordered breathing. *Journal of otolaryngology – head & neck surgery = Le Journal d'oto-rhino-laryngologie et de chirurgie cervico-faciale*, 45(1), 57. [Published] PubMed ID: [27809897](#).
11. The International Surgical Outcomes Study group [including George RB, Bernard AJ] (2016). Global patient outcomes after elective surgery: prospective cohort study in 27 low-, middle- and high-income countries. *British Journal of Anaesthesia*, 117(5), 601-609. [Published] PubMed ID: [27799174](#).
12. Curran JA, Murphy A, Burns E, Plint A, Taljaard M, MacPhee S, Fitzpatrick E, Bishop A, Chorney J, Bourque M (2016). Essential Content for Discharge Instructions in Pediatric Emergency Care: A Delphi Study. *Pediatric emergency care*. [Published] PubMed ID: [27902672](#).
13. Sharawy N, Hussein A, Hossny O, Refaa A, Saka A, Mukhtar A, Whynot S, George R, Lehmann C (2016). Effects of haemoglobin levels on the sublingual microcirculation in pregnant women. *Clinical hemorheology and microcirculation*, 64(2), 205-212. [Published] PubMed ID: [27258200](#).
14. Burkovskiy I, Lehmann C, Jiang C, Zhou J (2016). Utilization of 3D printing for an intravital microscopy platform to study the intestinal microcirculation. *Journal of microscopy*, 264(2), 224-226. [Published] PubMed ID: [27333217](#).
15. Bostick GP, Kamper SJ, Haanstra TM, Dick BD, Stitt LW, Morley-Forster P, Clark AJ, Lynch ME, Gordon A, Nathan H, Smyth C, Ware MA, Toth C, Moulin DE (2016). Pain expectations in neuropathic pain: Is it best to be optimistic? *European journal of pain* (London, England). [Published] PubMed ID: [27739623](#).
16. Racine M, Moulin DE, Nielson WR, Morley-Forster PK, Lynch M, Clark AJ, Stitt L, Gordon A, Nathan H, Smyth C, Ware MA, Jensen MP. (2016). The reciprocal associations between catastrophizing and pain outcomes in patients being treated for neuropathic pain: a cross-lagged panel analysis study. *Pain*, 157(9), 1946-53. [Published] PubMed ID: [28146042](#).

17. Higgins KS, Gillis J, Williams JG, LeBlanc M, Bezuhly M, Chorney JM (2016). Women's Experiences With Flap Failure After Autologous Breast Reconstruction: A Qualitative Analysis. *Annals of plastic surgery*. [Published] PubMed ID: [27740955](#).
18. Merovitch M, Doyle JM, Wyeth RC, Stoyek MR, Schmidt MK, Wilfart FM, Fine A, and Croll RP (2016). Data on horizontal and vertical movements of zebrafish during appetitive conditioning. *Data in Brief*, 9, 758-763. [Published] PubMed ID: [PMC5097951](#).
19. Hall R, Beattie S, Grocott HP, Mazer CD, Turgeon AF, Denault A, Yang H, Lalu MM, George RB, Sampson S, McDonald H, members of the Canadian Perioperative Anesthesiology Clinical Trials Group (PACT) Steering Committee (2016). Can we create a Canadian Perioperative Anesthesia Clinical Trials Group? We review the first five years and glimpse into the future. *Canadian Journal of Anesthesia*, 63, 1215-1222. [Editorial – Published] DOI: [10.1007/s12630-016-0719-6](#).
20. Lehmann C, Fisher NB, Tugwell B, Szczesniak A, Kelly M, Zhou J (2016). Experimental cannabidiol treatment reduces early pancreatic inflammation in type 1 diabetes. *Clinical hemorheology and microcirculation*. [Published] PubMed ID: [27767974](#).
21. Carvalho B, George RB, Cobb B, McKenzie C, Riley ET (2016). Implementation of Programmed Intermittent Epidural Bolus for the Maintenance of Labor Analgesia. *Anesthesia and analgesia*, 123(4), 965-71. [Review – Published] PubMed ID: [27464978](#).
22. Longard J, Twycross A, Williams AM, Hong P, Chorney J (2016). Parents' experiences of managing their child's postoperative pain at home: an exploratory qualitative study. *Journal of clinical nursing*, 25(17-18), 2619-28. [Published] PubMed ID: [27349504](#).
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