

Department of Anesthesia, Pain Management
and Perioperative Medicine

Annual Report

2017-2018



**DALHOUSIE
UNIVERSITY**

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

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Message from the Head



Our Department has created and sustained a solid reputation of being system-minded and solution driven.

With immense support from my Associate Head, **Dr. Adam Law**, staff, Cabinet and Site Chiefs, the Department of Anesthesia, Pain Management and Perioperative Medicine experienced another exceptional year of raising the bar in how we provide care, educate our medical learners and pursue leading-edge research.

Our Department has created and sustained a solid reputation of being system-minded and solution driven. Members from our team are continually called upon to set national and provincial quality improvement standards, build the way we deliver education in the future and help shape how care will be delivered for decades to come through, for example, the QEII redevelopment project.

When I look at our past year, I am proud of our continued display of excellence in education. The Office of Education continues to set the bar high in how it provides an excellent learning experience for all our learners – from medical students to our Fellows. This year they participated in a new exploratory residency summer program which showcased anesthesia as a career choice for medical students. This resulted in an impressive 45 per cent of the students finishing the program with an increased interest in the specialty (see page 17).

Likewise, our Office of Research continues to grow in its service delivery while keeping an eye on the evolving research environment, which enables us to provide relevant support. In particular, they are showing great leadership in their support and emphasis on the value of engaging patients in research studies.

The Department takes pride in knowing the value of an effective and efficient administrative function. It supports each individual to do their best. This past year we continued to push forward in being more accountable and forward thinking. We have refined our financial practices to increase our transparency and accountability, and we have laid groundwork to create an inviting environment to mentor, support and encourage our physicians to consider leadership roles in the future. A supportive and seamless transition within our leadership teams helps ensure we maintain momentum and are surrounded by leaders with expertise and skills that support the Department's drive for excellence.

I also want to congratulate our many members who were honoured this past year (see page 27). We are home to many professionals who exude excellence in what they do: respected teachers, ground-breaking researchers, innovative clinicians and trail-blazing leaders. We are fortunate to call them our colleagues and be able to benefit from their contributions every day.

I hope you enjoy reading our Annual Report and learn more about this Department, which I am proud to be given the honour to lead.

Romesh Shukla, MBBS, DABA, FRCPC

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

Message from Cabinet Chair

Building foundation key to Department growth

From prudent financial management to strategic planning and talent development, this past year Cabinet has been focused on putting in place robust practices and policies designed to strengthen the Department and position it to be a productive and rewarding place to work.

Having solid financial practices is critical to any organization's success. This is especially important following the Department's three groups – Pediatrics, Women's and Obstetrics and QEII Adult – merging under one academic funding plan and introducing Department-wide shared ownership of operating costs. To ensure our finances are managed with the highest level of integrity, Cabinet has worked closely with an external firm to assess and modify, when required, our finance office's function. Cabinet also supported restructuring the Offices of Education and Research to ensure their organization structures aligned with our broader scope.

Through a sub-committee, Cabinet has also begun the work to establish a consistent process to allocate protected time. Protected time serves an important function, where individuals are supported with focused time to advance the Department's mandate for excellence in both education and research. Cabinet wants to ensure this is done in a fair and consistent fashion. The group is expected to put forward recommendations by the end of 2018.

Recognizing a strong leadership team is a large part of having a high-functioning, positive and productive Department, Cabinet has also overseen the creation of a Talent Development Plan that will help promote and encourage a robust leadership team. The plan identifies critical positions that require specific leadership skills, sets criteria for selecting leadership candidates and establishes a process to identify and support Department members who show interest or aptitude for future leadership positions. In creating the plan, the Department is also demonstrating the value in growing and supporting its members in leadership development. The Plan is expected to be implemented later in 2018.

As Cabinet Chair, it has been a pleasure to participate in this role and help lead our Department into new territory, where we are fostering unity and working toward our vision of creating a Department responsive to the anesthesia care needs of our Maritime community while providing international leadership in anesthesia education and research.

Sincerely,



André Bernard, MD, MSc, FRCPC
Cabinet Chair

Cabinet

Dr. André Bernard (Chair)

Dr. Romesh Shukla, Head and Chief

Dr. Adam Law, Associate Head

Dr. Janice Chisholm, Victoria General Site, QEII Health Sciences Centre, Site Chief

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

Dr. Robyn Doucet, Program Director – Postgraduate

Dr. Claudio Diquinzio (Member-at-Large)

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

Dr. Blaine Kent, Halifax Infirmary Site, QEII Health Sciences Centre, Site Chief

Dr. Bruce Macaulay (Member-at-Large)

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

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











Approx. **78,000** procedures provided

90 anesthesiologists

31 anesthesia technicians and assistants

30 residents & **6** fellows

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

	Orthopaedic surgeries	6,822	 3%
	Ear, Nose Throat (ENT)	1,632	 1%
	Ophthalmology	7,687	 6%
	Urology	5,479	 7%
	Plastic Surgery	1,581	 2%

Data is compared to 2016-17

Cases By Subspecialty

Acute Pain Service
1,311 new consults

Adult Pain Management
7,757 clinic visits

Acute Pain Management
1,293 new patients

Blood Management Services
1,756

Cardiac
2,474 cases

Liver Transplantation
23 cases

Neuroanesthesia
1,208 cases

Pre-Anesthesia
8,042 patients seen

Pediatric Pain Management
1,274 patient visits

Pediatric Anesthesia
6,039 patients seen

Thoracic
979

Women's and Obstetrics
7,986

Education

185
Faculty

13%
with professorship
status

138
Medical
Undergrad
Learners

22
off-site learners
103
other learners

31
Residents

6
entering first year

6
Fellowships

Cardiac
Women's & OB
Pediatric
Global Health
Airway
Regional Acute Pain

Undergraduates



802 undergraduate teaching hours
22 off-site remote rotations

Postgraduates



59 off-service or visiting elective residents
5 off-service residents in Saint John, NB

Professional Development



37 grand rounds sessions
11 conferences supported
4 journal clubs hosted

Research



20 Researchers
(total of **6.9** full time equivalent
protected time)



\$8.1 Million in grants &
industry funding



22 New Projects



92% Collaborative Projects



127 Publications



101 Presentations



Excellence in Patient Care

Team

Dr. Greg Dobson, Director

Dr. Andrew Milne, Associate Director

Mr. Paul Brousseau, Quality Officer and Data Analyst

Ms. Vicki Christian, Administrative Assistant



Dr. Gregory Dobson receives Tom Marrie Leadership Award.

Quality leads way to continuous care improvement

Recognized nationally for its leadership, the Quality Improvement and Patient Safety Office is focused on the Department's continuous improvement in patient care and safety. Its services range from hosting morbidity and mortality rounds to advancing original quality improvement research. They also develop national practice guidelines, issue quality safety alerts and offer their expertise to a variety of committees and research projects.

This past year the team has been intentionally growing and enhancing its access and use of quality data from electronic records, which supports high-quality evidence-based decisions.

The team is also a source of education, support and guidance to help physicians and residents navigate adverse events, including helping them communicate with patients and families.

A sample of this past year's work included:

- helped revise and update the Canadian National Anesthesia Guidelines;
- published a review article on cardiac arrest in the operating room, and editorial on neuromuscular monitors;
- presented quality improvement research on lidocaine nebulizer flow rates, reporting of unexpected intra-operative events and a survey of provincial anesthesia departments quality practices;
- performed a quality audit of airway carts and kits across numerous hospital locations;
- supported multiple anesthesia resident and RIM medical student research projects;
- presented to the NSHA Zone Medical Advisory Committee on departmental quality improvement initiatives;
- reviewed and responded to local quality improvement/safety events in the province-wide Safety Improvement and Management System (SIMS);
- offered expert advice on hospital-wide case reviews;
- hosted nine morbidity and mortality education rounds; and,
- provided quality improvement and patient safety education sessions for residents and new staff.

The quality office's contributions and impact were further recognized this year when its Director, Dr. Greg Dobson was honoured at the Department's Awards of Excellence event.



What We Do

Our Patient Care service delivery includes:

Specialized anesthetic services in:

- Acute pain management, including regional block
- Blood management services
- Chronic pain management
- Cardiac
- Neurosurgery
- Pediatric
- Pre-anesthesia assessment
- Thoracic
- Transplantation
- Women's and obstetric anesthesia

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 Chiefs and Site Chiefs are:

Dr. Kevin Bent, Dartmouth General Hospital, Site Chief

Dr. Janice Chisholm, Victoria General Site, QEII Health Sciences Centre, Site Chief

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

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

Dr. Alison Kelland, Hants Community Hospital, Site Chief

Dr. Blaine Kent, Halifax Infirmary Site, QEII Health Sciences Centre, Site Chief

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

Dartmouth General

The Dartmouth General anesthesia team, led by Site Chief **Dr. Kevin Bent**, has six full-time anesthesiologists and one part-time, covering four operating rooms, pre-anesthesia clinics and an acute pain service. The group also actively educates medical students and residents.

The Dartmouth General is part of the QEII redevelopment plan, where this group is preparing for the planned expansion which includes forecasting future operation needs, clinical processes and staffing requirements. In 2020, they expect to be working within the expanded site which will see their operating rooms double to eight.



5,486 anesthetics given in the operating suites

1,123 pre-op consultations

1,430 visits in the Chronic Pain Clinic

4,178 treatments were given at the Nova Scotia Hospital

Hants Community Hospital

The Hants Community Hospital's anesthesia team, led by Site Chief **Dr. Alison Kelland**, are working within a newly renovated and expanded space, following a six-month closure during the renovations. While the renovations resulted in a decrease of activity (down 49 percent) during this past year, the new space provides two operating rooms, an endoscopy suite and the team now supports a new eye, ear, nose and

throat (EENT) surgical services. The team expanded its main Difficult Airway Care to include CMAC, Glidescope and flexible optic bronchoscope. A new Pixys system for drug storage and management has also been introduced into the Hants facility.

Thanks to the skills and organization of Dr. Kelland and a rotation of colleagues from the Halifax sites, the team has low post-operative re-admission rates (0.6 per cent) and day of surgery cancellations (0.9 per cent).



335 cases – (down 49%*)

**Operating rooms closure during renovations*

Halifax Infirmary

Halifax Infirmary Site Chief, **Dr. Blaine Kent**, and his team provide anesthetic support for tertiary and quaternary surgical procedures for the population of Nova Scotia and the Maritime provinces. The team covers 15 operating rooms (ORs) and offers off-site anesthesia support for areas such as electrophysiologic ablation procedures and transcatheter aortic valve implants (TAVIs) and provides evening and 24-hour weekend coverage year-round.

The Halifax Infirmary group offers subspecialty expertise and service under the capable leadership of subspecialty chiefs: neuroanesthesia (**Dr. Carlo Mariotti**), regional anesthesia/block service (**Dr. Kwesi Kwofie**), cardiac anesthesia (**Dr. Myron Kwapisz**) and pain management (**Dr. Ian Beauprie**). See more about the subspecialty services on page 11).

Publication

Celebrating 50 years of anesthesia technology

2018 marked the 50th anniversary of anesthesia technology, although its history goes much deeper than half a century. With a passion to both preserve and celebrate the long and rich history of anesthesia technology, **Dan Cashen** the Department's former Anesthesia Department Manager, now retired, wrote a paper "*The Introduction of Anesthesia Technology in Halifax*".

Cashen takes readers on a journey that starts in 1846 when the first public demonstration of using ether as an anesthetic was first displayed. From there they relive the significant role anesthesia played during periods of conflict and witness the evolution of anesthesia technicians; a now invaluable addition to the Department.

The paper's release was a timely commemorative to help celebrate 50 years of anesthesia technology. The paper can be found at <https://medicine.dal.ca/departments/departments/sites/anesthesia.html>

Anesthesia assistants (AA) continue to provide an essential service, exercising their airway skills in the operating room

Always with a goal to expand and optimize the full team's experience, the anesthesia assistants (AAs) are now trained to look after patients undergoing pacemakers and cardiac resynchronization therapy in the Electrophysiology Suite under the auspice of the Cardiac Anesthesia group.

Meanwhile **Drs. Janice Chisholm, Blaine Kent** and **Tobias Witter** led the process to introduce a new provincial "Smart Pump" – syringe and large volume infusion pump. The full roll-out is planned for next year, however the Department began using the new syringe pumps in September.

Dr. Edmund Tan is developing new curriculum for residents and Fellows to learn Echo. The group has also made several refinements to the "handover" of critically ill patients between the intensive care unit (ICU) and the operating room and back to the ICU to streamline the transfer of care of these challenging cases.

As part of the initiative to increase the number of orthopedic total joints performed, the Department's executive is supporting efforts to hire new orthopedic surgeons and anesthesiologists, purchase new equipment and define treatment pathways. The \$6.4 million investment announced in October 2017 is intended to address the long wait lists for hip and knee surgeries.

The Department also continues to provide leadership with the planned renovations of the Hybrid OR and PACU facilities.



11,641 Halifax Infirmary cases
(down 1 per cent)

120 Halifax Infirmary hours in Post Anesthesia Care Unit (PACU) (up 75%)

Victoria General Site

The Victoria General site, overseen by Site Chief **Dr. Janice Chisholm**, serves 11 operating rooms and a lithotripsy unit. On-call operating room coverage is provided 24/7, including 24/7 call for thoracic emergencies and liver transplantation. Service to interventional radiology and endoscopy is provided on request.

Anesthesia assistants (AA) continue to provide an essential service, exercising their airway skills in the operating room; each AA on average performs eight endotracheal intubations per month, in addition to laryngeal mask placement and other procedures. As time permits, the AAs also assist in difficult peripheral vascular access outside the operating room on request when there is difficulty in being able to place an IV cannula.





184 services at Brachytherapy Unit
(up 32%)

16,391 cases in the OR
(4 per cent decrease)

Subspecialty Care

Anesthesia, Pain Management & Perioperative Medicine Department provides anesthesia care to meet diverse patient care needs. The Department's skilled clinicians offer nine sub-specialty services to patients in Halifax, and across Nova Scotia and the Maritimes. The specialized programs also offer an ideal learning environment for medical students, residents and fellows.

Adult Acute Pain Management and Regional Anesthesia

Subspecialty Chief **Dr. Kwesi Kwofie**, grew his team this year with the addition of a part time research coordinator who has helped improve research capacity. The consistent growth and productivity in research within the Regional Anesthesia and Acute Pain Group is apparent. This year the team has at least 14 on-going research projects, published nine peer reviewed publications and participated in both investigator-driven and industry-partnered international multi-centre clinical trials.

The clinical output of the block room has increased by 15 per cent with 2,535 regional anesthesia procedures performed last year. APS consultations at the VG and HI have also increased by four per cent over the previous year. The team continues to offer a home catheter service that provides excellent prolonged analgesia for patients, which

improves home recovery, increases patient satisfaction and decreases hospital length of stay.



2,535 regional anesthesia procedures



1,311 new consults Acute Pain Service (VG & HI)



32% of consults were with Highly Opioid Tolerant (HOT) patients

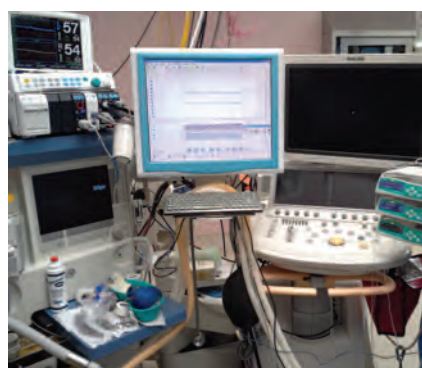
Blood Management Services

Led by **Dr. Blaine Kent**, the Perioperative Blood Management (PBM) Service focuses on improving perioperative management of blood transfusion and adjuvant therapies and reducing the risk of adverse outcomes associated with transfusions, bleeding, or anemia. With an ultimate goal to improve patient outcomes, PBM relies on approaches that detect and treat perioperative anemia and reduce surgical blood loss and perioperative coagulopathy to harness and optimize physiological tolerance of anemia. This year the service expanded with patient referrals to the Dartmouth General.

The group has also updated its Practice Guidelines for Perioperative Blood Management and International consensus statement on the peri-operative management of anemia and iron deficiency to align with current evidence.

With a commitment to continuing education, the PBM service hosted its 11th annual Blood and Beyond Conference which brings together professionals across disciplines to expand their knowledge and understanding of a wide variety of topics related to hemostasis and coagulation and perioperative best practice. New this year was a Per-





With a focus on improving care through research, the team has seven studies underway...

cutaneous Tracheostomy workshop at the Simulation Centre, providing participants the opportunity to perform tracheostomy on cadavers.



1,756 patient visits

** short-term decline in staff*



441 new patients

Cardiac Anesthesia

Under the leadership of Subspecialty Chief **Dr. Myron M. Kwapisz**, the cardiac anesthesia group provides anesthesia care for the most difficult cases, including repair of thoracic and thoracoabdominal aortic aneurysm, aortic root and/or arch repair with deep hypothermic circulatory arrest, insertion of right and/or left ventricular assist devices and heart transplantation. The group also performs state-of-the-art transesophageal echocardiography (TEE) and transthoracic echocardiography (TTE). After extensive teaching and training in cardiac anesthesia, anesthesia assistants are now able to help with complex inductions, transfer of critical ill patients and provide monitored anesthesia care for device implantations like pacemakers and ICDs.

The group has also introduced a first-of-its-kind combined rounds between cardiac anesthesia and cardiology, while revising the combined rounds between cardiac anesthesia and cardiac surgery. With a focus on improving care through research, the team has seven studies underway ranging from enhancing recovery in cardiac surgery to the use of cardiac emergency medications in cardiac anesthesia.



2,474 cases

Neuroanesthesia

The Neuroanesthesia team, led by **Dr. Carlo Mariotti**, provides 24-hour, high-quality, subspecialty anesthesia care for coil embolization of cerebral aneurysms, neuro-interventional management of acute thrombotic stroke patients, head trauma, spinal anomalies and other procedures on an elective and emergency basis.

Always driven to create efficiencies to see more patients on a timely basis, the team introduced a new process where operating room time was reserved on a set day each week allowing them to perform more elective coil embolization.

The group also hosted a team retreat with the entire neuro operating room team (anesthesia, surgeons, nurses) to improve communication and efficiency in the neuro OR and increase the number of cases completed during weekday hours. The team walked away with a clear action plan to improve patient flow, operating room turnover and optimize case bookings.



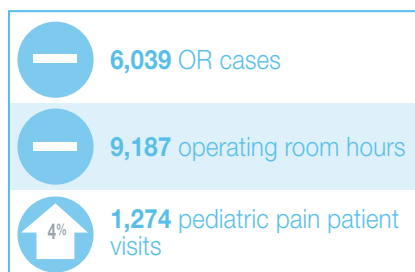
1,208 cases

Pain Services

Pediatric Anesthesia

Pediatric Anesthesia Chief, **Dr. Scott Drysdale**, and his team are responsible for providing anesthesia, consultative and pain management services to neonates, infants, children and adolescents of the Maritime provinces. This Department offers the safe delivery of anesthetic care to its patient population in a skilled and compassionate manner.

Accomplishments of the past year included securing new funding to grow the Complex Pain Team by a 0.2 full-time equivalent to help address wait times for this patient population, expanding the services (with new funding) of the spine team to conduct an additional 29 corrective spinal surgeries and launching a Collaborative Procedural Sedation pilot program to improve access to sedation for painful procedures across the children's programs. The group's BALANCE Team was also honoured for its work with children with Autism Spectrum Disorder (see Awards of Excellence on page 27).



Adult Pain Management Services

Dr. Ian Beauprie is the Medical Director of the Pain Management Unit. He and his team serve patients at the QEII Dickson Centre and Victoria Building, the Hants Community Hospital and until recently the Dartmouth General Hospital. The PMU continued to offer its Group Medical Visit this year, hosting 34 sessions for 573 patients. These group sessions are offered to all new, non-urgent patients. The service receives high praise from patients and has helped to significantly reduce the waitlist for the QEII and Hants sites.

Despite the closure of the Dartmouth General site this past year and the loss of 0.7 full time equivalent physicians, the PMU managed to see more new patients this year and did largely the same volume of clinic visits. This is a significant accomplishment under difficult circumstances. The Pain Management Team is committed to sharing its expertise and growing its knowledge in pain management through research. They serve as go-to experts for local media, host conferences including the Atlantic Pain Conference, and offered 79 presentations at an international, national and local level this past year. This year, its four researchers have been involved in 16 studies.



A recent international survey showed the Department's liver transplant practice is state of the art and compares favourably to other high volume centres in North America and Europe.



Pre-Anesthesia

Under the leadership of **Dr. André Bernard**, pre-anesthesia clinics are offered at both the Halifax Infirmary (HI) and Victoria General (VG) sites to evaluate, risk stratify and optimize patients scheduled for elective surgery. While the function of these clinics is predominantly to assess patients scheduled for admission following surgery (same day admission), clinic staff also assess high risk or medically complex ambulatory surgical patients based on screening.

The clinics, which typically see 15 patients per day, are run by a group of registered nurses, pharmacy technologists, a dedicated ward clerk and anesthesiologists. Together, this group is focused on preparing patients for their surgical experience.

This year the group adopted the new Canadian Cardiovascular Society (CCS) *Guidelines on Perioperative Cardiac Risk Assessment and Management for Patients Who Undergo Noncardiac Surgery*. The new guidelines recommend preoperative NT-proBNP testing for a select group of patients to help guide risk assessment and facilitate postoperative care. The team continues to implement Choosing Wisely Canada guidelines to reduce unnecessary testing. In May 2018, **Dr. David MacDonald** assumed the role as Pre-Anesthesia Medical Director.

7% 8,042 cases

Thoracic Anesthesia

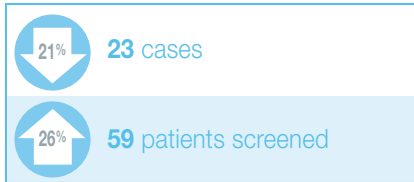
The thoracic anesthesia team, led by **Dr. George Kanellakos**, provides anesthesia services for thoracic surgery cases performed at the QEII. Case complexity includes all types of thoracic surgery, from straightforward lung surgery procedures to complex mediastinal mass resections (with the exception of lung transplantation).

The team is highly engaged in departmental activities and supports the Department's education and research mandate. Demand for thoracic anesthesia services is projected to increase with the active recruitment of another thoracic surgeon as more patients are referred from other parts of the province and Atlantic Canada.

2% 979 cases

Liver Transplantation

Subspecialty Chief, **Dr. Arnim Vlaten**, and his liver transplantation anesthesia team provide high quality care for patients undergoing liver and combined liver/kidney transplantation. A transesophageal simulation workshop on perioperative TEE was offered to all staff again this year, allowing all staff to now use TEE to guide hemodynamic management. Together with three members in the group who are fully trained in perioperative transesophageal echocardiography, the team uses TEE in all liver transplantations, except cases with absolute contraindications. A recent international survey showed the Department's liver transplant practice is state of the art and compares favourably to other high volume centres in North America and Europe.



Women and Obstetrics

Women and Obstetrics Chief, **Dr. Rob Nunn**, and his team of 19 specialty trained anesthesiologists provide 24-hour/7 days per week in-house anesthesia care. It offers an active labour analgesia/anesthesia service and serves gynecology and breast health anesthetic needs. The group has an active Acute Pain Service, Same Day Ambulatory Clinic and Anesthesia Consultation Service, while providing an integral service to the Cardiac Arrest Team.

This past year the group managed the pressure of limited OR availability for urgent caesarean deliveries, which is now being resolved through the renovation and enhancement of an operating room which will be on stand by for emergency caesarean cases. Two additional operating rooms are also being renovated to support gynecology surgery.

The group adopted new scheduling software, *Open Tempo*, to enhance and create efficiencies in the scheduling process, which also supports Department-wide integration as the software is used by the rest of the Department. Results are slowly being realized as the team diligently strives to further improve its OR efficiencies through defining efficiency markers, developing quality metrics, instituting new policies and ongoing evaluation.

The team makes significant contributions to the Department's overall academic and research mandates. Its



research efforts fall into three themes: perioperative, patient oriented and global health. This past year the team published 15 articles and provided 17 presentations. One of many notable research projects is the Enhanced Recovery After Surgery initiative (see page 23).



The team's research efforts fall into three themes: perioperative, patient oriented and global health.



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Excellence in Education

Office of Education Medical Director, **Dr. Narendra Vakharia**, and his team continue to offer a variety of education programs – across a spectrum of learning modalities. Programs are offered to hundreds of learners, from medical students to practising clinicians interested in continuing professional development.

The team continues to host highly competitive medical elective programming, residency and Fellowship programs. It is also committed to supporting its current physicians in expanding their medical knowledge by hosting grand rounds and other continuing medical education opportunities.

This past year the Department expanded its simulation program to 28 sessions. This is a significant bump from the eight sessions offered only a few short years ago.

The Department also participated in the inaugural Pre-clerkship Residency Exploration Program (PREP) to gain early exposure to a variety of specialties and aid in their career decisions. Anesthesia was one of seven disciplines to participate in all portions of the program: half-day elective, skills sessions, specialty-specific workshops and lunchtime seminars.

The early exposure to anesthesia appears to have had an impact, with 14 students leaving the program listing anesthesia as their top three career choices. Eighteen students (or 45% of all participants) also noted that their interest in anesthesia as a career increased following the program.

The Department's effort to create a positive elective program was recently recognized by Dalhousie University. Here's what a few students said about the experience:



"I did several electives in anesthesiology and the Dal experience was superior in its orientation and effort placed in aligning learners with a preceptor. No other school was able to match the amount of time I spent with one staff and this was hugely important both for my learning and my CARMS application."

"Great preceptor and the most well organized and executed elective I did during 4th year."

"It's fantastic that a student is paired up with their main preceptor for several days during the elective to give the student a chance to show progress and demonstrate learning. The teaching sessions were fantastic!"

Leadership Team

Dr. Narendra Vakharia, Medical Director, Education and Simulation

Dr. Robyn Doucet, Program Director, Postgraduate

Dr. Shannon Bradley, 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

Anesthesia builds simulation training in low-resource regions

When Australian, **Dr. Adam Mossenson**, joined the global health fellowship with Dalhousie's Department of Anesthesia, Pain Management and Perioperative Medicine, he knew he was embarking on a unique opportunity. He had just joined a Department that was a leader in anesthesia education and training to low-income countries and the first Canadian department to offer an anesthesia global health fellowship. What he probably didn't know is that one short year later he would achieve much more than a fellowship; he was leaving a legacy in global education.

"Past work tells us that there are many low-resource regions where the majority of anesthesia providers work in relative isolation and under extreme pressure," said Dr. Mossenson. "Their training beyond secondary education is highly variable, can be quite limited, and with few opportunities for ongoing professional development. We wanted to create something that would support an immediate boost in safe delivery of essential anaesthesia, but also provide a program that would be sustainable."

With that in mind, Dr. Mossenson, alongside his Dalhousie supervisor **Dr. Patty Livingston**, and the Head of Anesthesia at the Rwanda Military Hospital, **Dr. Christian Mukwesi**, created the three-day Vital Anesthesia Simulation Training (VAST) Course. Dalhousie's Department of Anesthesia's Global Health Program, led by Dr. Livingston, has a ten-year history of working alongside Rwandan colleagues. The VAST Course reflects practice at the district hospital level and centers on anesthesia and resuscitation for

obstetrics, paediatrics and trauma as well as safe general surgery, pre- and post-operative care. There is a focus on non-technical skills, such as interpersonal communication and effective decision-making.

"The focus on non-technical skills was important to us," said Dr. Mossenson. "It is understood that up to 80 per cent of all adverse events in medicine are related to non-technical skills, or human factors. It is essential to prevent these adverse outcomes, and this is no less important in low-resource settings as here in Canada or Australia."

The program also offers a VAST Facilitator Course, where trainee-facilitators are mentored to develop new skills in simulation delivery, thus increasing the local capacity to deliver simulation-based education.

Throughout the development and testing, an interprofessional team of nurses and residents at both the University of Rwanda and Dalhousie played an important role in testing and iterative refinement of materials. The Course was successfully piloted with the support and partnership between the Department and the Canadian Anesthesiologists' Society International Education Foundation (CASIEF), Dalhousie University and the University of Rwanda and the Rwanda Society of Anaesthesiologists.

The course, refined after pilot testing, has been endorsed by the World Federation of Societies of Anaesthesiologists. Plans are underway for expansion, including offering four more courses in Rwanda later this year. There are also early discussions to explore expanding to Ethiopia, Burundi and potentially to under-served areas in Canada.



VAST Team: (L-R) Dr. Adam Mossenson, Dr. Patty Livingston, Dr. Christian Mukwesi and Michelle Murray

At the core of VAST is the desire to expand capacity for simulation based medical education in low-resource regions. Dr. Patty Livingston will be leading a research study to assess the Course's ability to improve participants' non-technical skills, and in particular retention of those skills over an extended period of time. The Department's Anesthesia Research Fund supported this study with a \$20,000 grant.

As for Dr. Mossenson, while he has recently returned to his home in Perth, Australia, his connection with the Department and its Global Health Program is here to stay. He plans to work alongside the Halifax team to expand the VAST Course's reach while growing his imprint on global health.

To learn more about the VAST Course, visit vastcourse.org.

Mentorships turned friendships bolster career paths

A junior staff anesthesiology mentorship program was introduced in 2018. The program, which pairs an established staff anesthesiologist with a new junior anesthesiologist, is the third segment to be added to the Department's mentorship plan. It complements the already existing senior/junior resident mentorship and staff/resident mentoring. The three streams aim to support new members during all stages of their learning and career paths.

Dr. David MacDonald joined the Department in 2017 and welcomed the support and guidance from his mentor **Dr. André Bernard**. The two had already enjoyed a mentorship relationship during Dr. MacDonald's residency, which evolved into a friendship.

"André has been incredibly helpful, from helping me decide on my sub-specialty to my latest career decision to take on the appointment as Medical Director for the Pre-Anesthesia Clinic," said Dr. MacDonald. "He has been instrumental in guiding me along my early career path."

Dr. MacDonald also reflects on the value of his mentorship during his early months in joining the Department. *"When I think back, there were so many times that I would have felt lost, had I not had André to turn to, especially when it came to things that you don't learn in medical school, like how to approach scheduling and on-call."*

In addition to being a mentee, Dr. MacDonald also gives back to the program as a mentor to residents. In 2017 he began mentoring **Dr. Ben Cairns**, a PGY4 resident. In their PGY3 year, the residents select their staff mentor and choosing Dr. MacDonald was an obvious choice for Dr. Cairns.

"I always admired Dave's work ethic, work-life balance, and easy-going attitude," said Dr. Cairns. "As my mentor, he is always available and routinely checks in asking how my week is going or what rotation I am on. He helps me progress through the residency program, provides advice before I start each new rotation, supports me after a difficult case, and he has become a good friend."

While the mentorship program is structured, the best outcomes are based on the mentor and mentee building a trusting and open relationship. From career planning to choosing the best area to live, to understanding the inner operations of the operating room scheduling, the mentorship is designed to be responsive and adaptive, progressing based on what works best for the mentee and mentor.

While early in the relationship the duo may benefit from a more formal meeting, the relationships quickly evolve to casual coffee conversations or even a quick text chat to address a specific question or concern. The true value is having a trusted person to turn to when needed.

Goodbye Residents & Fellows:

In 2018 the Department celebrated seven residents and four fellows who completed their next learning milestone with the Department. Congratulations to:

RESIDENTS:

Dr. Jon Bailey
Dr. Liem Ho
Dr. Kyle Jewer
Dr. Michael Konviser
Dr. Ravi Pallela
Dr. Kitty Turney
Dr. David Watton

FELLOWS:

Dr. Adam Mossenson
 Global Health
Dr. Hilary MacCormick
 Women's and Obstetric Anesthesia
Dr. Sarah Phipps
 Airway Management
Dr. Jane Colish
 Regional Anesthesia & Acute Pain



2018 Graduating Residents, L-R: Mike Konviser, Ravi Pallela, Kitt Turney, Liem Ho, Dave Watton, Kyle Jewer and Jon Bailey



Excellence in Research

Dr. Orlando Hung was re-appointed as the Department's Medical Director for the Office of Research earlier this year.

"I am proud to continue in this leadership role," said Dr. Hung. "While I believe we have a great deal to celebrate with our Department's research success, we still have work to do as we continue to raise the bar when it comes to how our Department supports, encourages and integrates research excellence into our everyday practice."

In 2018, the research leadership team grew to better represent the Department's diversity, with strong representation from each of the Department's three groups.

The Office of Research has also grown in its size and the services it offers. With the addition of a new Research Coordinator, **Flynn Bonazza**, the team provides its researchers with comprehensive support through every stage of a research study; from helping to define an idea, secure funding or engaging patients in the research, the capable, experienced team is there to help.

The support has been welcomed by both new and seasoned researchers.

"As a new researcher, I can honestly say that there is no chance my clinical trial would be where it is today without the support, guidance and advice from the Office of Research. They helped me navigate the very complex process, supported my research ethics board application, strengthened my funding applications and kept me focused and on track," said researcher **Dr. Edmund Tan**.

With an eye on best practice, the Office of Research has also strengthened its ability to meaningfully engage patients,

families and communities in Department research studies. Office of Research Project Coordinator, **Jillian Banfield** (PhD), recently completed the certification program from the International Association of Public Participation (IAP2). IAP2 is the guiding framework based on principles and best practices that is the foundation for engagement work at Nova Scotia Health Authority.

"Jillian has been an excellent facilitator of our team. She has helped me pull together a diverse group of stakeholders to meet a tight deadline for a competitive application. She is proactive, organized, and committed. I am most impressed with Jillian's commitment to ensuring that the patient voice is represented in our work," researcher, **Dr. Jill Chorney**.

The Department also added patient representatives to its peer review committee responsible for reviewing and awarding grant applications and increased the emphasis for researchers to include meaningful patient engagement in their research studies when applying for grants.

Curiosity was at its peak at this year's Research Day with record-high submissions of 25 abstracts—up from last year's high of 18—and another record of eleven abstract submissions by residents and fellows. During the day, supervisors, faculty and Department staff queried 15 presenters on their studies and viewed 10 poster presentations. The strong resident representation demonstrated the Department's support for early-career researchers. Also noteworthy was the growing number of quality improvement research projects indicating an effective collaboration among researchers, trainees and members of the quality improvement office in the department.



Dr. Orlando Hung

Leadership Team

Dr. Orlando Hung
Medical Director

Dr. Christian Lehmann
Associate Director, QEII
(effective March 2018)

Dr. Jill Chorney, Ph.D.
Associate Director, Pediatrics
(March 2018 – June 2018)

Dr. Scott Drysdale
Associate Director, Pediatrics –
Interim (effective July 2018)

Dr. Ron George
Associate Director, Women and
Obstetrics
(April 2017 – March 2018)

Dr. Dolores McKeen
Associate Director, Women and
Obstetrics
(effective March 2018)

Heather Butler, Ph.D.
Managing Director, Research

Project Research Investigators

Dr. Michael Schmidt
Principal Investigator

Dr. Gail Eskes, PhD.
Principal Investigator

Dr. Ronald George
Associate Research Director,
Women and Obstetrics

Dr. André Bernard
Preoperative Assessment Clinics

Dr. Andrew Milne
Office of Quality Improvement
Anesthesia

Stan Matwin, PhD.
Big Data Institute, Dalhousie
University

Dr. Dennis Drapeau
Information Management
Anesthesia

Dr. Michael Schmidt stands before a small team of nurses and staff from the QEII VG's pre-admissions clinic. He and medical student and researcher, **Yaesh Sardiwalla**, share with their captive audience their study's findings. They have determined that it is feasible – with some tweaks – to conduct computerized cognitive assessments for patients before and after surgery.

This type of research could be a game changer in developing care treatment plans and predicting outcomes for patients over the age of 55 who undergo surgery. This growing cohort of patients is at particular risk of developing post-operative cognitive decline (POCD), a rarely discussed, but potential side-effect of surgery and general anesthesia.

Why would this group of non-researchers be interested in such a study? Because they were integral to the study's success.

When primary investigator, **Dr. Michael Schmidt**, began his research to assess the feasibility of evaluating cognitive changes after surgery for patients over

55, he knew he needed to work with a strong team with diverse skills. It was a study that required technology, data analysis, and access to patients.

From the study's inception, he enlisted neuropsychologist **Dr. Gail Eskes** to co-lead the research project. Dr. Eskes and her team had created the Dalhousie Computerized Attention Battery (DalCAB), which tests attention, working memory, and executive control. This tool – the core of the study – was used to assess the feasibility of computerized cognitive testing before and after surgery. For the study – and its future potential – it was also critical to have sophisticated means to enter, assess and compare the cognitive data with a plethora of other patient data points. A Senior Data Analyst with the Department was instrumental in integrating multiple sources of data for the study.

With the study's methodology designed, the next priority was to engage patients in the research. Enlisting patients in research trials can pose a variety of challenges. Yet, the group excelled in this work, thanks to the help of the Department's pre-admissions clinic staff, its Medical Director, **Dr. André Bernard**, and the Department's Office of Research staff.

A team of nurses and staff facilitated the screening of 580 patients and allowed the research team to recruit 50 patients within five months.



The feasibility study provided valuable insights about the challenges of computerized cognitive testing with older adults before and after surgery.

Armed with these insights, Dr. Schmidt and his team are preparing for the next steps in this program of research. Later in 2018, the team will be conducting a national, multicentre trial using a web-based version of DalCAB to demonstrate the value of integrating cognitive testing as part of routine assessment before surgery for older adults.

"Understanding the cognitive impact of surgery is important to how we provide care in the future," said Dr. Schmidt. POCD is an important area of study given its high incidence of 15 to 40 per cent after non-cardiac surgery and 24 to 80 per cent after cardiac surgery.¹ "Our surgical colleagues are asking us [anesthesiologists] for advice on how their elderly patients will handle and respond to an anesthetic. In the future, we envision an instrument that better predicts the patient's health outcome and helps the patient and care team make more informed decisions before going into surgery."

¹ A. Van Harten, T. Scheeren, A. Absalom: A review of postoperative cognitive dysfunction and neuroinflammation associated with cardiac surgery and anaesthesia. *Anaesthesia* 2012; 67:280-93

Improving uro-gynaecology surgery recovery

The IWK Health Centre has become the first health centre in the Maritimes to implement Enhanced Recovery After Surgery (ERAS). The practice is offered to all patients referred for in-patient uro-gynaecology and gynaecology surgeries.

ERAS is an emerging philosophy that prepares patients for surgery, focuses on providing evidence-based intraoperative anesthesia and surgical techniques and improving post-operative recovery.

Drawing from best practices and evidence from around the world, ERAS guidelines have been shown to improve patient care related to nutrition, mobility after surgery, fluid management, anesthesia and pain control. Importantly, ERAS includes patients as part of the team, by involving them in preparation for their surgery and post-operative recovery. It aims to help patients stay strong, improve outcomes, reduce complications and create a better patient experience.

Project lead and researcher, **Dr. Dolores McKeen** is supported by a team of anesthesiologists, surgeons, nurses, pharmacists and dietitians. With research funding, Dr. McKeen is assessing the interdisciplinary implementation of ERAS guidelines, including the impact on uro-gynaecology patient outcomes.

Implementing this new best-practice is a result of Dr. McKeen's earlier TRIC 1 funded study that identified both care gaps in this population and solutions to patients' care experience and outcomes, leading up to and following uro-gynaecology surgeries.



Dr. Dolores McKeen

This year, IWK Health Centre became the first health centre in the Maritimes to implement Enhanced Recovery After Surgery (ERAS).



Department awards \$114,000+ to researchers

The Department has funded researchers, trainees and students a combined \$114,323.59 to advance their research. The grant funding is provided through the Anesthesia Research Fund. Funding applications are reviewed by a Peer Review Committee, which includes patient representatives.

Researcher Awards

- Dr. Edmund Tan (\$5,000)** Co-investigators: Drs. Tim Mullen, Gemma Malpas, Sarah Phippsaculty
– PreOxygenation for EndoTracheal Intubation: High Flow versus Conventional Preoxygenation Therapy
- Dr. Patricia Livingston (\$19,936)** Co-investigators: Drs. Adam Mossenson, Christian Mukwesi, Eugene Tuyishime, Teresa Skelton, Dave Rawson
– Can we make a VAST improvement? Promoting anaesthetists' non-technical skills through the Vital Anaesthesia Simulation Training Course in a low-resource setting.
- Dr. Allana Munro (\$19,918)** Co-investigators: Dr. Ronald George and Pantelis Andreou, PhD
– A novel approach to optimize Programmed Intermittent Epidural Bolus (PIEB) delivery for labour analgesia.
- Dr. Hilary MacCormick (\$4,950.79)** Supervisor: Dr. Ron George
 Co-investigators: Drs. Allana Munro, Chris Nash
– A retrospective cohort assessment of the impact of programmed intermittent epidural bolus compared to continuous epidural infusion for labour analgesia.
- Melissa Howlett (\$4,999)** Supervisor: Dr. Jill Chorney, PhD
– I think I can, I think I can: the role of self-efficacy in the context of pediatric medical procedures.
- Dr. Stephanie Power-MacDonald (\$4,983)** Supervisor: Dr. Ana Sjaus
 Co-investigators: Drs. Ron George, Narendra Vakharia and Krista Ritchie, PhD
– Simulation compared to interactive classroom training in interdisciplinary communication for high risk obstetric teams – a prospective randomized mixed-methods study of impact on behaviors and longitudinal retention.



The Department has funded researchers, trainees and students a combined \$114,323.59 to advance their research.

Trainee Awards

- Dr. Xue Chen (Janny) Ke (\$5,000)** Supervisor: Dr. Ron George
 Co-investigators: Lori Wozney, PhD
– Patient-centred perioperative care through mobile application: feasibility and patient engagement pilot in Cesarean Delivery patients
- Danielle Fokam Kuitichou (\$17,500)** Supervisor: Dr. Christian Lehmann
– Impact of iron chelation on immune response and bacterial growth in experimental sepsis.



*Anesthesia, Pain Management
& Perioperative Medicine*
Awards of Excellence

*Anesthesia, Pain Management
& Perioperative Medicine*
Awards of Excellence

April 26, 2018

DAVIDSON COLLEGE
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*Anesthesia, Pain Management
& Perioperative Medicine*
Awards of Excellence

Celebrating Excellence

To uphold the Department's commitment to excellence, an annual Awards of Excellence Gala recognizes and honours colleagues who play an integral role in the Department's success.

Awards of Excellence Winners

Mr. Dave Tughan

Individual Award of Excellence

Dave Tughan, the Department's Information Technology (IT) consultant, is the driving force behind creating IT solutions that meet the Department's growing desire to use technology to be more efficient, while supporting its aim for excellence. Described as a creative problem solver, Dave constantly evolves his solutions until they deliver the desired result.

BALANCE Program

Dr. Jill Chorney (PhD), Dr. Sally Bird, Dr. Stuart Wright, Dr. Isabel Smith, PhD, Carolyn Doucet, Leigh-Anne Marshall, Kate Stone and Stephanie Snow

Internal Team of Excellence Award

This team developed BALANCE – Building Alliances for Autism Needs in Clinical Encounters – as an education program for health-care professionals who care for children with autism around the time of surgery. This dedicated team set an example of successful translation of research knowledge into clinical practice, creating a more positive experience for care providers, families and patients.

NHI PACU Team

Amanda Chisholm, Allison Mowlett and Michelle Taylor

Team External Award of Excellence

Through providing excellent clinical care and leadership, the Halifax Infirmary Post Anesthesia Care Unit team is instrumental to the daily success of the

Department's perioperative services. Described by colleagues as the “unsung heroes of patient care” this skilled and highly adaptable team offers clinical expertise, can-do attitudes, grace under pressure, and flexibility.

Dr. Victoria Allen

Individual External Award of Excellence

Dr. Allen, a valued research colleague, offers her expertise in interdisciplinary evidence-based clinical care, research methodology and protocol and manuscript review skills. Incredibly generous with her time, she is a trusted sounding board and resource for the Department.

Ms. Claire Ward

Dale Morrison Award

Claire is an anesthesia assistant (AA) with IWK Women's and Obstetrics Anesthesia. She is a professional and competent practitioner who anticipates the needs of her patients and staff. Highly respected, she is known for her safe approach to care and her quiet and kind nature with patients.

Mr. Ian Hamilton

Dale Morrison Award

Ian is an anesthesia technician (AT) at the QEII, Victoria General and Halifax Infirmary sites. Known for his professionalism and technical competence, Ian is a go-to person for anesthesia staff and other ATs. Drawing on his expertise as a former paramedic, he is a reliable and dependable colleague, especially during the most challenging situations.

Dr. Greg Dobson

Dr. Tom Marrie Leadership Award

Dr. Greg Dobson, anesthesiologist and Director of the Quality Improvement and Patient Safety Office, has worked tirelessly to advance quality care and



Ms. Claire Ward is presented with the Dale Morrison Award.



The Internal Team of Excellence Award is awarded to the BALANCE Program.



Mr. Dave Tughan receives the Individual Award of Excellence.



Dr. Oliver Poole (PYG1), winner of the Research Day Top Poster.

Teaching Awards

Dr. Andrew Jarvie

Undergraduate Teacher of the Year

Dr. Ben Schelew

Clinical Teacher of the Year

Dr. André Bernard

Resident Mentor

Dr. Vladko Pelivanov

Resident Advocate

Dr. Amanda Smitheram

New Brunswick Clinical Teacher of the Year

Dr. Trisha Doyle

Recognition of completing high quality In Training Evaluation Reports (ITER)

Dr. Julie Williams

Recognition of high quality Daily Encounter Cards

Dr. Emma Kehoe (PGY2)

Anesthesia Resident Teacher of the Year

Dr. Leo Fares

Resident Teacher of the Year Award – Graduating Medical School Class

patient safety on local, provincial and national levels. His calm, deliberate and caring nature with patients models how to be an effective and empathetic communicator.

Special Recognition

In 2017-2018, organizations from across the country also singled out Department members for their expertise and leadership.

Dr. Colin Audain

Dr. William Grigor Award, Doctors Nova Scotia

Dr. Stephen Beed

Distinguished Service Award, Doctors Nova Scotia

Dr. Janice Chisholm

2017 Excellence in Education Award, Dalhousie Faculty of Medicine
2018 AMA Donald Richards Wilson Award, Royal College of Physicians and Surgeons of Canada

Dr. Richard Hall

2018 Gold Medal winner, Canadian Anesthesiologists' Society
2017 Gold-Headed Cane Award, College of Physicians and Surgeons of Nova Scotia

Dr. Blaine Kent

R. Wayne Putnam Award, Dalhousie Faculty of Medicine

Dr. Rob Macneill

Senior Membership Award, Doctors Nova Scotia

Dr. Chris Soder

Honorary Membership Award, Canadian Medical Association

Dr. Narendra Vakharia

Letter of Recognition, Royal College of Physicians and Surgeons of Canada

2018 Research Day Winners

Top Poster

Oliver Poole

The impact of preoperative anemia on red blood cell transfusion in primary and revision hip arthroplasty: a retrospective analysis

Resident/Fellow

1st – Mallory Garza

An audit of the adult difficult airway carts and airway kits within three academic teaching centres in Halifax, Nova Scotia

2nd – Andrew Suen

Innate immune activation and organ injury in a mouse model of polytrauma: Role of extracellular miRNAs?

Graduate student/postdoctoral

1st – Maral Aali

Comparison of novel and clinically-approved iron chelators as adjunctive treatment in murine models of sepsis

2nd – Melissa O'Brien

Blocking the Nav1.8 sodium channel attenuates neuropathic pain in a rat model of joint neuropathy

Undergraduate student

1st – Yaeesh Sardiwalla

The Dalhousie Computerized Assessment battery is feasible and sensitive at detecting post-operative cognitive dysfunction

2nd – Loran Morrison

An innovative device for CO2 removal using membrane technology instead of chemical absorbent in anesthetic circuits: Preliminary clinical result

Appendices

Appendix A

2017 New Funded Research Projects

1. Chappe V, Anini Y, Croll R, Lehmann C, Pelis R, Xu Z (2017-2019). CFTR regulation by VIP: molecular basis and therapeutic potential [Grant] – American Cystic Fibrosis Foundation – \$107,379.
2. Chen JX, George RB, Wozney L (2017-2018). Patient-centered perioperative care through mobile application; feasibility and patient engagement pilot in cesarean delivery patients [Grant] – APMPM – \$5,000.
3. Hashmi, J.A, Lynch, M, Beaupre I, Mukhida, K. (2017-2021). Brain mechanisms of expectation and their role in pain sensitivity and hypervigilance in fibromyalgia [Grant] – NSHA QEII Health Sciences Centre, Fibromyalgia Funding Competition. – \$175,000.
4. Hashmi, J.A, Beyea, S, Matwin, S, Lynch, M. (2017-2019). Role of brain mechanisms of learning and expectation in chronic back pain [Grant] – NSHA QEII Health Sciences Centre – \$99,588.
5. Hashmi, J.A (2017-2018). Internal award. Department of Anesthesia, Pain Management and Perioperative Medicine – \$5,000.
6. Hung O, Milne A, d'Entremont M (2017-present). Development of a lightweight tracheal intubation device [Grant] – Nova Scotia Business Inc. – \$25,000.
7. Lehmann C, Lynch M, Arora N, Xia Y, Zhou J, Kelly M (2017-2018). Novel formulation for the treatment of interstitial cystitis [Grant] – Innovacorp - \$50,000.
8. MacCormick H, George RB, Munro A, Nash C (2017-2018). A retrospective cohort assessment of the impact of programmed intermittent epidural bolus compared to continuous epidural infusion for labour analgesia [Grant] – APMPM - \$4,950.
9. McDougall J (2017-2022). Contribution of proteases and protease activated receptors to joint neuropathy and arthritis pain [Grant] – CIHR - \$761,175.
10. McDougall J (2018-2020). Sex differences in joint neuropathic pain involve NaV1.8 ion channels [Grant] – The Arthritis Society – \$351,100.
11. McKeen D, Dryden T, Snelgrove-Clarke E, Van Eyk N (2017-2019). Research translated into evidence-based care: improving outcomes in urogynecology surgery through enhanced recovery: The RECOVER study [Grant] – QE II Health Sciences Centre Foundation & IWK Foundation Nova Scotia's Healthcare Improvement Research Program – \$136,960.
12. McKeen D, McIsaac D, Laupacis A, Earle MA (2017-2019). A Canadian Anesthesia Research Priority Setting Partnership [Grant] – Association of Canadian University Departments of Anesthesia, Dalhousie University, University of Manitoba – \$98,643.
13. Roda RD, Uppal V, McKeen D, Allen V, Woolcott C (2017-present). Postoperative analgesia with Quadratus Lumborum Blockade for elective caesarean delivery: A retrospective study with propensity adjustment [Grant] – IWK – \$5,000.



14. Rosen NO, Chorney JE, George RB, Lee-Baggey DL, Pukall CF, Snelgrove-Clarke EE (2017-present). Biopsychosocial predictors of postpartum genito-pelvic pain: A two-year follow-up [Grant] – CIHR – \$256,274.
15. Schmidt M, Roach DC (2017). Simulation and prediction of final product performance cases [Industry Contract] – BioNOVA – \$5,000.
16. Schmidt M, Roach DC (2018). memsorb: CO2 filter for safe, environmentally sound anesthesia {Modification} [Grant] – Sustainable Development Technologies Canada (SDTC) – \$245,336.
17. Schmidt M, Roach DC (2017-2018). Productivity & Business Skills Initiative [Grant] – Atlantic Canada Opportunities Agency – \$48,875.
18. Uppal V, Ke J, Shanthanna H, Kwofie K, Trenholm A (2017–2019). Preventing Rebound Pain after Arthroscopic Rotator Cuff Repair under General Anesthesia and Interscalene Block: A Randomized Controlled Trial of Pre-emptive Opioid Treatment Compared to Placebo (\$24,353) [Grant] – NSHRF – \$24,353.
19. Wijesundera DN, Alibhai S, Juni P, McIsaac DI, Scott Beattie W, Breau R; Chan V, Choi P, Choi S, Clarke H, Dhalla I, El Beheiry H, George RB, Isaranuwachai W, Johnson S, Kennedy E, Ladha K, Lalu M, Lebovic G, Mazer D, McCluskey S, Puts M, Wei A, Herridge M, Morris W, Nathens A (2018-2021). The Functional Improvement Trajectories After Surgery (FIT After Surgery) Study: A Multicentre Prospective Cohort Study to Evaluate the Incidence, Trajectories, Risk Factors, Impact and Healthcare Costs Related to Significant New Disability after Major Elective Surgery [Grant] – CIHR – \$1,388,474.
20. Juan Zhou, Ian Burkovskiy, Christian Lehmann (2017-2018). Novel formulation for the treatment of interstitial cystitis [Grant] – Mitacs – \$45,000



Appendix B

2017 Publications

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

1. Aali M, Caldwell A, House K, Zhou J, Chappe V, Lehmann C. Iron chelation as novel treatment for lung inflammation in cystic fibrosis. *Med Hypotheses*. 2017 Jul; 104:86-88.
2. Arora N, Islam S, Wafa K, Zhou J, Toguri JT, Cerny V, Lehmann C (2017). Evaluation of iris functional capillary density in experimental local and systemic inflammation. *Journal of Microscopy*. [Published] PubMed ID: 28102536.
3. Brindley PG, Beed M, Law JA, Hung O, Levitan R, Murphy MF, Duggan LV (2017). Airway management outside the operating room: how to better prepare. *Canadian Journal of Anaesthesia/Journal canadien d'anesthésie*, 64(5), 530-539. [Published] PubMed ID: 28168630.
4. Cerny V, Astapenko D, Brettner F, Benes J, Hyspler R, Lehmann C, Zadak Z (2017). Targeting the endothelial glycocalyx in acute critical illness as a challenge for clinical and laboratory medicine. *Critical Reviews in Clinical Laboratory Sciences*, 54(5), 343-357. [Review – Published] PubMed ID: 28958185.
5. Cerny V, Astapenko D, Burkovskiy I, Hyspler R, Ticha A, Trevors MA, Lehmann C (2017). Glycocalyx in vivo measurement. *Clinical Hemorheology and Microcirculation*, 67(3-4), 499-503. [Published] PubMed ID: 28922148.
6. Chen J, Zhou J, Kelly M, Holbein BE, Lehmann C (2017). Iron chelation for the treatment of uveitis. *Medical Hypotheses*, 103, 1-4. [Review – Published] PubMed ID: 28571790.
7. Curran JA, Bishop A, Plint A, MacPhee S, Zemek R, Chorney J, Jabbour M, Porter S, Sawyer S (2017). Understanding discharge communication behaviours in a pediatric emergency care context: a mixed methods observation study protocol. *BMC Health Services Research*, 17(1), 276. [Published] PubMed ID: 28412951.
8. Doca FNP, Costa AL, Finley GA, Linhares MBM (2017). Pain in pediatric inpatients: Prevalence, characteristics, and management. *Psychology & Neuroscience*, 10(4), 394-403. [Published] DOI: 10.1037/pne0000094.
9. Doyle JM, Merovitch N, Wyeth RC, Stoyek MR, Schmidt M, Wilfart F, Fine A, Croll RP. A simple automated system for appetitive conditioning of zebrafish in their home tanks. *Behav Brain Res*. 2017 Jan 15;317:444-452. doi: 10.1016/j.bbr.2016.09.044. Epub 2016 Sep 19. PubMed PMID: 27659557.
10. Dumbarton TC, Maxan A, Farah N, Zhou J, Shawary N, Nantais J, Lehmann C (2017). Tetrahydrobiopterin Improves Intestinal Microcirculation in Experimental Sepsis in the Rat. *Clin Hemorheol Microcirc*. [Published].
11. Ferland CE, Saran N, Valois T, Bote S, Chorney JM, Stone LS, Ouellet JA (2017). Preoperative Distress Factors Predicting Postoperative Pain in Adolescents Undergoing Surgery: A Preliminary Study. *Journal of Pediatric Health Care: Official publication of National Association of Pediatric Nurse Associates & Practitioners*, 31(1), 5-15. [Published] PubMed ID: 26852092.
12. George RB (2017). Obstetrics and Gynecology in Low-Resource Settings: A Practical Guide. *Anesthesia and Analgesia*. [Review – Published] PubMed ID: 28857801.
13. George RB, Lozada MJ (2017). Anesthesiologists, it's time to get social! *Canadian Journal of Anaesthesia/Journal canadien d'anesthésie*, 64(12), 1169-1175. [Published] PubMed ID: 28936589.
14. George RB, McKeen DM (2017). We must ask relevant questions and answer with meaningful outcomes. *Canadian Journal of Anaesthesia*. [Editorial – Published] PubMed ID: 28623501.
15. George RB, McKeen DM, Dominguez JE, Allen TK, Doyle PA, Habib AS (2017). A randomized trial of phenylephrine infusion versus bolus dosing for nausea and vomiting during Cesarean delivery in obese women. *Canadian Journal of Anaesthesia*. [Published] DOI: 10.1007/s12630-017-1034-6.
16. Gu Y, Robert JM, Kovacs G, Milne AD, MacQuarrie K, Hung OR, Morris IR, Law JA (2017). Restricted vs. full video-laryngoscopic view to facilitate GlideScope® – assisted tracheal intubation: a randomized clinical trial. *Canadian Journal of Anesthesia*, 63(8), 928-37. [Published] PubMed ID: 27090535.

17. Haider A, Scott JW, Gause CD, Mehes M, Finley GA, et al (2017). Development of a unifying target and consensus indicators for global surgical systems strengthening: Proposed by the Global Alliance for Surgery, Obstetric, Trauma and Anaesthesia Care (The G4 Alliance). *World J Surg*, 41(10), 2426-2434. [Published] DOI: 10.1007/s00268-017-4028-1.
18. Hashmi, J.A, Loggia, M, Khan, S, Gao, L., Kim J, Napadow, V, Brown E.N, Akeju OJ. Dexmedetomidine Disrupts the Local and Global Efficiencies of Large-scale Brain Networks. Commentary by George Mashour. Title: Network Inefficiency: A Rosetta Stone for the Mechanism of Anesthetic-induced Unconsciousness. 2017. *Anesthesiology – The Journal of the American Society of Anesthesiologists*. 126(3): 419-430. [Published]. PubMed ID: 27910247
19. Hong P, Maguire E, Purcell M, Ritchie KC, Chorney J (2017). Decision-Making Quality in Parents Considering Adenotonsillectomy or Tympanostomy Tube Insertion for Their Children. *JAMA Otolaryngology – Head & Neck Surgery*, 143(3), 260-266. [Published] PubMed ID: 27930764.
20. Hung O, McKeen D, Huitink J (2017). In defense of succinylcholine. *Canadian Journal of Anesthesia*, 64, 107-8. [Letter to the Editor – Published].
21. Johnston DF, Sondekoppam RV, Uppal V, Howard JL, Ganapathy S (2017). Hybrid Blocks for Total Knee Arthroplasty: A Technical Description. *The Clinical Journal of Pain*. [Published] PubMed ID: 28617716.
22. Jung F, Connes P, Lehmann C (2017). A.L. Copley Best Paper Prize 2016. *Clinical Hemorheology and Microcirculation*, 66(3), 185-186. [Editorial – Published] PubMed ID: 28671109.
23. Kern H, Sharawy N, Sardinha J, Lehmann C (2017). Microcirculation research in community hospitals – challenges and chances. *Clinical Hemorheology and Microcirculation*, 67(3-4), 511-514. [Published] PubMed ID: 28922147.
24. Khadra C, Le May S, Ballard A, Thérout J, Charette S, Villeneuve E, Parent S, Tsimicalis A, Chorney J (2017). Validation of the scale on Satisfaction of Adolescents with Postoperative pain management – idiopathic Scoliosis (SAP-S). *Journal of Pain Research*, 10, 137-143. [Published] PubMed ID: 28138264.
25. Krustev E, Muley M, McDougall JJ (2017). Endocannabinoids inhibit neurogenic inflammation in murine joints by a non-surgical cannabinoid receptor mechanism. *Neuropeptides*, 64, 131-135. [Published].
26. Lafreniere JD, Lehmann C (2017). Parameters of the Endocannabinoid System as Novel Biomarkers in Sepsis and Septic Shock. *Metabolites*, 7(4). [Review – Published] PubMed ID: 29104224.
27. Law JA, Morris IR, Malpas G (2017). Obstructing pathology of the upper airway in a post-NAP4 world: time to wake up to its optimal management. *Canadian Journal of Anaesthesia/Journal canadien d'anesthésie*. [Editorial – Published] PubMed ID: 28695449.
28. Lee J, George RB, Habib AS (2017). Spinal induced hypotension: incidence, mechanisms, prophylaxis and management: summarizing 20 years of research. *Best Practice & Research: Clinical Anaesthesiology*. [Review – Published].
29. Lehmann C (2017). New developments in clinical microcirculation imaging. *Clinical hemorheology and microcirculation*, 67(3-4), 487-488. [Editorial – Published] PubMed ID: 28922145.
30. Lovas DA, Pajer K, Chorney JM, Vo DX, Howlett M, Doyle A, Huber A (2017). Mindfulness for adolescent chronic pain: a pilot feasibility study. *Journal of Child and Adolescent Mental Health*, 29(2), 129-136. [Published] PubMed ID: 28974167.
31. Lynch ME (2017). The opioid pendulum and the need for better pain care. *Pain Medicine*. [Published] DOI: doi:10.1093/pm/pnw085.
32. Lynch ME, Katz J (2017). "One size fits all" doesn't fit when it comes to long term opioid treatment for people with chronic pain. *Canadian Journal of Anesthesia*. [Published] Available here.
33. Mai LM, Clark AJ, Gordon A, Lynch ME, Morley-Forster PK, Nathan H, Smyth C, Stitt LW, Toth C, Ware MA, Moulin DE (2017). Long-term outcomes in the management of painful diabetic neuropathy. *Canadian Journal of Neurological Sciences*, 44, 337-342. [Published] PubMed ID: 28065184.
34. Malpas G, Phipps S, Hung O, (2017). Tips & Tricks for successful flexible bronchoscopic intubation under general anesthesia. *The Airway Gazette* [Internet]. [Published] Available here.

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35. Mamashli, F., Khan, S., Bharadwaj, H., Michmizos, K., Ganesan, S., Garel, K.-L. A., Hashmi, JA, Herbert, M. R., Hämäläinen, M. and Kenet, T. Auditory processing in noise is associated with complex patterns of disrupted functional connectivity in autism spectrum disorder. 2017. *Autism Research*. 4: 631-647. [Published]. PubMed ID: 27910247
36. McDougall JJ, Albacete S, Schulert N, Mitchell PG, Lin C, Oskins JL, Bio H, Chambers MG (2017). Lysophosphatidic acid provides a missing link between osteoarthritis and joint neuropathic pain. *Osteoarthritis & Cartilage*, 25, 926-934. [Published].
37. McDougall JJ, Muley M, Philpott HT, Reid A, Krustev E (2017). Early blockade of joint inflammation with a fatty acid amide hydrolase inhibitor decreases end stage osteoarthritis pain and peripheral neuropathy in mice. *Arthritis Research & Therapy*, 19, 106-115. [Published].
38. McLellan M, Poulton A, Hung O (2017). The clinical utility of the Fluid IV Alert (FIVA) monitor. *J Clin Anesth*, 35, 293-4. [Published].
39. Miro J, McGrath PJ, Finley GA, Walco GA (2017). Pediatric chronic pain programs: Current and ideal practice. *PAIN Reports*, 2(5), e613. [Published].
40. Muley M, Krustev E, Reid A, McDougall JJ (2017). Prophylactic inhibition of neutrophil elastase prevents the development of chronic neuropathic pain in osteoarthritic mice. *Journal of Neuroinflammation*, 14, 168-180. [Published].
41. Munro A, George RB (2017). Programmed Intermittent Epidural Boluses (PIEB) for Maintenance of Labor Analgesia: A Superior Technique and Easy to Implement (Debate - Part 2). *Turkish Journal of Anaesthesiology and Reanimation*, 45(2), 70-72. [Review – Published] PubMed ID: 28439435.
42. Munro A, George RB (2017). Programmed Intermittent Epidural Boluses (PIEB): A Superior Technique for Maintenance of Labor Analgesia (Debate - Part 1). *Turkish Journal of Anaesthesiology and Reanimation*, 45(2), 67-69. [Review - Published] PubMed ID: 28439434.
43. Munro A, George RB, Chorney J, Snelgrove-Clarke E, Rosen NO (2017). Prevalence and Predictors of Chronic Pain in Pregnancy and Postpartum. *Journal of Obstetrics and Gynaecology Canada*, 3(9), 734-741. [Published] PubMed ID: 28624445.
44. Noel M, Rabbitts JA, Fales J, Chorney J, Palermo TM (2017). The influence of pain memories on children's and adolescents' post-surgical pain experience: A longitudinal dyadic analysis. *Health psychology: official journal of the Division of Health Psychology, American Psychological Association*, 36(10), 987-995. [Published] PubMed ID: 28726472.
45. O'Brien M, Philpott HT, McDougall JJ (2017). Understanding osteoarthritis pain through animal models. *Clinical and Experimental Rheumatology*, 35, S47-S52. [Published].
46. Pelland A, George RB (2017). Safe obstetric anesthesia in low – and middle -income countries. *BJA Education*, 17(6), 194-7. [Review – Published] Available here.
47. Philpott HT, O'Brien M, McDougall JJ (2017). Attenuation of early phase inflammation by cannabidiol prevents pain and nerve damage in rat osteoarthritis. *Pain*, 158, 2442-2451. [Published].
48. Phipps S, Malpas G, Hung O (2017). A technique for securing the Aintree intubating catheter to a flexible bronchoscope. *Can J Anesth*. [Letter to the Editor – Published] DOI: 10.1007/s12630-017-1015-9.
49. Pool O, Vargo M, Zhang J, Hung OR (2017). A comparison of three techniques for cricothyrotomy on a manikin. *Journal of Respiratory Care*, 53(2), 29-32. [Published].
50. Prabhakar C, Uppal V, Sondekoppam R (2017). Effect of beam steering on echogenic and non-echogenic needle visibility at 40, 50 and 60-degree needle insertion angles. *Anesthesia & Analgesia*. [Published] PubMed ID: 29116966.
51. Sawynok J, Lynch ME (2017). Qigong and Fibromyalgia circa 2017. *Medicines*, 4(37). [Published] DOI: 10.3390/medicines4020037.
52. Sharawy N, Mahrous R, Whynot S, George R, Lehmann C (2017). Clinical relevance of early sublingual microcirculation monitoring in septic shock patients. *Clinical Hemorheology and Microcirculation*. [Published] PubMed ID: 29036793.

53. Sharawy N, Mukhtar A, Islam S, Mahrous R, Mohamed H, Ali M, Hakeem AA, Hossny O, Refaa A, Saka A, Cerny V, Whynot S, George RB, Lehmann C (2017). Preliminary clinical evaluation of automated analysis of the sublingual microcirculation in the assessment of patients with septic shock: Comparison of automated versus semi-automated software. *Clinical Hemorheology and Microcirculation*, 67(3-4), 489-498. [Published] PubMed ID: 28922146.
54. Sondekoppam R V, Ip V, Johnston D, Uppal V, Johnson M, Ganapathy S, Tsui B (2017). Ultrasound guided transmuscular quadratus lumborum block for analgesia following anterior iliac crest bone graft harvesting: An anatomical and clinical study. *Canadian Journal of Anesthesia*. [Case Series – Published] PubMed ID: 29164530.
55. Song JSA, Wozney L, Chorney J, Ishman SL, Hong P (2017). Design and validation of key text messages (Tonsil-Text-To-Me) to improve parent and child perioperative tonsillectomy experience: A modified Delphi study. *International Journal of Pediatric Otorhinolaryngology*, 102, 32-37. [Published] PubMed ID: 29106872.
56. Stoyek MR, Schmidt MK, Wilfart FM, Croll RP, Smith FM (2017). The in vitro zebrafish heart as a model to investigate the chronotropic effects of vapor anesthetics. *American Journal of Physiology – Regulatory, Integrative, and Comparative Physiology*, 313. [Published] DOI: 10.1152/ajpregu.00467.2016.
57. Szczesniak AM, Porter RF, Toguri JT, Borowska-Fielding J, Gebremeskel S, Siwakoti A, Johnston B, Lehmann C, Kelly ME (2017). Cannabinoid 2 receptor is a novel anti-inflammatory target in experimental proliferative vitreoretinopathy. *Neuropharmacology*, 113, 627-638. [Published] PubMed ID: 27569993.
58. Szerb J, Kwofie M K (2017). Ultrasound-guided block and the incidence of intraneural injection. *Anaesthesia*, (4), Epub. [Letter to the Editor – Published] Available here.
59. Thorburn T, Aali M, Kostek L, LeTourneau-Paci C, Colp P, Zhou J, Holbein B, Hoskin D, Lehmann C (2017). Anti-inflammatory effects of a novel iron chelator, DIBI, in experimental sepsis. *Clinical Hemorheology and Microcirculation*, 67(3-4), 241-250. [Published] PubMed ID: 28869457.
60. Uppal V, Kalagara HKP, Sondekoppam RV (2017). Tips and tricks to improve the safety of the retroclavicular brachial plexus block. *The American Journal of Emergency medicine*. [Published] PubMed ID: 28978400.
61. Uppal V, McKeen DM (2017). Strategies for prevention of spinal-associated hypotension during Cesarean delivery: Are we paying attention? *Canadian Journal of Anaesthesia*. [Published] PubMed ID: 28702819.
62. Uppal V, Retter S, Shanthanna H, Prabhakar C, McKeen DM (2017). Hyperbaric Versus Isobaric Bupivacaine for Spinal Anesthesia: Systematic Review and Meta-analysis for Adult Patients Undergoing Noncesarean Delivery Surgery. *Anesthesia and Analgesia*. [Published] PubMed ID: 28708665.
63. Uppal V, Sondekoppam RV, Sodhi P, Johnston D, Ganapathy S (2017). Single-Injection Versus Multiple-Injection Technique of Ultrasound-Guided Paravertebral Blocks: A Randomized Controlled Study Comparing Dermatomal Spread. *Regional Anesthesia and Pain Medicine*. [Published] PubMed ID: 28665874.
64. Ware MA, Martel MO, Jovey R, Lynch ME, Singer J (2017). A prospective observational study of problematic oral cannabinoid use. *Psychopharmacology*. [Published] DOI: 10.1007/s00213-017-4811-6.
65. Wozney L, Chorney J, Huguet A, Song JS, Boss EF, Hong P (2017). Online Tonsillectomy Resources: Are Parents Getting Consistent and Readable Recommendations? *Otolaryngology – Head and Neck Surgery: Official Journal of American Academy of Otolaryngology – Head and Neck Surgery*, 156(5), 844-852. [Published] PubMed ID: 28195825.



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