Alberta Health Services

ANNUAL REPORT 2019-2020

Department of Anesthesiology, Perioperative and Pain Medicine

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Executive Report

The past year cannot be reviewed without acknowledging the disruptive effect the Covid-19 pandemic had on the department. The pandemic upset all aspects of our personal and professional lives. I thank the individual consultants, and our operational and administrative colleagues for their support and hard work. The Department's preparation and willingness to support the care of critically ill patients at the acute care sites is commendable. The collaboration and information sharing at the Section Head level allowed for the changes in recommendations to be rapidly disseminated across the Zone. At each site, the simulation teams worked endlessly to ensure operational and medical staff are well versed in the current perioperative management of our patients. I specifically thank Dr. Bishop for acting as our liaison with critical care and Dr. Hayter for representing our specialty on the Provincial Perioperative IP&C Committee. I wish I could say we can rest on our laurels.

In 2020 we have experienced considerable turnover in our medical leadership. Dr. Sims (RGH), Dr. Ha (FMC) and Dr. Olivieri (SHC) all remained as Section Chiefs beyond their desired resignation dates to see us through wave 1 of the pandemic. I am very appreciative of the work they have done throughout their tenure. Simultaneous representation of the Section members' interests and those of Alberta Health Services is not easy at the best of times, and these have not been the best of times. I welcome Dr. Eng (RGH), Dr. Anderson (FMC) and Dr. Stephan (SHC) as new Section Chiefs and look forward to them building upon the successes of their predecessors. Dr Liepert, who set up our Zone-wide QAC Subcommittee, has stepped down as Chair and is mentoring Dr. Marois as she assumes that role. I thank both for their commitment and contribution to patient safety.

The Alberta Surgical Initiative (ASI), which now includes the post-Covid recovery plan, will be our biggest challenge of the post-pandemic period. Our workforce planning from 2017 had identified that, allowing for some luck and lean times, we would manage to replace our retirement aged workforce through recruitment within our residency program. The expansion of surgical services that was outlined in the initial ASI would pose a challenge. However, with patience on the part of AHS, expanded residency numbers, requesting anesthesiologists temporarily increase their FTE and postpone retirement, and changes to the governance and servicing of the Contracted Service Facilities, the request could likely be accommodated. How the department can meet the needs of the expanded ASI remains to be seen.

There have been additions to our full-time faculty. Dr. Miller, a clinical neuroscientist specializing in functional neuroimaging and pain, has joined the department as an Assistant Professor. Dr. Birnie, a clinical psychologist with expertise in pediatric chronic pain, and the Assistant Scientific Director for SKIP (Solution for Kids in Pain) has been recruited as an Assistant Professor. I welcome them into our department and look forward to their academic successes as we look to expand beyond our clinical strength in pain management.

On the educational side, Dr. Davis was selected as Program Director, Anesthesiology, following Dr. Eng's completion of his five-year term. Dr. Darcus was the successful applicant for our Clerkship Program Director, replacing Dr. Davis. Dr. Haber stepped down as interim Program Director for Chronic Pain as Dr. Shinkaruk returned from leave. I thank the aforementioned for their hard work and dedication to our educational programs. Finally, we have no programs without the daily volunteering of the clinical faculty, whose commitment exceeds expectations. You all have my gratitude.

Sincerely,

Gary Dobson MDCM, MSc, FRCPC
Chair, Department of Anesthesiology,
Perioperative and Pain Medicine

Department Structure and Organization

The Department of Anesthesia has five sections; 188 physicians, and 2 city wide locums, 11 administrative support staff, about 100 Anesthesia Respiratory Therapists, 6 site-specific Anesthesia Respiratory Therapist site leads, and Service Workers. In addition, 14 RNs work in the Acute Pain Service and Peri-Operative Blood Conservation Program. The total annual operating budget is approximately $16 million.

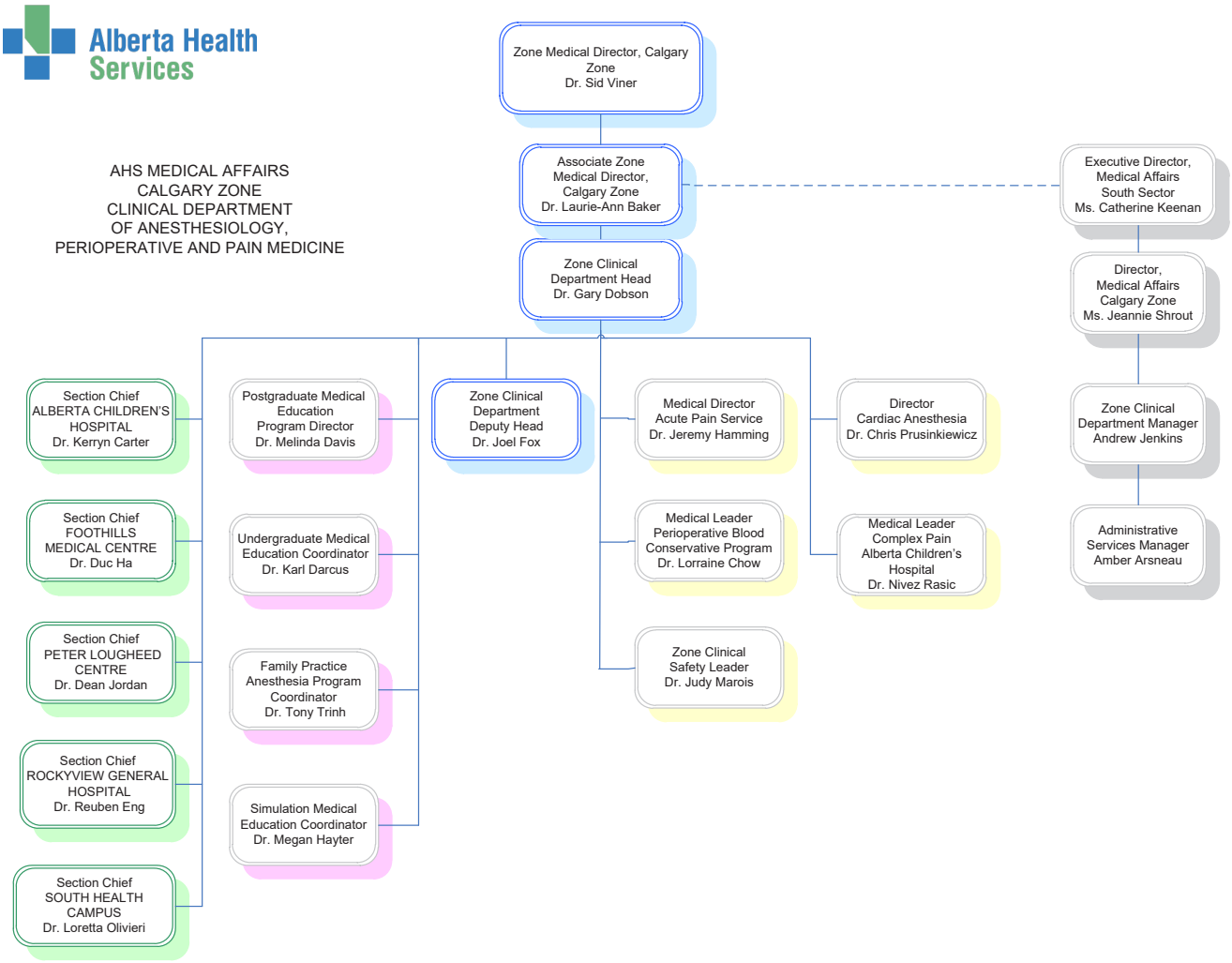
Department medical staff are faculty members at the Cumming School of Medicine, University of Calgary. Academic appointments include five geographic full time and ten major clinical positions, including Post Graduate Medical Education, Family Practice Anesthesia, and Undergraduate Medical Education program directors. Staff anesthesiologists work a range from 0.4 to 1.0 clinical FTE, with many working in a variety of part-time or job sharing arrangements.

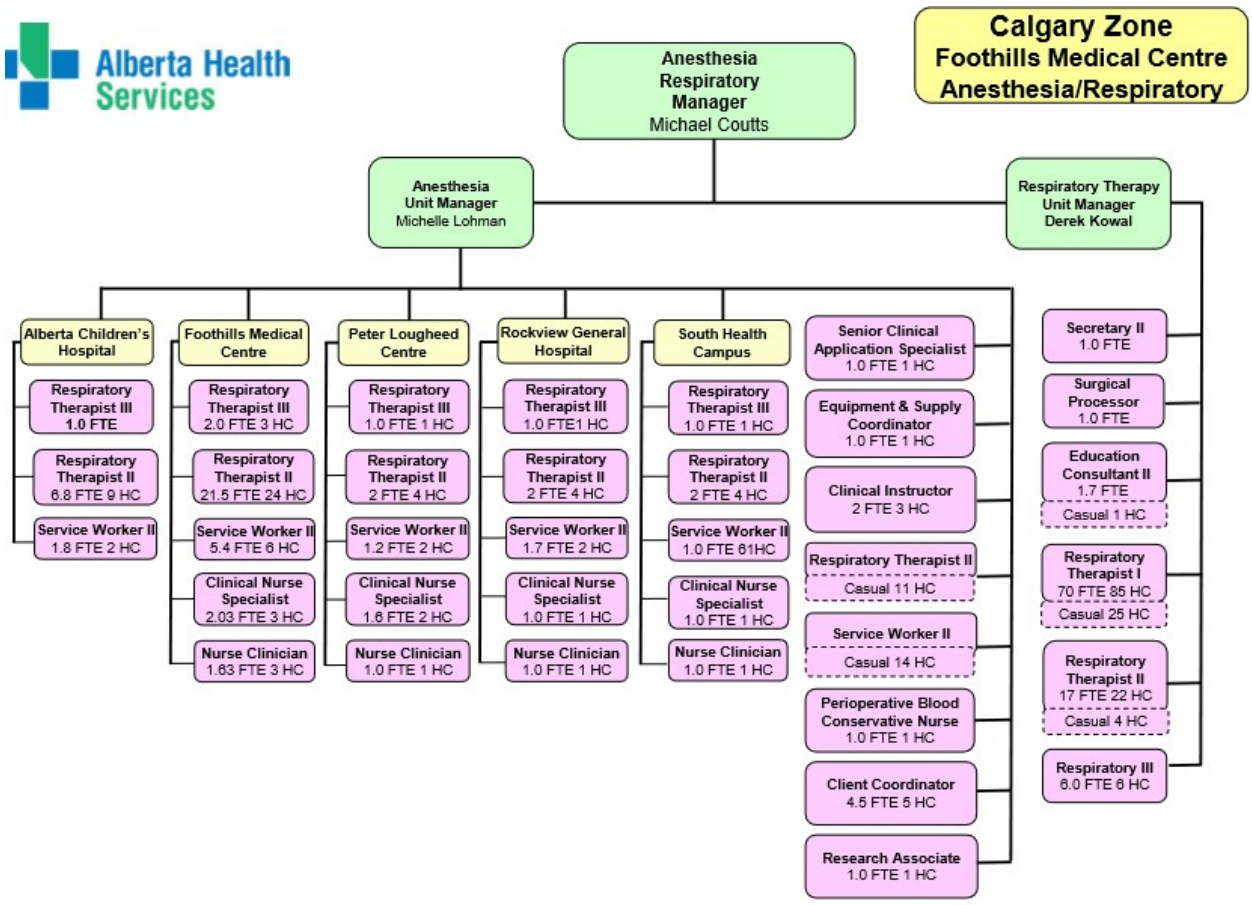
Anesthetic services are also provided at several AHS contracted non-hospital surgical facilities for ophthalmology, podiatry, oral maxillofacial surgery and pediatric dental surgery. Anesthesia service continues to be provided in Yellowknife, NWT by some members of our department as well as throughout Alberta as needed. Annually anesthesia provides manpower, preceptorship, and organizational support to the Banff Family Practice Anesthesia conference.

Subspecialty clinical services and programs are provided for Pediatric Anesthesia, Cardiac Anesthesia, Obstetrical Anesthesia, Acute Pain, Chronic Pain, Cancer Pain, Neuroanesthesia, Regional Anesthesia, Thoracic Anesthesia, Vascular Anesthesia, Preadmission Clinics, Trauma Anesthesia, Palliative Care, and the Perioperative Blood Conservation Program.

In 2019 – 2020, the Department provided anesthetic care for over 80,000 inpatient and outpatient surgical procedures, more than 10,000 deliveries, and treated many patients through the Acute and Chronic Pain Services.

Zone Organization Charts




Alberta Health Services
Calgary Zone
Foothills Medical Centre
Anesthesia/Respiratory
Anesthesia Respiratory Manager
Michael Coutts
Anesthesia Unit Manager
Michelle Lohman
Respiratory Therapy Unit Manager
Derek Kowal
Alberta Children's Hospital
Respiratory Therapist III 1.0 FTE
Respiratory Therapist II 6.8 FTE 9 HC
Service Worker II 1.8 FTE 2 HC
Foothills Medical Centre
Respiratory Therapist III 2.0 FTE 3 HC
Respiratory Therapist II 21.5 FTE 24 HC
Service Worker II 5.4 FTE 6 HC
Clinical Nurse Specialist 2.03 FTE 3 HC
Nurse Clinician 1.63 FTE 3 HC
Peter Lougheed Centre
Respiratory Therapist III 1.0 FTE 1 HC
Respiratory Therapist II 2 FTE 4 HC
Service Worker II 1.2 FTE 2 HC
Clinical Nurse Specialist 1.6 FTE 2 HC
Nurse Clinician 1.0 FTE 1 HC
Rockview General Hospital
Respiratory Therapist III 1.0 FTE1 HC
Respiratory Therapist II 2 FTE 4 HC
Service Worker II 1.7 FTE 2 HC
Clinical Nurse Specialist 1.0 FTE 1 HC
Nurse Clinician 1.0 FTE 1 HC
South Health Campus
Respiratory Therapist III 1.0 FTE 1 HC
Respiratory Therapist II 2 FTE 4 HC
Service Worker II 1.0 FTE 61HC
Clinical Nurse Specialist 1.0 FTE 1 HC
Nurse Clinician 1.0 FTE 1 HC
Senior Clinical Application Specialist 1.0 FTE 1 HC
Equipment & Supply Coordinator 1.0 FTE 1 HC
Clinical Instructor 2 FTE 3 HC
Respiratory Therapist II
Casual 11 HC
Service Worker II
Casual 14 HC
Perioperative Blood Conservative Nurse 1.0 FTE 1 HC
Client Coordinator 4.5 FTE 5 HC
Research Associate 1.0 FTE 1 HC
Secretary II 1.0 FTE
Surgical Processor 1.0 FTE
Education Consultant II 1.7 FTE
Casual 1 HC
Respiratory Therapist I 70 FTE 85 HC
Casual 25 HC
Respiratory Therapist II 17 FTE 22 HC
Casual 4 HC
Respiratory III 6.0 FTE 6 HC

Zone Anesthesiology Executive Committee

ZCDH & Academic Head, U of C	Dr. G. Dobson
Deputy ZCDH	Dr. J. Fox
FMC Section Chief	Dr. D. Ha
FMC Deputy Section Chief	Dr. K. Anderson
PLC Section Chief	Dr. D. Jordan
PLC Deputy Section Chief	Dr. B. Parkinson
RGH Section Chief	Dr. R. Eng
RGH Deputy Section Chief	Dr. M.Hayter
ACH Section Chief	Dr. K. Carter
ACH Deputy Section Chief	Dr. M. Gale
SHC Section Chief	Dr. L. Olivieri
SHC Deputy Section Chief	Dr. D. Milne
Director, Residency Training Program	Dr. M. Davis
Clinical Safety Lead	Dr. J. Marois
Acute Pain Service Medical Director	Dr. J. Hamming
Zone Clinical Department Manager	Mr. A. Jenkins
ZCDH and Head, Department of Surgery	Dr. S. Grondin
Director of Cardiac Anesthesia	Dr. C. Prusinkiewicz
Medical Lead, Calgary Chronic Pain Program	Dr. L. Montgomery
Executive Director Women's Health, NICU, Anesthesiology, and Respiratory	Mr. B. Peffers
Associate Zone Medical Director and Facility Medical Director, RGH	Dr. L. Baker
Simulation Medical Education Coordinator	Dr. M. Hayter

Anesthesia Academic Council

Zone Clinical Department Head (Chair)	Dr. G. Dobson
Residency Associate Program Director CBD	Dr. G. Bishop
ACH and GFT Representative	Dr. R. Cox
Residency Training Program Director, FMC	Dr. M. Davis
Resident Representative	Dr. H. Yu
RGH and CI/SIM Representative	Dr. M. Hayter
FMC Representative	Dr. K. Duttchen
PLC Representative	Dr. C. Pearce
SHC Representative	Dr. L. Baghirzada
ACH Representative	Dr. D. Lardner
Senior Research Associate	Mr. A. Walker
ACUDA Representative	Dr. R. Chun
Co-Resident Scholarly Project Coordinator	Dr. E Bruce Dr. L. Hung
Medical Leader, Calgary Chronic Pain Program	Dr. L. Montgomery
Executive Director Women's Health, NICU, Anesthesiology, and Respiratory	Mr. B. Peffers
Zone Clinical Department Manager	Mr. A. Jenkins

University of Calgary Faculty

Dr. G. Dobson	Zone Clinical Department Head, Department of Anesthesiology, Perioperative and Pain Medicine	Associate Professor, GFT
Dr. R. Cox	Pediatric Anesthesia and Pediatric ICU	Professor, GFT
Dr. J. Davies	Anesthesia and System Safety	Professor, GFT
Dr. D. Archer	Neuro-Anesthesia	Professor, GFT
Dr. J.N. Armstrong	Anesthesia, Stars	Associate Professor, GFT
Dr. J. Vinall Miller	Pediatric Pain Neuroscientist	Assistant Professor, GFT
Dr. K. Birnie	Clinical Psychologist, Assistant Scientific Director for Kids in Pain (SKIP)	Assistant Professor, GFT
Dr. A. Gregory	Cardiac Anesthesia	Assistant Professor, GFT
Dr. M. Davis	Residency Program Director	Clinical Assistant Professor, MPT
Dr. J. Hamming	Medical Director, Acute Pain Service	Clinical Assistant Professor, MPT
Dr. K. Darcus	Clerkship Director	Clinical Associate Professor, MPT
Dr. T. Trinh	FPA Residency Program Director	Clinical Assistant Professor, MPT
Dr. K. Shinkaruk	Pain Medicine Residency Program Director	Clinical Assistant Professor, MPT
Dr. K. Darcus	Clerkship Evaluation Coordinator	Clinical Assistant Professor, MPT
Dr. M. Hayter	Simulation Medical Education Coordinator	Clinical Assistant Professor, MPT

Section Reports

Peter Lougheed Centre

Section Chief: Dr. D. Jordan

The big news this year was the arrival of the Corona Virus in Canada followed by the declaration of global pandemic by the WHO on March 11, 2020. Surgical services were disrupted as a result and we focused care on urgent/emergent cases and cancer cases. As a result, many elective or urgent surgical cases have been postponed. I would like to take the opportunity to acknowledge the effort that so many members of our department made, and continue to make, to ensure that our operating rooms would be safe and ready to deliver anesthetic care as CoVID arrived in Calgary. Thank you!

The Peter Lougheed Centre will have approximately 5,500 obstetric deliveries this year. This will likely be slightly higher than past years due to the South Health Campus being temporarily relocated here as part of the CoVID response in March 2020. We provided care for about 4,600 of these deliveries through providing labour analgesia or anesthesia for caesarean section.

The pandemic also had a large impact in the overall number of surgeries completed this year. It is anticipated that we will complete 12,500 cases by the end of June 2020. This is less than years prior by about 1,500 cases. In addition to the main operating theatres, PLC also provides anesthetic care in two specialized vascular surgery theatres.

Our Section has increased our presence in the GI clinic this year.

We provide anesthesia for complex patients coming for ERCP, endoscopy, and colonoscopy. In addition, we continue to provide anesthetic services to the Department of Radiology, Women's Health Clinic, and Psychiatry. Peter Lougheed Centre Section of Anesthesiology has a dedicated team providing care for a busy Acute Pain Service and Pre-operative Assessment Clinic.

Manpower

PLC Section is made up of 38 Anesthesiologists. Over the past year, we have had one retirement from the department. Dr. Sandy Shysh retired in January 2020. The department wishes him the best in retirement and is grateful for his years of dedication, hard work, and caring for Albertans!

Dr. Shysh arrived in Calgary in July 1988 to complete his residency. Following this, he achieved a Masters in Medical Education, the first student in the Calgary program. For his thesis titled "Teaching and Learning in the Operating Room", he received a significant grant from the Royal College of Physicians and Surgeons of Canada. Sandy then became Residency Program Director and was quite involved in the CaRMS match, having been involved in the selection of several residents who eventually came on as staff here in Calgary.

He also published abstracts, an editorial, and was an invited speaker at several international conferences regarding anesthesia education. Later, after Sandy moved his practice from the FMC to PLC, he was "interim" Director of the Acute Pain Service, but subsequently completed a full term in this position. He was very honoured to assist Roberta DeJong in the preparation of a review article that was published on Multimodal Analgesia for BKAs. Sandy also facilitated many resident research projects and has recently assisted Dr. Judy Marois with her fellowship project in developing a Return to Work Program.

In retirement, Sandy looks forward to reviving his interest in playing violin and making more Ukrainian Easter Eggs. Most importantly, number one pick each day for an FDO!

The PLC Section of Anesthesiology extends a warm welcome to Drs. K. Biefer, A. Moazeni, and D. Milne who have been hired this past year.

Dr. Kristen Biefer was born and raised in Calgary. She lived in Edmonton for nearly ten years doing medical school and residency, and then moved back to Calgary to pursue a fellowship in perioperative ultrasound. She's very excited to join the group at the PLC and put her echo and ultrasound skills to work! She has many interests, including cultivating tropical houseplants, cooking (a recently discovered enjoyable pastime), reading, biking, and having meaningful conversations with others.

Dr. Afra Moazeni completed her undergraduate studies and medical school at the University of Saskatchewan. She moved to Ottawa for her first year of Anesthesia residency before transferring to the Calgary program to join her husband and finished her residency training in June 2017. She completed a Perioperative Ultrasound fellowship in Calgary 2018. She has an interest in perioperative medicine and regional anesthesia. She also hopes to be involved in medical education and the training of future anesthesia residents in Calgary. Afra and her husband, Ani, have their hands full these days with their 10 month old chubby-cheeked twin daughters, Nessa and Neva. They also have a three year old cockapoo named Juno who holds a managerial position in their home and does her best to mostly avoid the twins.

Dr. David Milne has joined our group this summer. He has held numerous administrative roles over the years and we look forward to his contributions to our group.

Lead Educational, Clinical and Provincial Roles

Thank you to all of our staff members who continue to work tirelessly to fill academic, administrative, and educational roles. Provincial and Zone positions held by members of our Section include:

Dr. Gary Dobson, Zone Clinical Department Head

Dr. Graeme Bishop, RPC Associate Program Director, Competence Committee Chair

Dr. Karl Darcus, Clerkship Director

Drs. Wood, Milne, and Pearce, AMA Anesthesia Section Executive

Alberta Children's Hospital

Section Chief: Dr. K. Carter

Beginnings, Endings and COVID

2019 – 2020 began with welcoming our new hires: Dr. Scott Else and Dr. Lindsay McMillan back to Calgary and ACH. Both resident graduates of the Calgary program they were well known to our team members and seasoned pediatric anesthesiologists. Dr. Else completed a fellowship at Harvard and then worked at Stollery Children's Hospital in Edmonton and as a locum in Calgary. Dr. McMillan completed her fellowship at Denver Children's Hospital and then was a staff pediatric anesthesiologist at BC Children's Hospital. We are lucky to have them join our team and bring with them a wealth of enthusiasm and experience, both picking up resident education awards in their first year here. We celebrated their arrival with a fall welcome social at Wildrose Brewery.

Dr. Michelle Theam welcomed her daughter Elise to join their family late August. Our RT team lead, Chelsey Neda, welcomed her daughter Scotti, while the RT team senior members including Hugh Allen and Katie Andrews COVID-responded like the champions they are.

Our program of anesthetizing locations and patient numbers remained similar to previous years until COVID changed all of the surgical services work. The team pulled together during this unprecedented time quickly changing our communication practices, developing protocols to ensure staff and patient safety, all while completing Medically Necessary Time Sensitive surgery for our sickest patients. Dr. McLuckie's donning/doffing video has been used as a Canada wide resource. Our Out of OR ARP provided flexibility with our manpower requirements during this time. Our Pediatric Anesthesia team continues to work in many different settings from palliative care, adult anesthesia, regional anesthesia, all types of pain medicine, helicopter emergency medicine, and pediatric critical care transport and has many varied interests from quality, education, administration, simulation and airway management. They have presented at many local and national conferences.

Our Professor, Dr. Robin Cox will no longer be working in the operating room environment, caring for his last anesthetized patient in March 2020. During his career, he has provided so many children expert pediatric anesthesia care. He will; however, continue to be busy in POAC providing education support to learners and representing us at the University of Calgary and outside of ACH.

After a 24 year career at Alberta Children's Hospital, as a Pediatric Anesthesiologist, Dr. Alastair Ewen will be transitioning his anesthesia practice over the next six months. Dr. Ewen has accepted a new position as the Medical Director of the Surgical Centres Inc Riverview clinic. He will continue with work at ACH until the end of 2020.

Our national Canadian Pediatric Anesthesia Society continues to be active with Dr. Luntley on CPAS board. Projects from CPAS include funding the training of pediatric anesthesiologists in the developing world, pediatric fasting guidelines and pediatric anesthesia fellowship development in Canada. Dr. Carter is the incoming Pediatric

Section Chiefs of Canada chair. October 2019 saw an initiative out of Toronto Sick Kids, Canadian Anesthesia Perioperative National Outcomes Data-lake (CANPPOND). This is nation-wide database with a focus on perioperative outcomes. Our participation in the Pedi-R registry with the difficult airway working group led by Dr. David Lardner has launched and we look forward to the data flowing back to our section. We gathered data for an aligned study looking at airway management during COVID with the same group.

Leo Strunin Award Recipient

Dr. Duncan McLuckie

The CAS meeting was held in Calgary during June 2019. Our section provided a number of pediatric presenters and held an evening gathering for pediatric anesthetists from across the country.

The ACH obtained ongoing level one trauma accreditation with Drs. Mulvey, Luntley, and McMillan represented section on ACH trauma committee and trauma safety committee. Dr. Mulvey was COVID-cancelled midway through his sabbatical to HEMS London UK, and has come back to start his new position as the Medical Director of STARS Calgary.

Our team's commitment to working in the developing world providing pediatric care continued right until COVID closed travel.

Our retreat was COVID-poned, along with many other spring, summer and fall activities. We did manage an outdoor get-together to celebrate the successful fellowship of Dr. Tanya Santella, whose Montreal flair and superb neonatal and pediatric anesthesia skills will be missed by the ACH OR teams. We wish her well in her career and plan a proper celebration in the future.

Dr. Hardcastle and Dr. McMillan lead our education team, Thank you to Dr. Luntley for his time as residency site co-ordinator up until he stepped aside in December 2019. Key highlights of our education year were Dr. McLuckie received the Leo Strunin Award and Dr. Gale won outstanding educator for our site. The opportunity to provide more access to pain education for residents with an interest in all types of pediatric pain. Please see Dr Hardcastles education report.

Dr. Theam leads our quality program and continues to work on projects including a standardized OR-PICU Handover process and content and continues to improve our Idiopathic Spine Care. Peds NiSQUP started then COVID-paused.

Our pain teams, complex and acute and newly an emerging transitional pain team have continued to work hard for our patients. The Canadian Pain Society meeting scheduled to be held in Calgary in June was COVID-cancelled, we had planned so many satellite events to highlight our talented team and educate ourselves more. We hosted a Calgary Pediatric Pain Seminar February 5, 2020 at Alberta Children's Hospital, with over 150 attendees and had guest speaker Dr. Elliot Krane from Stanford University. The conference focused on educating health care providers in latest best-evidenced pediatric pain practices.

Dr. Jillian Vinall Miller is the newly hired Assistant Professor, in the Department of Anesthesiology, Perioperative and Pain Medicine, as a GFT. She is a pediatric pain neuroscientist. She has been studying pediatric pain in both healthy and clinical populations for over a decade, and has expertise in both acute and chronic pain, and the transitions in-between, from infancy through to early adulthood. She leads the Pediatric Anesthesia, Imaging & Neurodevelopmental Science (P.A.I.N.S) lab at the Alberta Children's Hospital, and the focus of her research is on the effects of pain and anesthesia on the developing brain.

Dr. Katie Birnie is a clinical psychologist who has recently joined the Department of Anesthesiology, Perioperative and Pain Medicine at the University of Calgary as an Assistant Professor. Dr. Birnie leads the Partnering for Pain research lab, and bring extensive and innovative expertise to pediatric pain assessment and psychosocial management, patient engagement, and implementation science. She joins us as the new Assistant Scientific Director for Kids in Pain (SKIP), a national knowledge mobilization network, and is a practicing psychologist at Alberta Children's Hospital.

The Vi Riddell clinical pain research team, comprised of Drs. Jillian Miller, Katie Birnie, Melanie Noel, Tiffany Rice, and Nivez Rasic, has 17 ongoing research projects, has received over $1.1 million in grant funding, and 33 publications. Dr. Birnie received the Pain Awareness Award for the Canadian Pain Society and Dr. Miller received the Best Paper in Neuroanesthesia at the Canadian Anesthesiologists' Society. Both Drs. Birnie and Miller each received the Canadian Pain Society Early Career Investigators Grant Award this year. Dr. Katie Birnie and Nivez Rasic were awarded the Mayday Pain & Society Fellowships for 2020 – 2021. This fellowship provides public engagement and leadership training for pain experts to assume public leadership roles to help end human suffering from pain. Please see Appendices C – Vi Riddell Pain and Rehabilitation Research Annual Report for further details.

Rockyview General Hospital

Section Chief: Dr. C. Sims until June 30th 2020, Dr. R. Eng – as of July 1st)

The Rockyview General Hospital section of anesthesia currently includes 35 anesthesiologists. We have a wide range of full-time and part-time practices. This section provides anesthesia care and teaching at the RGH facility; as well as, privately-owned publicly-funded Non-Hospital Surgical Facilities which provide mostly eye surgery.

Our section is also currently staffed to accommodate two privately-owned privately-funded surgical facilities, Canadian Surgical Solutions, and the South Calgary Oral and Maxillofacial Surgery Centre. Section members who work at these facilities do so on average for about 20 percent of their practice.

The section provides daily service to 14 operating rooms at RGH; as well as, a dedicated anesthesiologist in the L&D suite and another anesthesiologist for out-of-OR duties including pre-operative assessment clinic, ECT, acute pain service (with the help of our acute pain nurses), and in-hospital consults. Our outside facilities' daily requirements are somewhat variable. Typically we staff between two and three NHSF eye lists, and approximately three private facility lists on a daily basis. In terms of call coverage, we have two members covering the OR, one covering the L&D suite, and one covering the acute pain service.

We have had, and continue to have, a number of personnel changes this year:

- Dr. Brenda Lee has ceased doing regularly scheduled work, and helps us out occasionally on a casual basis. She will give up her privileges at the end of 2020.
- Dr. David Kent stopped working at RGH in July 2020. He is retiring to Vancouver where he plans to do some locum work, as well as spend a lot of time boating and skiing, we expect.
- Dr. Nadine Lam started working with us in July 2020 at a 0.6 FTE level. She will have just finished her residency here in Calgary and plans to pursue a master's degree at the University of Calgary during her first year in our department.
- Dr. Kelly Shinkaruk will transfer to our section in July 2020 from her current position at FMC. She will work at our site at a 0.6 FTE level. She will continue to work in chronic pain; as well as, maintain her position as Program Director for the Chronic Pain Residency Program.
- Dr. Lori Olivieri will transfer to our section in September 2020 from her current post at SHC. She will job-share with Dr. Farrah Morrow.

The following department members were recipients of postgraduate medical education awards:

- Dr. Paul Dawson – Excellence in Postgraduate Medical Education Award
- Dr. Niamh Donnelly-Warner – Excellence in Postgraduate Medical Education Award
- Dr. Reuben Eng – Faculty Extra Mile Award, Excellence in Postgraduate Medical Education Award

- Dr. Wendy Hall – Excellence in Postgraduate Medical Education Award
- Dr. Megan Hayter – Excellence in Postgraduate Medical Education Award
- Dr. Udell Larsen – Excellence in Postgraduate Medical Education Award
- Dr. Rod Schultz – Outstanding Educator Award, Excellence in Postgraduate Medical Education Award
- Dr. Zahid Sunderani – Excellence in Postgraduate Medical Education Award

In July 2018 Dr. Ray Zhou joined our section. Dr. Zhou was a cardiac anesthesiologist in London Ontario, and is a skilled practitioner of transthoracic echo and TEE. He really hit the ground running at RGH this year, given he won the Excellence in Undergraduate Education for the Rockyview General Hospital for 2019. This is awarded by the Anesthesia Clerkship Committee in recognition of his teaching in the mandatory anesthesia clerkship rotation. He is now the clerkship rotation coordinator for RGH.

Last but not least, we were lucky to have had Dr. Farrah Morrow join our department in 2018. Dr. Morrow was a member of the South Health Campus section of Anesthesiology, and was the Section Chief for her last few years there. She is now one of our schedulers, which is a very challenging job, given so many variable RGH schedulers have to deal with.

I've never been more pleased with our workforce than I am now, and I'm looking forward to more additions in 2020.

South Health Campus

Section Chief: Dr. L. Olivieri

2019 – 2020 was the seventh fully operational year for surgical services at South Health Campus. The Section consistently works towards being a Zone leader in Regional Anesthesia and Acute Pain Management, Simulation and Education, and Quality Assurance. The Section's mission statement remains, "to provide superior, innovative anesthetic and perioperative care for our patients, and enhancing the knowledge and skills of ourselves, our colleagues and our trainees through excellence in teaching, research and ongoing professional development."

SHC continues to have low-risk bariatric surgery, colorectal surgery, flap procedures for breast reconstruction, upper and lower joint arthroplasty programs, advanced auditory programs (including cochlear implants), hand surgery and surgical sports medicine programs, in addition to an extensive ambulatory surgery program. The four-bay SHC PACU block area supports the provision of regional anesthesia and ultrasound-guided line placement to patients. The PACU block area facilitates approximately 3,300 – 3,500 regional anesthesia procedures annually. This unique multi-disciplinary work area allows anesthesiologists to provide advanced pain management modalities to preoperative, postoperative, and outpatient (eg. minor surgery, epidural blood patch) patients with the support of PACU nurses and Anesthesia RRTs. The PACU block area has three dedicated ultrasound machines and two peripheral nerve stimulators. Gastric ultrasound, basic trans-thoracic echocardiography, and basic lung ultrasound scanning can also be supported.

Anesthesia residents and fellows participate in regional anesthesia and perioperative ultrasound rotations in the SHC PACU block area. Over the past few years, the anesthesia group has been trialing an "out of OR" position, in order to evaluate the feasibility of a daily PACU block area-dedicated anesthesiologist.

In the last year, SHC Anesthesia has participated in a "Building Healthier Workplace Culture" Initiative, led by Dr. Yael Moussadji and Doreen Pershon. Thus far, the project has involved confidential interviews and an anonymous survey completed by Section members, as well as certain other key stakeholders. Over the summer, Section members will be invited to focus groups with the goal of developing an Action Plan to address opportunities for growth and improvement.

SHC Leadership Positions and Contributions

- Dr. Lori Olivieri Section Lead, SHARP* Committee Member, Residency Academic Coach Dr. Jarad Stephan Deputy Section Lead**, SHC Search and Selection Committee (co-Chair), Transitional Pain Services Lead
- Dr. David Milne AMA Anesthesia Section representative, Deputy Section Lead**
- Dr. David Goldstein PAC Anesthesia Lead, Specialist Link Lead for Anesthesia (citywide), Connect Care Area Trainer, Deputy Section Lead**, SHARP* Committee Member, Search and Selection Committee (co-Chair)

- Dr. Fayaz Bharwani SHC Obstetrical Anesthesia Lead, SHARP* Committee Member (Chair), SHC Search and Selection Committee (co Chair), SHC Women's Health Leadership Committee, SHC Maternity Working Group, FMP OR Transfer Working Group
- Dr. Mark Cheesman Section Scheduler, SHARP* Committee Member
- Dr. Ryan Endersby Acute Pain/Regional Anesthesia Lead, Perioperative Ultrasound Fellowship Site Lead, SHC Regional Anesthesia and Acute Pain Medicine Fellowship Coordinator, Workshop instructor for ASA, CAS and Banff FP-A conferences, Calgary Anesthesia Fellowship Advisory Committee, Q-Path Site Lead, SHARP* Committee Member (out-going), Alberta Pain Strategy Perioperative Pain Management Working Group
- Dr. Shaylyn Montgomery PACU-DSU-SSU-Ward Lead, SHC Block Area Lead, SHARP* Committee Member, Assistant Director of the SHC Regional Anesthesia and Acute Pain Fellowship, Residency Academic Coach
- Dr. Ted Schubert Out-of-OR Anesthesia Lead, Residency Academic Coach
- Dr. Leyla Baghir-Zada Quality/Safety Lead, South Health Campus Quality Council, ER-ICU Liaison, SHC NSQIP Champion, ATLS Instructor, Physician Examiner for the National Assessment Collaboration (NAC) Examination
- Dr. Tony Trinh Family Medicine Anesthesia Program Director
- Dr. Alan Chu PGME Site Coordinator, UGME Site Coordinator, Lead Residency Academic Coach Program, Lead Mentorship Teams Program, CaRMS Committee, CBD Leadership Committee, SHARP Committee Member, RRT Liaison, ER Airway Liaison
- Dr. Nathan Brown Residency Training Committee, Regional Anesthesia Rotation Coordinator, RTC Assistant Site Coordinator, Minor Surgery Block Program Lead, EBP Program Lead, CaRMS Committee *SHARP stands for "Strategic Human and Resource Planning Committee" **SHC has had three different Deputy Section Leads over the past 12 months
- Dr. Esther Ho Treasurer/Secretary, Annual Retreat Organizer, Connect Care Super User, Citywide Simulation Committee Member, SHC NSQIP Working Group Member
- Dr. Afra Moazeni CME Rounds Coordinator, RPC member, Residency Core Program Co-Coordinator, Calgary Anesthesia TEE/TTE Committee, CaRMS Committee
- Dr. Melissa Jack SHC MSA President, Research Judge for the Residency Research Dinner, Residency Academic Coach, Women in Leadership Committee
- Dr. Ulyana Nemish SHC Annual Retreat Organizer, Choose Wisely SHC Lead, SHC OR Laser Safety Committee, ATLS Instructor
- Dr. Mark Kostash Perioperative Ultrasound Fellowship Site Deputy Lead, Citywide NHSF Committee (out-going)
- Dr. Matthew Banasch SHC Family Maternity Working Group, Citywide NHSF Committee (ingoing), Citywide Simulation Committee Member

SHC Surgical Services

The SHC site has up to nine elective operating rooms, including one Access room and one Ortho Trauma room, running daily. There were 10,250 surgical cases carried out last year. SHC routinely provides Anesthesia services for the outpatient 7th floor Gyne clinic procedure room, Diagnostic Imaging (for imaging investigations and kyphoplasty procedures), ECTs, and GI Endoscopy. One staff person is also assigned to an off-site NHSF list, up to four days a week. The SHC Anesthesia section staffs two on-call anesthesiologists per day, one for the main operating room and one dedicated to obstetrical anesthesia care.

During certain weeks of the COVID pandemic response, SHC created a third on-call position: Airway Anesthesia Call. SHC supports placing peripheral nerve blocks for patients booked for minor surgery (56 elective upper limb peripheral blocks from April 1, 2019 - March 31, 2020), expanding the scope of procedures done in the Minor Surgical Center. There were 25 epidural blood

patches for spontaneous intracranial hypotension performed from April 1, 2019 - March 31, 2020 (in PACU, via minor surgery), in conjunction with the Calgary Headache Assessment & Management Program (CHAMP).

SHC Pre-Admission Clinic

The Section staffs an on-site pre-operative assessment clinic (PAC) that continues to manage increasing demands for patient assessments. The PAC Anesthesia lead is David Goldstein and he has worked closely with GIM and nursing, to review and implement improvements to clinic management. To that end, Dr. Goldstein is participating in a multidisciplinary committee involving an AHS QI lead Sandra Young to revise booking processes over the next year. Nathan Morin (pharmacy), in consultation with Dr. Lori Olivieri, trialled a PAC perioperative diabetes management protocol in this year. The new protocol involves the PAC pharmacist screening certain at risk patients for a Preop insulin sliding scale that is applied in DSU on admission. The trial was a success and as a result, the same process will be extended to postoperative inpatient surgical ordering.

SHC Family Maternity Place (FMP)

South Health Campus saw 3,074 deliveries in 2019 – 2020. Two operating rooms in the main OR area are dedicated to elective and emergency obstetrical operative management. The labour epidural rate was 80% and the caesarean section rate was 28.3%. VBAC deliveries (78.3% success rate) and vaginal breech deliveries (19 cases) are supported at SHC. There were also over 17.2% assisted vaginal deliveries at SHC. Anesthesia for Cerclage procedures and External Cephalic Versions are routinely provided at SHC. Hospital RRTs continue to be called for most Eo caesarean sections (after hours), to provide the option of immediate access to a "second pair of skilled hands" in potential General Anesthesia emergency obstetrical cases. SHC FMP collects patient feedback on a monthly basis, allowing team members to receive patient appreciation and identify areas for improvement in a timely fashion.

SHC Acute Pain Services

The SHC APS saw a total of 1,168 inpatients for the following: peripheral nerve blocks (997 single shot and 18 continuous), epidural infusions (44), PCAs (15), ketamine and/ or lidocaine infusions (7), and acute on chronic pain consults (87). Dr. Ryan Endersby, Rosa Reyes and Kayla Denness, in conjunction with Dr. Kate Elzinga from Plastic Surgery, have developed a new postoperative pain management information sheet for outpatient hand surgery patients. Also, in collaboration with Dr. Justin Leblanc and Dr. Carmen Brauer from Orthopedic Surgery, the APS Team completed the postoperative patient pain information documents for shoulder arthroplasty and pediatric upper extremity surgery, respectively. Finally, the APS team finalized of a generic postoperative patient pain information document applicable for most surgeries at SHC.

Rosa Reyes continues with the position of the APS clinical lead for the Calgary Zone. She also continues with the AB Pain Strategy – Medication Policies working group, as well as the Connect Care APS working group, and updates of the APS learning modules. Jennifer Marquardt has temporarily accepted the Nurse Clinician position, while Kayla Denness is on leave. Kayla Denness, CNS for APS has accepted the position of Senior Practice Consultant for the Provincial Acute Pain Initiative for the next two years.

Transitional Pain Services

The SHC Transitional Pain Service (TPS), led by Dr. Jarad Stephan, Dr. Jennifer Joo, and Rosa Reyes NP, opened in the SHC Pre-Admission clinic in the fall of 2017. The TPS welcomes Dr. Marie-Eve Beauchemin-Turcotte to the team with hopes of expanding the service zone-wide. This outpatient clinic continues to support patients identified at risk for challenging pain management in the perioperative period, such as those patients with significant opioid tolerance and/or complex pain syndromes. SHC surgeons, anesthesiologists and APS nursing staff have the opportunity to involve chronic pain specialists in patient care prior to surgery, prior to discharge from hospital, or after discharge for ongoing pain management support. This advanced outpatient pain management service adds to our Section's goal of creating a

comprehensive "perioperative surgical home". Since November 9, 2017, the TPS has seen a total of 836 patients with 603 visits in the past year. The team has seen an average of ten new patients per month for each specialist MD and NP. The service has seen an additional 125 new patients in 2019.

During the COVID OR reductions, TPS accepted urgent consults to manage patients in pain crisis (virtually), while awaiting elective surgeries to resume. The team is continues to work on a QI study to determine if the service has made a difference in patient outcomes and opioid use, in comparison with patients who have not been referred to the TPS program. Last year, the TPS won the Health Quality Council of Alberta Patient Experience Award and was nominated for the AHS President's Excellence Award.

Quality Assurance and Patient Safety

Dr. Leyla Baghirzada has been participating on a multidisciplinary OR-ICU committee (led by Michelle Shand RN and Rachel Taylor RN) tasked to implement the Zone-wide ICU-OR Handover Tool. Other members involved in this project were: Drs. David Goldstein, Lori Olivieri, Matthew Banasch and Ted Schubert.

Dr. Leyla Baghirzada is the Anesthesia NSQIP Champion for SHC, working closely with Dr. Carmen Brauer (SHC Surgery NSQIP Champion) and Stacey Robinson RN on the implementation of this global QI/QA program. The team has lead working groups on timely antibiotic delivery and reducing the risk of hypothermia perioperatively.

Dr. Esther Ho sits on one of the multi-disciplinary NSQIP working groups. The OR-PACU-DSU flow efficiencies quality improvement project was a QI project to improve patient flow and increase efficiencies, while focusing on patient and family centred care throughout the patient's entire surgical journey.

Dr. Shaylyn Montgomery was the anesthesia lead; Sophie Goodman RN, Brigitte Killian RN and Michelle Shand RN were the nursing manager unit leads. Drs. Lori Olivieri and Jenni Joo directly participated in the FMP "Respect in the Workplace" multi-disciplinary seminar, as part of a larger SHC FMP Culture project.

Drs. Fayaz Bharwani and Matthew Banasch participated on a FMP QI working group that developed the use of a secured dropbox (attached to all of the FMP epidural carts) for unused ampoules of fentanyl.

Simulation

Our section continues to value the use Simulation for allied health care education and patient safety initiatives, in the OR and PACU, as well as on FMP. Prior to COVID, simulation was employed to trial the launch of the SHC ICU-OR Handover Tool. Drs. Ted Schubert and Matthew Banasch participated in these multi-disciplinary eSim sessions. The COVID pandemic resulted in extensive use of Simulation to develop and teach new policies and procedures in Anesthesia and OR team management, including intubation/ extubation practices in the OR, ED and ICU. Dr. Esther Ho was the Lead Anesthesia Educator during COVID. Dr. Matthew Banasch also organized multi-disciplinary eSim sessions in the ED and ICU, as part of the implementation of the On Call Airway Anesthesiologist role. The AHS COVID OR video was filmed under the direction of Dr. Megan Hayter (RGH Anesthesiologist and Citywide Simulation lead) in a SHC OR, and "starred" Drs. Susan French and Ted Schubert.

Academics and Teaching

Dr. Tony Trinh continues in the role of Program Director for the Family Medicine Anesthesia program at Cumming School of Medicine, University of Calgary. Dr. Trinh oversees two FP-A residents per year. Dr. Trinh recruited Drs. Ted Schubert and Melissa Jack to participate on the FP-A residency interview committee this year. Dr. Alan Chu is helping our Residency Program continue to transition to Competency-by- Design (CBD) as the Lead of Academic Coach Program for CBD and Lead of the Mentorship Teams Program in the residency program.

Dr. Ryan Endersby, with the support of Drs. Montgomery, Kostash, Spencer, Olivieri, and Fox, successfully developed the new SHC Regional Anesthesia and Acute Pain Management Fellowship program. The first SHC RA and Acute Pain fellowship candidate, Dr. Philippe Champagne, is scheduled to begin a 12-month fellowship program in October 2020. Dr. Ryan Endersby continues

as the Perioperative Ultrasound Fellowship site coordinator. Fellows focus on Ultrasound Guided Regional Anesthesia, but are exposed to other POCUS modalities, such as TTE, Lung, Gastric and Airway ultrasound. This year, we welcomed Dr. Daniel Mok for the January 2020 – 20201 academic year.

Dr. Ryan Endersby was awarded Outstanding Educator for SHC by the U of C Anesthesia Residency Program. Excellence in Postgraduate Education Awards were given to Drs. Nathan Brown, Shaylyn Montgomery, Dr. Jenni Joo, Dr. Ryan Endersby and Dr. David Goldstein. The SHC Annual Retreat took place on September 19, 2019 at the Calgary Fort. The event was organized by Drs. Ulyana Nemish and Esther Ho. The topics included "Billing Advice" from the AMA, as well as "Disclosure and Resilience after an Adverse Event" from the CMPA. Dr. Alan Chu participated in the University of Calgary Pathways to Medicine Program, as a mentor and admissions reviewer.

Other Contributions

- Dr. David Goldstein has undergone training as a Connect Care Area Trainer and Dr. Esther Ho is now a Connect Care Super User.
- Dr. Melissa Jack participated in the Women in Leadership committee, bringing forward actionable items to AHS in the said area.
- Dr. Ryan Endersby is participating in the Alberta Pain Strategy Perioperative Pain Management working group, which consists of pain experts from across the province. Dr. Ryan Endersby worked with Dr. Marelise Kruger on developing standardized regional anesthesia and POCUS reporting templates for Q-path.
- Dr. Ulyana Nemish participated in the University of Calgary medical school admissions process as an interviewer.
- Dr. Alan Chu returned to Guyana as part of the CASIEF Guyana Project, to support their physician anesthesiology program. Dr. Chu helped to develop a unique regional anesthesiology fellowship program in Guyana.

The COVID Pandemic

The SHC Section of Anesthesia mounted a highly organized response to COVID, with numerous leaders contributing substantially to the creation and organization of excellent care paths, processes and policies, in very short periods of time. The planning of main OR COVID footprint and services was overseen by Dr. David Milne, Dr. Marcia Clark (surgery) and Crystal Cunningham RN. This pandemic inspired many of our staff to dedicate enormous hours of personal time to COVID initiatives. As only a few of several examples, Dr. Mark Cheesman spent numerous hours adjusting schedules repeatedly as manpower resources changed week-to-week in a highly unpredictable fashion. Many staff also came into work daily to develop and run multiple simulations with their anesthesia colleagues, as well as other allied health care team members.

Dr. Esther Ho, Dr. Tony Trinh, Dr. Susan French, Dr. Ted Schubert, Dr. Ryan Endersby, Dr. Matthew Banasch, Dr. Alan Chu, Dr. Melissa Jack, Dr. Adam Spencer, Dr. Jenni Joo, Dr. Lori Olivieri, and Dr. Fayaz Bharwani were involved in multiple simulation sessions and videos, trialling innovative PPE ideas and techniques. Some of these innovative ideas resulted in publications.

On April 21, 2020, SHC FMP temporarily closed in order to consolidate FMP and NICU resources across the Zone. This change had a significant impact on SHC Anesthesia department member morale. The hospital community warmly welcomed the return of FMP on June 3, with a "cutting of the cord" (as opposed to a ribbon) ceremony. Dr. Fayaz Bharwani supported the reintegration of SHC FMP Anesthesia services, development of SHC Obstetrical COVID protocols, and to update our Section with the Obstetrical COVID protocols from the other adult centres.

Also during COVID, SHC Anesthesia developed and implemented a COVID Airway Team service for the hospital, under the leadership of Dr. Matthew Banasch. The roles and expectations of the Airway Team took into account the needs of the ICU, ER and Ward RRT staff. In addition to being immediately available to assist with emergency airways throughout the hospital, with dedicated in-house coverage, the Airway Team Anesthesiologist

participated on the Code Blue Team, during the peak of the COVID surge. And before FMP temporarily closed, the Airway Anesthesiologist also provided clinical support to the OB Anesthesiologist and Main OR Call Anesthesiologist for COVID OR cases. The emotional, physical and cognitive loads that COVID has created and continues to create for anesthesiologists across the city cannot be over-stated.

Below are the different roles and committees taken on by SHC staff anesthesiologists during relatively large-scale and rapid preparations for COVID:

- Dr. Lori Olivieri SHC COVID Incident Command Post (IPC) committee member, SHC OR Planning Committee member, COVID Airway Team Committee member
- Dr. David Milne COVID Anesthesia-OR Lead, SHC OR Planning Committee co-Lead
- Dr. David Goldstein COVID Anesthesia-ICU liaison, COVID OR planning committee member, COVID PAC lead Dr. Fayaz Bharwani COVID OB Anesthesia Lead
- Dr. Matthew Banasch COVID Airway Team Lead
- Dr. Esther Ho COVID Education Lead
- Dr. Tony Trinh COVID Education and PPE leader

New Recruitment and Departures

SHC's anesthesia manpower has remained fairly stable, but sadly, a few anesthesiology staff members have decided to move their clinical practices to other sites within the city at the end of this current academic year. SHC is undergoing a Search and Selection process, under the leadership of Drs. Bharwani and Goldstein. Dr. David Milne will join the PLC at the end of June 2020 and Dr. Afra Moazeni moves to the PLC in September 2020. Dr. Lori Olivieri starts at the RGH in September 2020. Dr. Olivieri steps down as Section Chief at that time. These staff anesthesiologists have contributed significantly to the SHC work environment, and will be missed and SHC Anesthesia wishes them the best in future endeavours.

Dr. Mark Kostash was originally scheduled to retire from AHS in May 2020, but happily, has decided to defer retirement to Christina Lake, BC to January 2021 (and maybe later). Dr. Susan French COVID Education and PPE leader, COVID Information Management Lead, COVID Airway Team Committee member Dr. Ted Schubert COVID Education and PPE leader, COVID Airway Team Committee member, COVID Out of OR Lead Dr. Shaylyn Montgomery COVID PACU Block Area Lead, SHC PPE Working Group Dr. Ryan Endersby COVID Education and PPE leader, COVID APS Lead

Clinical Services

Anesthesia Assistants

Michael Coutts, RRT

Michelle Lohman, RRT HBSc

Over the past year it was business as usual until the arrival of Covid-19. During the start of the pandemic we were faced with many challenges which all team members participated in the new workflow developments and adapted to these changes to ensure optimal patient care.

As with many areas, our Section was faced with the challenge of COVID-19 preparations. This work included:

- Redeployment/training of Anesthesia RT's to the five acute care ICU's
- Ensuring all staff were properly trained, fitted, and educated for recommended AHS PPE requirements
- Adding a second call back person due to increased workloads
- Collaborating with colleagues, other departments to create and update Policies and Procedures
- Development of Airway Teams
- Increased support managing staff's physical and mental health
- Creation of COVID-19 airway carts, isolation carts, isolation theatres

There are 69 Anesthesia Respiratory Therapist IIs and seven Anesthesia Respiratory Therapist site leads. There are 28 Anesthesia Aides and relief staff distributed among the five sites. To provide efficient service coverage at all sites we have many staff that work at multiple sites.

Anesthesia Respiratory Therapists continue to provide high level service delivery to all areas that require an Anesthesiologist. This service delivery involves clinical and technical support of anesthesia equipment. Anesthesia Respiratory Therapists are located at the five acute care centers within the Calgary Zone and provide consulting support for the rural sites (Canmore, High River, and Banff) as well.

Many experienced staff are currently on maternity leave and venturing into parenthood but returning over the next six months. We have added two new Anesthesia RT staff to our team at all sites, and therefore there will be some new faces at the bedsides.

Continuing education and policy/procedure development and updating continues. Continuing competency audits for advanced skill sets occur annually.

Within Anesthesia, five Client Coordinator support staff provide zone- wide support to clinical applications including Anesthesia Electronic Record (AER) and anesthesia scheduling software and other clinical applications. There is one Zone Senior Analyst, two Zone Clinical Educators and one Zone Equipment and Supply Coordinator.

Connect Care is scheduled to commence in the Calgary Zone in 2021. Our staff have begun to complete modules on 'My Learning Link'.

- ACH/PLC - June 5th
- FMC – Fall

The standardized Peadiatric Anestheisa carts have been implemented at all sites.

There continues to be increases in clinical activity at all sites which adds to the dynamics of ensuring appropriate equipment and clinical support staff. Although challenging we continue to support the surgical services.

Increases in outliers at most of the sites:

- ACH – Induction Rooms
- FMC - Cath lab (ablations, pacemakers)
- PLC – GI
- RGH – GI
- SHC - DI

Acute Pain Service

Dr. J Hamming MD FRCPC

Overview

APS, the acronym for Acute Pain Service or Anesthesia Pain Service (depending on the hospital), is a consultant service run by the Department of Anesthesiology, Perioperative and Pain Medicine. The APS service provides specialized consultative analgesic care to select patient cohorts. The primary patient cohort for the service is post-operative patients with moderate to severe pain, receiving analgesic treatment with regional anesthesia or specialized intravenous infusions, but may also include other patient cohorts, such as: polytrauma, intracranial hypotension syndrome, refractory cancer pain, post-dural puncture headaches, severe burns, and sickle cell crisis.

Like many services within AHS, the APS service was deeply impacted by the coronavirus pandemic in the late winter and spring of 2020. Surgical volumes were drastically reduced across the Calgary Zone hospitals, and thus the need for specialized post-operative analgesic care was likewise significantly reduced. Several of the APS nurses were redeployed to other essential services, while APS physicians took on additional duties to compensate for reduced APS service workloads. However, the APS service continued to provide excellent consultative care to those patients that required their expertise during the pandemic. At the end of spring and resumption of near normal surgical services, the APS service seamlessly resumed a more normal workload. I would like to thank the entire APS team across the Calgary Zone for their resilience and adaptability during this dynamic time.

Structure

The APS service is a component of Calgary's Department of Anesthesiology. The Departmental APS Medical Director, Dr. Jeremy Hamming, represents APS at the Anesthesia Zone Executive and partners with the other four Divisional APS Directors (one for each hospital in the Calgary Zone). There were some changes to site medical leads during the last year; the current site leads are: Dr. Jeremy Hamming (FMC), Dr. Karl Simon (RGH), Dr. Ryan Endersby (SHC), Dr. Linda Hung (PLC) and Dr. Meggie Livingstone (ACH).

The daily APS medical team is composed of anesthesiologists from each site, who rotate onto service. However, the backbone of the APS service is the APS nurses, with numbers varying from site to site and from designations of Nurse Practitioner to Nurse Clinician depending on individual service staffing requirements.

Clinical Activities

The primary activity of the APS team is providing clinical care to hospital inpatients referred to the service. Post-operative patients are offered a number of advanced modalities, including epidural catheter infusion, intrathecal narcotics, peripheral regional block or catheter infusions, ketamine infusions, lidocaine infusions, and narcotic infusions/PCA. The case mix has changed slightly from site to site compared to previous years, with expansions of some patient cohorts at some hospitals and coronavirus pandemic related reductions in others. Some notable changes include: increased use of IV lidocaine and ketamine at PLC, increased peripheral regional procedures at PLC, the rollout of IV ketamine and lidocaine infusions on Unit 83 at RGH, and the resumption of high dose cervical brachytherapy cases at TBCC with the peri-procedural concomitant use of neuraxial catheters.

A second, and somewhat overlooked service provided by APS across the zone is development of various analgesic policy and procedures and their implementation. Most of this work over the last two years has revolved around the production and testing for provincial order sets and policies associated with the rollout of Connect Care. Other activities include research and collaboration with various ERAS protocols and with the Transitional pain service. The Transitional Pain Service was started a few years ago at SHC. This program involves the APS nurses at SHC, as well as separate physician team although it is the APS service that is involved with inpatient care of these patients. The Transitional Pain Service will be expanding to the other hospitals in the Calgary Zone at some point in the future.

Throughout North America there has been a movement in reduction of opioid use in the peri-operative setting. This is, in part, a response to the rise in illicit opioid use and the particular challenges associated with the fentanyl crisis. Although the use of regional analgesia and use of multi-modal analgesia is not particularly new, the fentanyl crisis has certainly added extra incentive into implementation of opioid sparing techniques. The APS team at PLC and SHC have been leaders in the development and implementation of opioid minimization protocols.

Education and Research

During the Anesthesia residency training program, Anesthesia residents are exposed to APS at various points. Senior residents take their formal one month block in Acute Pain at the FMC site, usually in their PGY-4 or PGY-5 year. Junior residents also get exposure at FMC, participating in a one-week rotation as part of their general anesthesia rotation. Additionally, residents cover some of the night call for APS, under supervision of a staff anesthesiologist. Finally, residents gain further APS exposure as part of their regional rotation at SHC or PLC, and as a component of their pediatric rotations. In the near future, the APS program will host a pain fellow for one or two blocks, as well as provide a rotation to the thoracic anesthesia fellow, when that fellowship program starts up.

The APS nurses provide a lot of education to their nursing colleagues on a weekly basis in various capacities. They also provide reminders and protocol summary sheets to assist OR anesthesiologists with initiating the more advanced peri-operative protocols at the start of patient contact. The culmination of their annual teaching work is the Pain Awareness Day, now in its eighth year, although funding issues in the current fiscal environment may make further PAD untenable, though we all hope this will not be the case. The work of the APS nurses is highly regarded at the provincial level, and most of their teaching material is being updated and modified to serve as the nursing education resource for the province at large.

Members of the APS team across the city have been active in conducting and publishing research over the last several years. Research topics and production have been variable from year to year, but there are several notable mentions for this last year. First, there was a poster presentation at the ASRA meeting this spring "Practical Acute Pain Management for Patients Stabilized on Buprenorphine in Tertiary Care". There were two poster abstracts presented at the Canadian Pain Society: "Practical Acute Pain Management for Patients Stabilized on Buprenorphine in Tertiary Care" and "Case Report: Acute Pain Management of Patient Receiving Injectable Opioid Agonist Treatment (iOAT) following Total Knee Arthroplasty". Finally, there was a case report published in the Canadian Journal of Anesthesia: "Case Report: Perioperative Pain Management in a Patient On Injectable Opioid Agonist Treatment Undergoing Total Knee Arthroplasty" DOI: 10.1007/s12630-020-01765-7.

Cardiac Anesthesia

Dr. C. Prusinkiewicz

Vision

To improve the quality of life and longevity of patients with surgical cardiac disease by optimizing perioperative management

Mission

To be an international leader in the enhanced recovery of cardiac surgery patients and to excel in academic cardiac anesthesia

Overview

The Cardiac Anesthesia Group (CAG) consists of nine sub-specialty trained anesthesiologists who hold primary appointments in the Department of Anesthesiology, Perioperative and Pain Medicine (Foothills Medical Centre Section) with joint appointments in the Department of Cardiac Sciences. Group members also hold clinical appointments with the University of Calgary. All group members have successfully completed the National Board of Echocardiography Perioperative Examination and have received certification in perioperative transesophageal echocardiography from the College of Physicians and Surgeons of Alberta.

The current Director of Cardiac Anesthesia is Dr. Chris Prusinkiewicz and he represents the CAG on both the Zone Anesthesia Executive Committee and the Cardiac Sciences Executive Committee. Multiple group members hold leadership positions including Dr. Duc Ha (Section Chief for FMC Anesthesia), Dr. Alex Gregory (Director of Cardiac Anesthesia Research and Director of the Cardiac Anesthesia Fellowship Program), and Dr. Doug Seal (Cardiac Anesthesia Lead for Perioperative Blood Conservation).

The group has recently recruited Dr. Michael Gysel as a new member. Dr. Gysel will join the faculty in 2021, upon completing his fellowship in Cardiothoracic Anesthesia at Duke University. He will take a leadership role in developing quality assurance and quality improvement programs in cardiac anesthesia.

Clinical Practice

CAG members work in a multidisciplinary environment to provide anesthetic care for a complex variety of cases in an increasingly elderly patient population. Anesthesia services are provided for open-heart surgery, off-pump coronary artery bypass grafting, aortic reconstruction including deep hypothermic circulatory arrest, mechanical assist device support, total endovascular aortic repair, minimally invasive valve surgery, and complex pacemaker/implantable defibrillator lead extractions.

Outside the cardiac operating rooms, group members provide anesthetics in the cardiac catheterization laboratories for both electrophysiology procedures and for percutaneous structural heart procedures such as transcatheter aortic valve implantations, atrial septal defect closures, perivalvular leak closures, valvuloplasties, and left atrial occlusion device insertions. Upon request, members also provide care to patients with complex cardiac disease undergoing non-cardiac surgery. Outpatients awaiting heart surgery are reviewed by cardiac anesthesiologists at the weekly preadmission clinic, while inpatients receive preoperative assessments by cardiac anesthesiologists on an on-going basis.

Demand for cardiac anesthesia services continues to be high. In recent years, the CAG has expanded coverage to meet the demands of the Cardiac Surgical Uplift and an increased number of both percutaneous structural heart procedures and complex electrophysiology procedures. In the spring of 2020, cardiac surgical volumes and cardiology procedural case volumes were reduced due to the COVID-19 pandemic. Traditional CAG assignments were temporarily reduced to approximately 75% of the usual workload. During this time, CAG members contributed to the COVID-19 effort in multiple ways. CAG members served on the ECMO team, a multi-disciplinary team composed of surgeons, intensivists, anesthesiologists, nurses, perfusionists, and respiratory therapists, which inserted and managed extra-corporeal membrane oxygenation machines in patients failing traditional ICU ventilator therapy. CAG members participated in numerous COVID-19 clinical simulations, and were available for the anesthesia airway team. The COVID-19 response required flexibility even in traditional CAG assignments, such as a change in the pre-operative assessment clinic from an in-person model to a phone-based model.

In the coming months, the CAG anticipates increasing its clinical commitment further, in response to the planned increase in cardiac surgical volumes to allow for “catch-up” from the COVID-19 operating room slow-down. Although the COVID-19 pandemic was and continues to be a challenging time, the CAG has been most impressed by the way in which health care providers from many different fields have collaborated for the common cause.

Education

CAG members strive to provide the highest standard of clinical education and numerous members have been recipients of teaching accolades over the last year, including the Excellence in Medical Education Award received by Drs. Alex Gregory, Chris Noss, and Chris Prusinkiewicz. On an international level, Dr. Duc Ha represented cardiac anesthesia as part of a multi-disciplinary delegation who travelled to a large hospital in Gdansk, Poland, to provide education on minimally invasive cardiac surgery.

Anesthesia residents complete two blocks of cardiac anesthesia in their fourth year. Off-

service trainees rotating with the CAG include fellows from critical care medicine, cardiology, and perioperative ultrasound; as well as, residents from cardiac surgery. The group would like to acknowledge Dr. Nicole Webb who has taken over the role of cardiac anesthesia resident coordinator this year from Dr. Prusinkiewicz.

CAG members provide didactic teaching for the anesthesia residency cardiovascular core program on a bi-annual basis. Computer-based learning is available through the TeachingMedicine.com website, which is designed by group member, Dr. Jason Waechter, and includes modules on transthoracic and transesophageal echocardiography.

Research

The CAG has an active research program with numerous publications by multiple members. Highlights include recent publications by Dr. Gregory in JAMA Surgery, Annals of Thoracic Surgery, Journal of Cardiothoracic & Vascular Anesthesia, and the European Journal of Cardio-Thoracic Surgery (among others).

Regarding on-going research, we have successfully completed our participation in the multi-center CAMRA-1 study (Site Lead Investigator: Dr. A Gregory; Study Principle Investigator: Dr. V. Chan, University of Ottawa Heart Institute) and the manuscript has been submitted for publication in Circulation. CAMARA-1 evaluated the difference in trans-mitral pressure gradients during exercise in patients who received mitral valve repair surgery using one of two different repair techniques. Following a postponement in research due to the COVID-19 pandemic, we have resumed recruitment for our current active projects: NETWON-CABG (RCT of PCSK9-inhibitor vs placebo on CABG vein graft patency at 2-years), TITAN- SvS (a trial of early surgery versus surveillance in patients with intermediate risk aortic aneurysms), and a pilot study on the impact of CPB on platelet function using a novel platelet procoagulant membrane dynamics technique (in collaboration with Dr. E. Agbani). Recruitment is also ongoing for the PREPARE Study (Site Lead Investigator: Dr. R. Chun; Study Principle Investigator: Dr. D McIsaac, Ottawa Hospital Research Institute) which is a multicenter randomized trial of frailty-focused preoperative exercise to decrease postoperative complication rates and disability scores.

Dr. Seal is the project holder of the Foothills Medical Centre Staff Anesthesia Research Fund. The fund was established through the generosity of Dr. Tim Tang, a former CAG member, and was developed to promote research in the areas of cardiac anesthesia, patient outcomes and quality improvement.

Enhanced Recovery in After Cardiac Surgery

The CAG is on the forefront of the design and implementation of an enhanced recovery after cardiac surgery (ERACS) program. Enhanced recovery after surgery programs have been developed in other fields to improve patient comfort and outcomes, as well as to decrease the length of hospital stay. ERACS implementation involves a multidisciplinary team of health care professionals including anesthesiologists, surgeons, intensivists, and nurses. The ERACS pathway was successfully launched in Calgary in the summer of 2019, and collaboration is ongoing with the Cardiac Anesthesia Section of the Mazankowski Heart Institute to establish an Alberta-wide ERACS program.

Patient Blood Management Program

Despite steady improvements over the last decade, cardiac surgery continues to have a high rate of blood transfusion compared to other types of procedures. Preoperative anemia significantly increases a patient's chance of requiring perioperative blood products and the risk of transfusion-related complications. The Patient Blood Management Program has been launched to help identify and treat patients with preoperative iron deficiency anemia using either oral or intravenous iron. The algorithm also contains a provision for the use of erythropoietin in a select patient cohort. The medical leader of the initiative is Dr. Lorraine Chow and nurse Rebecca Rock is the Patient Blood Management Program Coordinator.

Cardiac Anesthesia Future Opportunities

1. The CAG has a leadership role in cardiac surgical ERAS. Future ERAS opportunities include: a) performing data analysis on existing interventions to determine their effectiveness and streamlining the ERAS pathway by eliminating interventions which are felt to be less effective and replacing them with higher-yield interventions; b) expanding the cardiac surgical ERAS program to become a province-wide initiative; and c) publishing the results of the Calgary cardiac surgery ERAS experience.

2. The CAG is developing our quality improvement/ quality assurance program, including the hire of a new colleague in the summer of 2021 who will lead this initiative. Areas of future work may include: a) examining the rate of perioperative neurologic complications following cardiac surgery, such as delirium and stroke; b) examining the rate of perioperative line infections; and c) further optimizing perioperative blood conservation.

3. The relationship between cardiac anesthesia, cardiac surgery, cardiac ICU, and cardiology is close and highly collaborative. The CAG expects to play a key role during anticipated expansions of the cardiac surgery program and cardiology device program.

Cardiac Anesthesia Future Challenges

1. A central challenge for the CAG involves unknowns about intermediate-term cardiac anesthesia workload, including accommodating plans for an anticipated future increase in cardiac surgical and interventional cardiology cases numbers, weighed against potential future operating room slow-downs in the event of a concerning increase in local or provincial COVID cases.

2. Providing adequate support for our developing research program.

3. Providing help for our developing QA/QI program, including introducing our new cardiac anesthesiologist to mentors in the field, and connecting him with appropriate local QA/ QI resources.

Calgary Pain Program

Dr. L. Montgomery

Chronic Pain Centre

We are very pleased that we were able to maintain our progress with regard to access during 2019, and our wait time from treatment planning workshop (where patients identify which providers they would like to see during their time at CPC) and physician assessment was on average 3.2 months. We helped 2,750 unique patients in 2019. This includes 813 telephone consultations with family physicians, on par with 2018 despite a leave of absence by one of the physicians completing telephone consultations. Of those patients who were the subject of a telephone consultation typically with the family physician — 603 were discharged without requiring further care from the CPC.

At the end of the 2019 – 2020 fiscal year, surge capacity planning for COVID-19 resulted in the Chronic Pain Centre being temporarily moved out of our space at Richmond Road Diagnostic and Treatment Centre, and relocating at South Calgary Health Centre. The majority of our clinical and non-clinical staff worked from home. The impact on access in 2020 is not yet clear, but is anticipated to be substantial.

We welcomed a new clinic manager to the Chronic Pain Centre in November 2019. Eliane Domingue is a health leader with considerable experience outside AHS. Her clinical background is in physiotherapy, and she has led a number of private rehabilitation facilities in Canada and elsewhere, as well as holding management roles with Procter and Gamble internationally. She is a certified project management professional, and has an MBA from the University of Louisville, Kentucky. She is a native of Quebec, and is fluently trilingual in English, French and Spanish.

Chronic Pain Consult Service

Our nurse practitioners continue to operate an extremely busy consult service at all four acute care hospitals. They see approximately 600 unique patients per year, and have demonstrated a significant reduction in length of hospital stay since the creation of the consult service. The NPs are also first-call for the Specialist Link telephone

advice service, and fielded 620 calls in 2019 – 2020. Calls to the service increased dramatically during the pandemic (spring 2020), with monthly calls going from 16 in March to 52 in April. Plans for 2020 include an expansion of data collection for the purposes of continuous quality improvement.

Transitional Pain Program

Dr. Jarad Stephan, Director

The Transitional Pain Service is a multidisciplinary pain management program established at the SHC to assist patients at risk of or who have developed significant post-operative pain. It operates out of the Pre-Admission Clinic at the SHC and utilizes the clerical and administrative staff there as well as the physical space. In 2020, a third physician was added to increased operation to four days per week.

Resources

Three physicians and one nurse practitioner, one day of service each, one social worker who runs a monthly CBT and mindfulness group and sees patients one on one, and one psychologist who sees patients on a referral basis one on one

New assessments	125
Follow-ups	478

In 2020, we are participating in efforts to scale up the Transitional Pain Service, both within Calgary Zone via our department, and provincially via our collaborations with the Strategic Clinical Networks.

Primary Care Network collaborations

We continue to support clinical teams in four of the seven Calgary Zone PCNs: Calgary Foothills, Mosaic, Highland, and Bow Valley. We provide lunch and learn sessions upon request, and do clinical rounds with their teams on complex patients. South Calgary PCN began the process of developing the 5th PCN-based pain program in Calgary Zone, and plans for 2020 include provision of professional development for their multidisciplinary team.

Teaching

Pain Medicine Residency Program

- Dr. Vishal Varshney became our second pain medicine resident to graduate in January 2020. He has taken up a position in Vancouver.
- We did not match a resident for 2019-21, but anticipate welcoming our third pain medicine resident July 1 2020 – Dr. Shannon Clarahan.
- CARMs interviews for the 2021 cohort will be conducted in September 2020.

Undergraduate Medical Education

- All clinical clerks spend one day with our hospital-based chronic pain consult service under the supervision of the nurse practitioners.
- Five pain lectures (multi-professional presenters) and two small group case discussions on 1) Acute Pain and 2) Chronic Pain are provided to students in the undergraduate program in Course 5.
- In 2020, the University of Calgary has announced that pandemic restrictions will result in conversion of both lectures and small groups to an online format. We have also begun to develop online teaching modules for learners who were not able to complete their chronic pain experience at the Chronic Pain Centre due to COVID-19.

Off Service Learners

- A large number of off-service residents from a wide variety of specialties pass through the Pain Centre shadowing all healthcare providers. The rotation is mandatory for residents in urban Family Medicine, Anesthesiology (Calgary and Saskatchewan), Physiatry (R1 and R3) and palliative medicine. We also host elective residents from Neurology, Gynecology, and psychiatry, in addition to trainees from allied health professions. Last year, we hosted approximately 150 off-service learners.

Continuing Medical Education and Professional Development

- Our CPD program "Essential Strategies for Chronic Pain Management" is accredited for three credits per hour by both the CFPC and the RCPSC and continues to train FPs and other healthcare professionals from primary and secondary care, offering four to five training programs per year. We have recently adapted this course to be delivered entirely online, and will continue to offer online and in-person versions of the course in the long term.
- We also continue to offer a second three-credit-per-hour Mainpro+ and MOC course, "Wise Prescribing and Deprescribing: Opioid skills for the frontline clinician." This is a flipped classroom model, with online asynchronous modules followed by two synchronous (in-person or online) seminars to discuss challenges with opioid tapering.
- The Pain Program offers "Pain Education Day" which attracts up to 100 delegates three to four times per year. This is primarily aimed at allied healthcare providers in secondary and tertiary care.
- Plans for 2020 include the launch of a new, accredited CME program — PCN Pain Rounds. This will be a bimonthly online series aimed at primary care physicians and other members of the team in the medical home.

Research projects currently underway at the Chronic Pain Centre include:

- Probenecid for opioid withdrawal symptoms during opioid tapering — PI Dr. Montgomery
- Undergrad interprofessional pain teaching – PI Dr. Shinkaruk
- PhotoVoice – PI Dr. Shinkaruk
- Managing Life – an app and website designed to support patient self-management and provide program level data
- Oxytocin for chronic pain (CIHR); co-PI and site lead Dr. Robert

Strategic Partnerships

- A number of pain program staff and physicians are involved in development of a provincial pain strategy, partially sponsored and supported by the Strategic Clinical Networks.
- Pain program staff and physicians continue to participate in development and adaptation of clinical knowledge topics that have been incorporated in ConnectCare. We have also participated in the creation of clinical workflows including ordering and documentation. We anticipate launching ConnectCare for our program in Wave 5.
- The Pain Program continues to be represented at the level of the Strategic Clinical Networks and has members on the core group of the Bone and Joint SCN. This group is actively involved in the "Spine Access" collaboration and projects related to Osteoarthritis care for all Albertans.
- We are represented on the steering committee of the Alberta Pain Research Network, supported by the Hotchkiss Brain Institute and Campus Alberta Neuroscience.

Patient Blood Management Program

Dr. L. Chow

Staffing

In January of this year, we were pleased to have Lynn Acheson RN joined the PBM Program in a part-time Program Coordinator role to assist Becky in managing patient referrals and program development. Lynn will continue in her role with Acute Pain Service at FMC as well.

Current staffing includes:

- Medical Director: Lorraine Chow MD
- Program Coordinator: Becky Rock RN
- Program Coordinator: Lynn Acheson RN

Program Contact & Access

New email access for patient referrals, questions, etc.: CZ.PBM@ahs.ca

Phone: 403-944-47 10

Fax: 403-944-4571

Activities

PBM and ERAS in Cardiac Surgery:

The Program continues to address pre-op anemia for CV Surgery patients in collaboration with the CV Surgery Referral Office and Pre-Admission Clinic. Nursing personnel identify patients meeting anemia criteria and often trigger referral to the PBM Program long before patients are seen at PAC.

Current approach:

- Patients with pre-op Hgb <130 g/L (any gender) are identified by CV Referral Office Nurse Navigators
- Patient referrals are sent to the PBM Program for treatment
    - Urgent In-Patients: PBM collaborates with Attending, organizes SCM orders as appropriate
    - Non or Semi-Urgent Out-Patients: PBM implements iron (PO/IV) and/or epo orders, collaborating with specialties (e.g.: Nephrology for CKD patients, etc.), when appropriate

PBM and ERAS in Oncology:

The Program has participated in ERAS strategy meetings to identify potential ways to optimize this subset of patients challenged by: complex anemia related to both iron-deficiency and chronic health; short interval to surgery; and, increased risk in delaying surgery to pursue optimization. Opportunities to engage & utilize expertise of Nurse Practitioner staff are being pursued.

Hgb Optimization in Major Spine

Work is on-going to establish early and consistent identification of pre-operative anemia in this area.

Similar to Bone & Joint Arthroplasty, CV surgery, other major surgery:

- algorithmic pre-op management and referral 'triggers' (e.g.: (Hgb <130 g/L, any gender)

Unique to Major Spine:

- 'between-stage' in-patient strategies applied by the Nurse Practitioner and/or surgeon

"Iron Stewardship" Provincial Working Group for Parenteral Iron Utilization: PMB Program representation

The "Iron Stewardship" work led by provincial Pharmacy has produced numerous 'backgrounder' documents providing consistent and evidence-based guidelines for iron management in specialty populations.

The current resources are found on the Pharmacy "Drugs & Therapeutics" page:

https://insite.albertahealthservices.ca/phm/Page13844.aspx

- Iron Dosing & Administration in Adults
- Maternal Health & Iron
    - Algorithm | Slides | Recording
- Optimizing Oral Iron
- Special Populations
    - Congestive Heart Failure

      Slides | Recording
    - Inflammatory Bowel Disease
    - Iron Safety
    - Perioperative Iron Therapy

Re-development: 'Transfusion' Guidelines to "Patient Blood Management Guidelines"

Becky is working with representatives from TM lab, Hematology, and others, to develop more broad-based, clinical-support guidelines to address "Anemia", "Coagulation", and "Massive Hemorrhage". Further, rather than adopt a 'product' focus, the guidelines will emphasize a 'patient' focus.

Current/existing guidelines have been housed on the Calgary Lab Services website, which has been identified as unsuitable for clinician access. The re-development project will incorporate information design, user input, and communication expertise.

AHS Leadership and Collaborations

On-going support and participation in the following:

- Calgary Zone Transfusion Committee (CZTC)
- Hematology Fellows & Anesthesia Residents Teaching Sessions
- Alberta Parenteral Iron Working Group

External Leadership and Collaborations

Society for the Advancement of Blood Management (www.sabm.org).

In an effort to support the PBM Program, Becky Rock has been an active member and volunteer with SABM.

Roles:

- Nursing Education Workgroup (Member: 2012-present; Chair: 2016-2019)
- Mentorship Committee (Chair, 2015-present)
- Board of Directors, Director (2016 to present)
- Executive, Society Treasurer (2019 to present)

Activities

Becky has helped to develop international education resources for physicians, nurses, perfusionists, etc., which include:

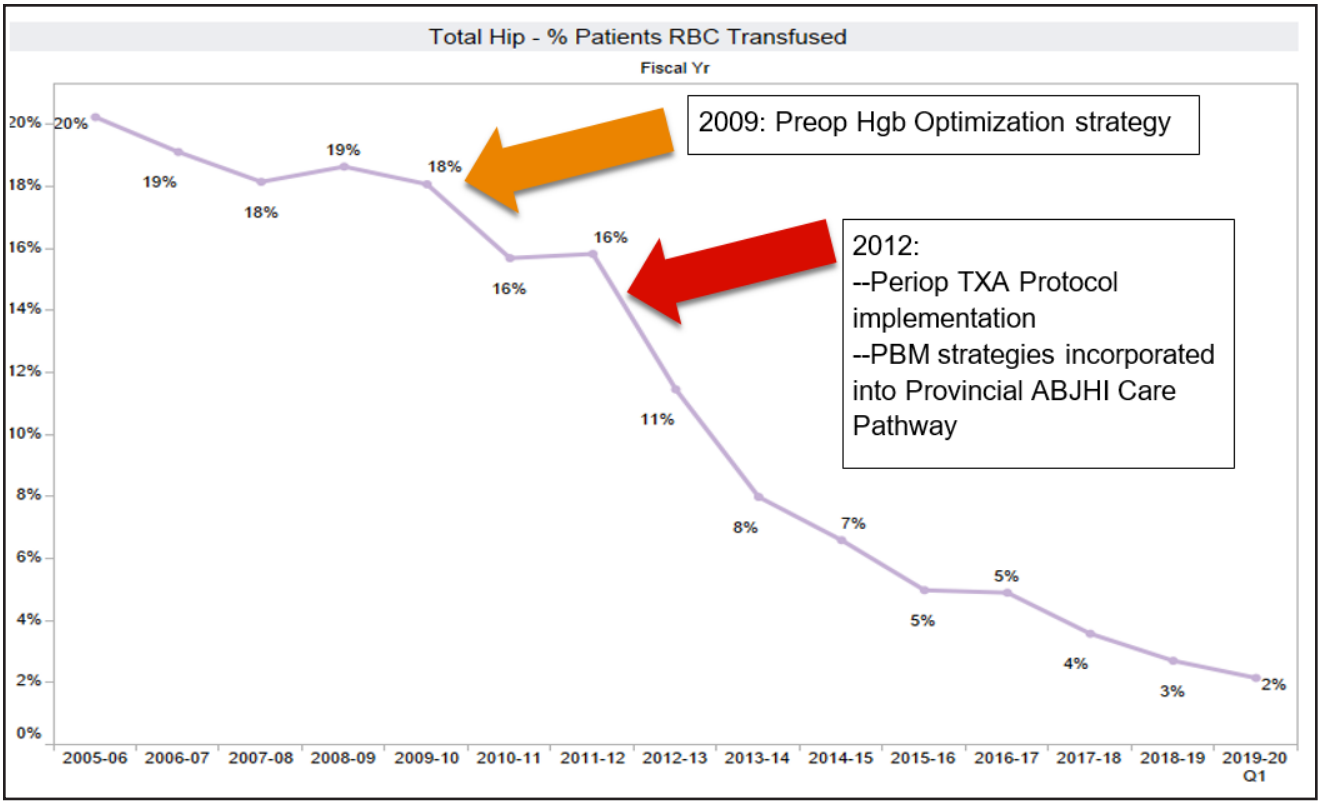
- "PBM Toolkit" (algorithms and treatment guides for anemia, antifibrinolytics in surgery, MTP, and more)
- 'Patient Blood Management Certificate Course' (PMB CC); a comprehensive program offered both online and as a day-long education course, prior to the SABM Annual Meeting.
    - Course subjects: Program Administration, Law & Ethics, Anemia Assessment, Coagulation, Perioperative PBM, Profound Anemia (When Transfusion is Not an Option), Advanced Anesthesia, PBM in Surgery, PBM in Trauma, PBM in Obstetrics, Pediatric PBM, and more.

Data

Surgical Blood Utilization Reporting Statit piMD Database

Created in collaboration with Data Integration Management & Reporting (DIMR), the Program distributes annual reports to Department Heads.

TYPE	Overall % (last year)	Female	Male	FMC	PLC	RGH	SHC
Arthroplasty; PRIM Hip	2% (3)	3% (2)	2% (2)	7% (6)	1% (2)	1% (1)	1% (1)
Arthroplasty; REV Hip	22% (28)	26% (34)	19% (23)	27% (37)	40% (31)	15% (21)	21% (21)
Arthroplasty; PRIM Knee	1% (1)	1% (2)	0% (1)	1% (4)	0% (1)	1% (1)	0% (1)
Arthroplasty; REV Knee	4% (6)	5% (7)	3% (4)	2% (11)	0% (0)	1% (9)	0% (0)
Breast Reconstr TRAM	7% (5)						
Cardiac; CABG	23% (26)	43% (47)	19% (22)				
Cardiac, Valve	28% (27)	35% (34)	25% (23)				
Cardiac, CABG-Valve	60% (48)	73% (63)	55% (45)				
Hysterectomy	2% (3%)						
Prostatectomy	2% (1%)						
Spine; Adult	5% (5%)						
Spine; Peds	20% (20%)						
Vascular; major	30% (30%)	45% (37)	24% (27)				



Point-of-care Coagulation Testing

We continue to work with Dr. Davinder Sidhu (Section Chief, transfusion medicine) in bringing point-of-care coagulation testing to the Calgary zone. Thromboelastography (TEG) and rotational thromboelastometry (ROTEM) are currently being utilized for research purposes only. We hope to make their availability for widespread clinical use in the near future.

Research

Platelet Function Studies

We are also extremely thrilled to continue our collaboration with Dr. Ejaife Agbani, Adjunct Research Assistant Professor, on several translational studies extending his research to the clinical setting. We have completed our pilot study investigating platelet function in preeclampsia compared to healthy pregnancy as well as non-pregnant controls. The results of the pilot study were presented by Dr. Agbani at the British Society for Haemostasis and Thrombosis (BSHT) annual conference in Birmingham, UK. The results were also to be presented by Dr. Josh Nicholas (PGY2 Anesthesia) at Network for the Advancement of Patient Blood Management, Haemostasis and Thrombosis (NATA) annual conference in Athens, Greece, and by Dr. Lorraine Chow at the Canadian Anesthesiologists' Society (CAS) annual meeting, but unfortunately, both meetings were cancelled due to COVID-19 pandemic. Dr. Alex Gregory continues to collaborate with Dr. Agbani, Dr. Gary Dobson, Dr. Lorraine Chow, Dr. Adrienne Lee (hematology) and Dr. Man-Chiu Poon (hematology) regarding platelet function studies in patients undergoing cardiopulmonary bypass

Education

Perioperative Medicine Rotation

Starting this year, senior anesthesia residents (PGY4 and 5) will be partaking in a new peri-operative medicine rotation, which is geared towards refining their skills as peri-operative physicians. As part of their rotation, anesthesia residents will be spending time on the Patient Blood Management Program (PBMP) to learn about pre-operative hemoglobin optimization (through anemia management), as well as other techniques to reduce the need and risks of peri-operative transfusions.

Human Factors in Anesthesia

Dr. J.M.Davies, Mario I. Pehar, and Terri Tryon

Standardization of the Malignant Hyperthermia (MH) carts

Recap: Starting in 2017, Terri Tryon, residents Katrina Drohomirecki and Nadine Lam, Jan Davies, and Mario Pehar undertook to standardize the Calgary Zone MH carts. Two ACH Clinical Nurses Educators, Torey Erdman and Karen Bibaud, also assisted. The team found there were more than seven types of MH carts or totes, each with a variety of contents. Totes are used for initial emergency treatment in geographically isolated areas such as Diagnostic Imaging or ECT, until an MH cart can be delivered from the main OR at that site. In addition, responsibility for the upkeep of the carts/totes varied between the Department of Anesthesiology and the operating room nurses, depending on the site. Nadine Lam and Katrina Drohomirecki, respectively, presented the initial survey and recommendations for standardization; as well as a review of the literature, at the 2017 National Scientific Congress of the Australian Society of Anaesthetists in Perth, Western Australia.

The team undertook standardization of the carts/totes using the Malignant Hyperthermia Association of the United States (MHAUS) guidelines as the starting point. Survey input was sought from a variety of OR users. A decision was made to ensure the carts' contents was identical, except for the PLC cart. As the PLC is the bariatric centre, the cart was stocked with 72 vials of dantrolene, rather than 36 vials as at all other sites. Totes were similarly standardized, with minimum supplies. After standardization, the layout of medications and equipment was iteratively tested for its usability and changes made based on users' feedback. In addition, as of August 1st, 2018, the Department regained responsibility for the upkeep of the MH carts and totes.

Implementation of the new carts and totes was carried out on a roll-out basis.

- FMC - completed July 11th, 2018 (3 carts, 1 tote)
- SHC -completed August 1st, 2018 (1 cart)
- ACH -completed August 21st, 2018 (1 cart)
- RGH - completed August 22nd, 2018 (1 cart, 2 totes)
- PLC -completed August 23rd, 2018 (1 cart, 2 totes).

Cost-savings were calculated for our service population of 1.4 million people in urban/rural communities over 39,290 km2. Based on a reduction of dantrolene vials city-wide from 389 to 338 and removal of duplicate equipment from general (non-MH) emergency carts, we were able to effect a total cost-savings of $6,945, which was then used for other patientcare needs.

None of the carts/totes were used until September 20, 2019, when a patient undergoing a procedure at the FMC suffered an MH reaction. The cart was used and the reaction successfully aborted. Post-event comments and interviews resulted in one recommendation - the addition of an additional one litre bag of Sterile Water for Injection, to help facilitate mixing a dantrolene infusion for use after the crisis.

Finally, once any piece of equipment is standardized, monitoring and review of requirements, guidelines and resources must be continued. Some 17 months after implementation of the new carts and totes, the supplier stopped producing 60mL syringes, affecting how dantrolene is mixed, as the drug manufacturer recommends using 60mL sterile water/vial. Syringe supplies for cart are now 50mL x 5 + 10mL x 5. However, this change in syringe size had a knock-on effect on dantrolene mixing time with the process slowed by 18% (5 seconds). Since then, the Department has requested access to ryanodex, which requires less sterile water and shorter mixing times than with dantrolene; as well as, fewer vials required for the average patient. However, Ryanodex has not yet been approved by Health Canada and, as of December 2019, Eagle Pharmaceuticals had no plan to request access to the Canadian Market.

Anesthetic machine circuits

The standard anesthesia circle circuit is made up of a number of components. On the GE Healthcare (GEHC) Aisys platform, all components are standard 15mm ID/22mm OD that can be used on any machine with the exception of one connector which is a proprietary 'elbow' piece. This 'elbow'

piece is incorporated within the bag support arm that holds the breathing circuit bag. In the past, this elbow piece was made of a hard plastic and needed to be connected to anesthesia down tubes on both ends. These connections were not easy to attach because of the hard plastic material. These connections were notorious for leaks as a result of small cracks in the tubing connections which resulted in failed circuit leak tests and added time required by the Anesthesia RRTs to troubleshoot and resolve the leak. Because of this, Mario Pehar proposed to the anesthesia circuit supplier that it would be very helpful if the manufacturer could fabricate a tubing that incorporated this proprietary elbow with the already established down tube. The manufacturer agreed. This new tubing significantly improved the fit to the anesthesia bag down tubing and subsequently decreased the incidence of circuit leaks previously related to these substandard connections.

Standardization of the Pediatric Anesthesia Carts

There are now standardized pediatric anesthesia carts at all adult hospitals in the Calgary Zone. These carts have been setup, stocked, and have requirement lists based on the layout of the carts at ACH. The Anesthesiologists from ACH have commented that having these standardized pediatric anesthesia carts has been a huge benefit in bringing familiarity for anesthetic care given outside the ACH.

COVID-19 supplies

On March 5th, 2020, the first case of COVID-19 was reported in Alberta (in Calgary). On March 11th, the World Health Organization officially declared COVID-19 a global pandemic. Much work was carried out by members of the Department in preparation for COVID-19 positive patients who might require surgical and obstetric care; as well as, tracheal intubation, resuscitation, and intensive care. Specific ORs in the FMC were identified and the Obstetric ORs were stripped of non-essential equipment and prepared. Simulations were run on Labour & Delivery (Unit 51), from arrival on the fifth floor to discharge, and transferring patients to and from an OR for an emergency Cesarean Section. Members of the Department, including the Anesthetic Respiratory Therapists (ARTs), participated in and contributed to this preparatory work, with development of an extensive guidance document, an algorithm and a video. In addition, Mario Pehar was able to lend two anesthetic carts to Labour & Delivery to be used as carts for PPE, as Labour & Delivery was unable to access funds to purchase their own. The loan greatly facilitated the work of the Labour & Delivery staff, including the obstetric anesthesiologists and ARTs. With the move to Phase 2 of the pandemic, the carts have been returned to the Department.

Anesthesia Intubation Team Carts

During our preparations for the pending surge levels of the COVID-19 pandemic, the Critical Care and Anesthesia medical groups determined that we needed a dedicated intubation team. With very short timelines and sketchy supply chains (due to the unprecedented pandemic turmoil) the Anesthesia Department took on the burden of providing this team with an intubation cart. At the time, there were no extra carts available in addition to the anesthesia supply carts assigned to each of the ORs. However, postponement of most of the elective operations and resultant closure of almost 90% of the ORs at all sites offered the opportunity to repurpose the second anesthesia carts into intubation carts. After significant debate and multiple adaptations/interpretations, these carts were outfitted with the essential tools and supplies (including the vitally important PPE) that would accompany the team to any of the intubations required throughout the hospitals.

After a relatively successful campaign to flatten the curve of the first wave, we moved into re-establishing a more normal operating room with an increase in elective procedures and higher capacity. These repurposed carts were needed back in their original role as the second anesthesia supply cart. But because this pandemic is a medium to long term event, we sought to provide an appropriate solution. We have therefore acquired carts specifically for this intubation team and they are on service whenever the need for Anesthesia lead intubations outside the OR is required.

Education

Anesthesia Residency Program

Program Director – Dr. Melinda Davis.
Associate Program Director – Dr. Graeme Bishop

The 2019 – 2020 academic year brought some changes to the University of Calgary Anesthesiology Residency Program.

Dr. Reuben Eng completed his term as Program Director and handed over to Dr. Melinda Davis who had previously occupied an Associate PD position. During his term Dr. Eng, guided our residency program through a successful and smooth transition to the Competence by Design (CBD) model of training. His foresight and planning have placed our program in a very strong position as we move forward, never more so than during the pandemic. We were not able to acknowledge Dr. Eng at a graduation and awards dinner this year, but the Residency Program Committee and the residents in the program wish to thank him for his time, energy and commitment to excellence for our program.

Flexibility and an abundance of clinical opportunities are among the strengths of our program. We were able to see these on display this spring as we responded to the COVID-19 pandemic. While we did encounter some rotation disruption as a result of changes to OR workload and case mix, these clinical experiences have been able to be rescheduled with minimal difficulty. Our residents were able to participate in COVID-19 related simulations designed and run by Dr. Megan Hayter and Dr. Chris Dyte. With the exception of the PGY1s, residents are participating in all operating room cases, regardless of COVID-19 status. We continue, however, to face limitations to resident involvement in trauma team activations and in Pre-Admission Clinics as a result of physical distancing concerns. Several of our residents volunteered to be redeployed to ICU during the peak of the spring case numbers. Their professionalism was well-noted both within our program and by those they encountered in other disciplines. Our graduating PGY5s have experienced significant disruption to their certifying examinations. After some uncertainty, the Royal College will move forward with written exams only in September. Our out of operating room teaching has had to change substantially during the pandemic. Our core program coordinators, Drs. Dawson and Chuquer, were quickly able to pivot to online learning for academic half day. Morning teaching has become digital, with Dr. Heather Hurdle coordinating faculty across the city in the creation of written short answer and oral exam style questions. Participation is not for the faint of heart!

During this academic year we introduced a new PGY4 rotation, Perioperative Medicine, to reflect our ever-increasing role as perioperative physicians. Dr. Danae Krahn has taken on the task of developing this new rotation. We also welcomed a new Wellness Director to the program, Dr. Meredith Hutton. Dr. Hutton will be an excellent advocate for resident wellness, as she was when she was a resident in the program herself.

Dr. Cameron Shillington and Dr. Katrina Roberts completed their terms as chief residents and Drs. Oliver Hatheway, Courtney Phillips, and Cameron Williams have taken over this important role at a challenging time.

Our program is lucky to have phenomenal administrative support from Anca Petri and Sarah Bolton. Their knowledge of the program and their attention to detail have been invaluable during the transition in program leadership. They continue to provide guidance, support and encouragement to the residents even while working remotely.

The upcoming academic year will have our program complete internal accreditation. This review was postponed due to the pandemic and will now occur in an online format.

The residency program committee and our rotation coordinators work hard to ensure consistent and outstanding training opportunities for our residents. Individually and as a committee these members create goals and objectives for our rotations and ensure that evaluations of the residents rotating through are consistent with

the objectives. All members engage in continuous quality improvement as feedback about training experiences is received.

The Residency Program Committee (RPC)		
Joseph Ahn *CAS Resident Representative (non-voting)*	Yara Babyak *Rockyview General Hospital Site Co-Coordinator*	Katie Birnie *GFT Research*
Graeme Bishop *Associate Program Director*	Nathan Brown *South Health Campus Associate Site Coordinator*	Erin Bruce *Education Co-Coordinator, Scholarly Project Co-Coordinator*
Alan Chu *South Health Campus Site Coordinator, CBD Academic Coach Lead, Longitudinal Coach Program Lead, Mentorship Teams Program Lead*	Karl Darcus *UME Director.*	Jan Davies *Quality & Safety Co-Coordinator*
Melinda Davis *Program Director*	Paul Dawson *Education Co-Coordinator*	Gary Dobson *Department Head, University of Calgary*
Christopher Durr. *Junior Resident Representative*	Chris Dyte *Simulation Co-Coordinator*	Oliver Hatheway *Chief Resident*
Megan Hayter *Simulation Co-Coordinator*	Nina Hardcastle *Alberta Children's Hospital Site Co-Coordinator*	Linda Hung *Scholarly Project Co-Coordinator*
Heather Hurdle *Foothills Medical Centre Site Co-Coordinator*	Meredith Hutton *Wellness Director*	Lindsay McMillan *Alberta Children's Hospital Site Co-Coordinator*
Judy Marois *Quality & Safety Co-Coordinator*	Jillian Miller *GFT Research*	Afra Moazeni *Education Co-Cordinator, Peter Lougheed Centre Site Co-Cordinator*
Joshua Nicholas *Senior Resident Representative*	Courtney Phillips *Chief Resident*	Shannon Rabuka *Peter Lougheed Centre Site Co-Coordinator*
Zahid Sunderani *Rockyview General Hospital Site Co-Coordinator*	Michelle Theam *Quality & Safety Co-Coordinator*	Andrea Todd *Foothills Medical Centre Site Co-Coordinator*
Cameron Williams *Chief Resident*	Paul Zakus *Journal Club Coordinator*	

Rotation Coordinators		
Dr. Yara Babyak *Adult Anesthesia (RGH), Medical Education*	Dr. Nathan Brown *Regional Anesthesia*	Dr. Lorraine Chow *Thoracic Anesthesia*
Dr. Alan Chu *Adult Anesthesia (SHC)*	Dr. Danae Krahn *Perioperative Medicine*	Dr. Afra Moazeni *Adult Anesthesia (PLC)*
Dr. Richard Falkenstein *Neuroanesthesia*	Dr. Julia Haber *Airway Anesthesia (FMC)*	Dr. Jeremy Hamming *Acute Pain Service*
Dr. Nina Hardcastle and Dr Lindsay McMillan *Pediatric Anesthesia*	Dr. Linda Hung *Perioperative Ultrasound*	Dr. Lindsay MacKenzie *Obstetric Anesthesia (PLC)*
Dr. Nadeem Jadavji *Vascular Anesthesia*	Dr. Nicole Webb *Cardiac Anesthesia*	Dr. Zahid Sunderani *Obstetric Anesthesia (RGH)*
Dr. Marie-Eve Turcotte *Chronic Pain*	Dr. Andrea Todd *Adult Anesthesia (FMC), Complex Anesthesia*	Dr. Paul Zakus *Obstetric Anesthesia (FMC)*

The RPC is grateful to the following rotation coordinators who stepped down from their roles this year:

Drs. Karl Darcus, Saul Pytka, Chris Prusinkiewicz, Jeremy Luntley

Competence by Design (CBD)

Contribution by Dr. Graeme Bishop (Associate PD, CBD)

The 2019 – 2020 academic year saw our program welcome the fourth cohort of residents entering training under the competency by design (CBD) educational paradigm. In short, CBD divides residency into four stages (transition to discipline, foundations, core and transition to practice) and assigns entrustable professional activities (EPAs) which are stage appropriate and designed to create a clear learning path for trainees.

This past year saw our program return to the Royal College e-portfolio platform for all EPA evaluations. This platform improves our ability to run assessment reports and ensures our trainees are working on contemporary EPAs in a landscape of ever-changing assessment requirements. Our ideal goal would be to have daily evaluations available on e-portfolio to allow for all assessments to be completed on a single platform. At this time, this functionality is not possible, and our daily evaluations remain on the familiar one45 platform.

Promotion between stages and tracking of resident progression is now the purview of the competence committee. This group met three times in the past academic year to systematically review each resident on two occasions. The goal is to ensure that progression through our program is active, intentional, and merit based. The upcoming year will see the added task of determining exam readiness for our PGY-4 cohort as their Royal College written exam will occur in the fall of 2021.

Competence Committee Members: Dr. Graeme Bishop Dr. Robin Cox Dr. Reuben Eng Dr. Heather Hurdle Dr. Marelise Kruger Dr. Shean Stacey

Academic Coach Program

Contribution by Dr. Alan Chu (Academic Coach Program Lead)

Our Academic Coach program began with the first cohort of CBD residents in 2017 and surpasses the recommendations of the Royal College's Academic Advisor program. Indeed, resident feedback suggests that there is no shortage of coaching and mentorship in our program! In this program, all CBD residents have a staff physician who provides goal-directed coaching toward residency and early career success.

Our coaches have received additional training in mentorship, professional coaching, educational coaching via the R2C2 model; along with topics such as burnout, resiliency, and emotional intelligence.

They meet regularly with their residents and work with them in the OR.

During the 2019-20 year, our Academic Coaches were:

Michael Chong	*Peter Farran*
Julia Haber	*Wendy Hall*
Melissa Jack	*Udell Larsen*
Alan Lee	*Shaylyn Montgomery*
Lori Olivieri	*Chris Prusinkiewicz*
Ted Schubert	*Marc Soska*
Teresa Yang	

Recruitment is ongoing as each new cohort of CBD residents mandates another cohort of staff Coaches! Please contact Dr. Chu at aycchu@ucalgary.ca if you are a permanent staff anesthesiologist interested in participating as a Coach.

Clinical Teaching Sites

Alberta Children's Hospital

Contribution by Dr. Nina Hardcastle (Site Co-Coordinator)

The Section of Pediatric Anesthesiology and Pain Medicine at Alberta Children's Hospital had an excellent year in regard to its contributions to resident medical education. This year's COVID pandemic challenged our residency educational structure, but we endeavored to have residents continue to rotate through ACH, and are proud to say we provided excellent subspecialty training throughout the pandemic restrictions.

Our commitment to operating room education for the anesthesiology, pediatrics, family medicine, and emergency medicine residency programs continues, and we are involved in supporting airway and simulation education to residents at ACH through the KidsSim program. We also continue to provide educational opportunities in pediatric complex pain to both Calgary and Saskatoon anesthesiology residents; as well as, for the Calgary pain medicine fellowship program.

This past year we had the pleasure of having Dr. Tanya Santella as our pediatric anesthesiology fellow. She was a tremendous addition to our department over the past year, and we wish her the best with her move back home to Montreal at the end of the summer.

Our staff work hard to achieve our educational mandate and some have been recognized at the annual awards. Of special note, we hired two new anesthesiologists into our department this past year, Dr. Lindsay McMillan and Dr. Scott Else, both of which were recognized for their teaching efforts this year.

Leo Strunin Award

The Leo Strunin Award recognizes one faculty member in the Department of Anesthesiology, Perioperative and Pain Medicine who has who has contributed to resident education in a manner that deserves exceptional recognition. Like the other awards in our program this individual is selected by the resident body. The recipient has personified the highest standards and expectations of the ideal medical educator.

Dr. Duncan McLuckie

ACH Excellence in Postgraduate Medical Education Awards

Dr. Scott Else	*Dr. Lindsay McMillan*
Dr. Nina Hardcastle	*Dr. Adam Spencer*
Dr. Michelle Theam	*Dr. Mark Gale*

ACH Outstanding Educator Award

Dr. Mark Gale

Foothills Medical Centre

Contribution by Dr. Andrea Todd
(Site Co-Coordinator)

The Foothills Medical Centre provides the anesthesia program residents with exposure to tertiary anesthesia care in the areas of trauma, cardiac surgery, neurosurgery, thoracic surgery, obstetrics, interventional radiology, and acute pain for Southern Alberta. The residents carry out several rotations at this site, including: Acute Pain Service, Adult Anesthesia, Thoracic Anesthesia, Neuro Anesthesia, Cardiac Anesthesia, Complex Anesthesia, Obstetrical Anesthesia, and an Airway Rotation. FMC also provides rotations for the Family Practice Anesthesia residents.

Our faculty are fully engaged in teaching as evidenced by the following teaching awards:

FMC Excellence in Postgraduate Medical Education Award:

Dr. Keith Anderson	*Dr. Lorraine Chow*
Dr. Melinda Davis	*Dr. Alex Gregory*
Dr. Chris Noss	*Dr. Chris Dyte*
Dr. Richard Falkenstein	*Dr. Danae Krahn*
Dr. Kyle Rogan	*Dr. Chris Prusinkiewicz*
Dr. Paul Zakus	*Dr. Heather Hurdle*

FMC Outstanding Educator Award

Dr. Chris Dyte

Prior to required social distancing restrictions, many members of the department participated in bi-weekly morning teaching and oral exam preparation for the residents. To align with social distancing regulations, an online program of case-based learning was created by Dr. Heather Hurdle with contributions from Dr. Danae Krahn, Dr. Jeff Ng, and Dr. Paul Zakus.

Many other department members have leadership roles within the residency training program.

- Dr. Melinda Davis serves as Program Director and the Resident Wellness Coordinator
- Dr. Heather Hurdle and Dr. Andrea Todd serve as the FMC co-site coordinators
- Dr. Lorraine Chow serves as the Thoracic anesthesia rotation coordinator and serves on the CBD leadership team
- Dr Heather Hurdle is also a CBD lead and is a co-director of clinical clerks with
- Dr Kaylene Duttchen
- Dr. Andrea Todd is also the rotation coordinator of the Adult and Complex anesthesia rotations
- Dr. Paul Zakus serves at the obstetrical anesthesia rotation coordinator
- Dr. Richard Falkenstein continues in his role as neuroanesthesia rotation coordinator
- Dr. Julia Haber who served for several years co-coordinating the core program teaching sessions has transitioned to rotation coordinator for the FMC airway rotation
- Dr. Kelly Shinkaruk continues her role as chronic pain rotation coordinator
- Dr. Jeremy Hamming continues his role as acute pain service rotation coordinator
- Dr. Chris Prusinkiewicz handed over his role as the cardiac anesthesia rotation coordinator to Dr. Nicole Webb

Peter Lougheed Centre

Contribution by Dr. Karl Darcus
(outgoing Site Co-Coordinator)

The Peter Lougheed Centre continued in its commitment to resident education over the last year. Even with the changes wrought by the COVID-19 pandemic we were able to continue to provide educational experiences for residents at all levels.

All the staff members at the PLC are involved in resident teaching in the OR. Many participate in Thursday morning teaching rounds and Royal College exam preparation. There are several members of the group that need to be acknowledged individually:

- Dr. JN Armstrong in his role as Chief Medical Officer for STARS is ultimately responsible for the pre-hospital critical care transport elective as well as the pre-hospital critical care transport fellowship
- Dr. Graeme Bishop continued in his roles as Associate Program Director and Competence Committee chair
- Dr. Karl Darcus concluded his time as Site Co-Coordinator
- Dr. Meredith Hutton began her role as Wellness Director
- Dr. Linda Hung continued in her roles as Scholarly Project Co-Coordinator as well as co-coordinating the POCUS/regional/US resident rotation
- Dr. Nadeem Jadavji is the Vascular Anesthesia Rotation Coordinator
- Dr. Dean Jordan continued his involvement with ACRM and CanNASC simulation training
- Dr. Lindsay MacKenzie is the Obstetrical Anesthesia Rotation Site Coordinator
- Dr. Neal Maher continued to be instrumental in providing resident training in POCUS. He also served as a longitudinal preceptor/coach
- Dr. Afra Moazeni began her role as Site Co-Coordinator
- Dr. Bronwyn Parkinson continued her roles as Regional/Perioperative Ultrasound Rotation Site co-coordinator and Perioperative Ultrasound Fellowship Site Coordinator
- Dr. Shannon Rabuka continued as Site Co-Coordinator
- Dr. Kristi Santosham is the PLC OR Simulation Leader
- Dr. Theresa Yang is an Academic Coach

Several members of the department were honoured with teaching awards:

PLC Excellence in Postgraduate Medical Education Awards:

Dr. Graeme Bishop	*Dr. Gary Dobson*
Dr. Linda Hung	*Dr. Nadeem Jadavji*
Dr. Lindsay MacKenzie	*Dr. Kristi Santosham*
Dr. Theresa Yang	

PLC Outstanding Educator Award

Dr. Linda Hung

Rockyview General Hospital

Contribution by Dr. Yara Babyak
(Site Coordinator)

The Department of Anesthesiology, Perioperative and Pain Medicine at the Rockyview General Hospital has had a very successful and productive year with its involvement in the postgraduate anesthesia resident education.

We are proud to have uniform staff involvement and genuine interest in day-to-day clinical teaching of PGY levels residents that come to RGH in the operating room, preoperative anesthesia clinic and post-anesthesia recovery unit. Most of our staff members continue to organize and participate in Wednesday morning teaching rounds; as well as, oral RCPSC exam preparation sessions. Our site continues to welcome PGY1 Anesthesia residents to their first CBD Transition to Discipline block. This block also coincides in its timeframe with Medical Education rotation offered by our site to the PGY-5 anesthesia residents. This allows for invaluable bidirectional teaching opportunity; as well as, professional bonding amongst residents at the two ends of the residency continuum. This unique rotation continues to be developed and built on and still remains the only rotation of this kind offered to Anesthesia residents by Canadian postgraduate anesthesia programs.

Special mention and gratitude also goes to these outstanding section members that have demonstrated true dedication to resident education over the past year:

- Our deepest gratitude extends to Dr. Reuben Eng as he passed along the torch of Residency

Faculty Extra Mile Award

The Faculty Extra Mile Award recognizes one faculty member in the Department of Anesthesiology, Perioperative and Pain Medicine who has demonstrated exemplary support and dedication to the well-being of resident physicians. The recipient of this award is selected by the resident body for their extraordinary selflessness and personal support of the resident physicians in our program.

Dr. Reuben Eng

Program Director last year to Dr. Melinda Davis and took over the role of the Section Chief at Rockyview General Hospital. He was also deservingly named the recipient of the "Extra Mile Educator Award" for 2019 by our residents.

- Dr. Meghan Hayter continues to lead and tirelessly develop simulation education programs including CRM/core simulation program, CanNASC, and many other simulation based resident education activities.
- Dr. Zahid Sunderani continues in his role as Associate RGH Site Resident Coordinator and Obstetrical Anesthesia Resident Coordinator.
- Dr. Erin Bruce continues her two busy roles as a Scholarly Project Associate Coordinator; as well as, the Resident Core Program
- Education Coordinator.
- Our Department welcomed Dr. Paul Dawson this past year who has generously accepted the positions of Academic Day Coordinator.
- Dr. Ray Zhou continues on the role of RGH Undergraduate Medical Education Site Coordinator
- Dr. Yara Babyak continues as the Medical Education in Anesthesia Rotation Coordinator and the RGH Site Coordinator.

In the years to come we hope to continue and expand our active involvement in the postgraduate anesthesia resident education. We will strive to incorporate the feedback we collected from both TTD and Medical Education rotations to improve residents experience and educational value of these rotations. Some other directions of development for our site would be: to improve resident exposure to ultrasound use for both regional anesthesia as well as bedside cardiac echo; and to explore the opportunities of utilizing RGH on-site simulation facilities for our postgraduate anesthesia education needs.

Several members of the department were honoured with teaching awards:

RGH Excellence in Postgraduate Medical Education Awards

Dr. Zahid Sunderani	*Dr. Paul Dawson*
Dr. Reuben Eng	*Dr. Meghan Hayter*
Dr. Wendy Hall	*Dr. Udell Larsen*
Dr. Niamh Donnelly-Warner	

RGH Outstanding Educator Award

Dr. Rod Shultz

South Health Campus

Contribution by Dr. Alan Chu
(Site Coordinator)

The SHC hosts residents for the following rotations: Junior Adult Anesthesia, Junior and Senior Regional Anesthesia. We look forward to hosting the CBD PGY-5s in 2021 for a Senior Adult Anesthesia rotation. The PGY-1 junior anesthesia rotation employs a longitudinal preceptor model and provides time in regional anesthesia, APS, OB, and PAC, along with Tuesday morning case-based teaching. Optional training time with the Transitional Pain Service is available. We continue to train off-service residents, paramedic students, ward RRTs, and provide airway training days for our emergency medicine colleagues, in addition

to medical students, FP-A residents, and fellows in the Perioperative Ultrasound fellowship.

Our regional anesthesia service is very busy and provides great opportunities for regional anesthesia education. We continue to work toward complete coverage of the block anesthesiologist position that provides more consistent training and supervision for our learners. Our home catheter program continues to mature and our highly collaborative APS has worked with several surgeons to improve the quality of postoperative pain management. We look forward to the start of our acute pain service and regional anesthesia fellowship program under the direction of Dr. Ryan Endersby.

We enjoy contributing to our city's anesthesia education, staying responsive to our residents' and residency program's needs over this time of transition to CBD.

RPC Members from SHC:

Dr. Nathan Brown - Associate Site Coordinator, Regional Anesthesia Rotation Coordinator

Dr. Alan Chu - Site Coordinator, Academic Coach Program Lead, Mentorship Teams Program Lead

SHC Excellence in Postgraduate Medical Education Awards:

Dr. Nathan Brown	*Dr. Ryan Endersby*
Dr. Shaylyn Montgomery	*Dr. David Goldstein*
Dr. Jenny Joo	

SHC Outstanding Educator Award

Dr. Ryan Endersby

Scholarly Projects

Contribution by Dr. Erin Bruce & Dr. Linda Hung (Scholarly Project Co-Coordinators)

Our annual Scholarly Project Evening to showcase resident and staff research took place on March 5, 2020 at the Calgary Winter Club. This year, our keynote speaker was Dr. Tim Tang, retired cardiac anesthesiologist, former Foothills Medical Centre Section Chief, and founder of the Tim and Linda Tang Department Research Fund, who spoke to us about "A Journey Through Anesthesia". Our resident and staff physicians alike found this to be a fascinating and engaging presentation.

We continue to have excellent faculty involvement in this evening and would like to specially thank Dr. Rod Schultz (RGH), Dr. Melissa Jack (SHC), and Dr. Debbie McAllister (ACH) for being our guest adjudicators for the evening. We had excellent resident presentations given by Dr. Michael Gysel, Dr. Carlos Yu, Dr. Claire Allen, Dr. Courtney Phillips and Dr. Ryden Armstrong. A staff member of the South Health Campus, Dr. David Goldstein, also presented on "Safety perceptions of health care leaders in 2 Canadian academic acute care centres". Dr. Michael Gysel took home the prize for best oral presentation for his project on "Lactate production & metabolic acidosis in hypothermic circulatory arrest for thoracic aneurysm surgery" with his supervisor Dr. Alex Gregory (FMC).

We have a lot to be proud of in the resident research department this year! Our residents represented us well at multiple conferences in the past year, including Claire Allen who presented her systematic review and network meta-analysis titled "Comparative Efficacy of Pharmacologic Interventions for the Prevention of Chronic Postsurgical Pain" at two conferences! She presented both at the Canadian Pain Society 41st annual scientific meeting, and at the 2020 World Congress on Pain. Josh Nicholas presented "Procoagulant membrane dynamics: a novel approach to identify platelet activation in pre-eclampsia" at the 21st Annual Symposium on Patient Blood Management, Haemostasis and Thrombosis.

Also, several residents and staff supervisors were successful with excellent publications this year, including Dr. Katrina Roberts (supervisor Dr. Duncan McLuckie) with "Enhanced recovery after surgery in paediatrics: a review of the literature" (BJA Education 2020), and Dr. Chris Young (supervisor Dr. Adam Spencer) with "Quality improvement assessment of a Bianchi-technique pediatric orchiopexy perioperative pain management pathway" (Journal of Pediatric Urology 2020). Additionally, Dr. Oliver Hatheway was the lead author for "A survey of anesthesia quality programs in Nova Scotia community hospitals" (Canadian Journal of Anesthesia, 2020), and Dr. Marisa Webster published "Swimming

Against the Current" in Canadian family physician in 2019.

We would like to congratulate our residents and department members for their ongoing success in research and scholarly projects. Finally, we would also like to extend a sincere thanks to Dr. Andrew Walker for his continued amazing support of research in our department. As always, we welcome any and all staff to participate in resident research.

Core Program

Contribution by Dr. Paul Dawson & Dr. Maria Chuquer (Education Co-Coordinators)

This academic year we continued to have a mix of traditional and competency by design residents, and include all training levels from R1 through R4 in core program. We currently have a three-year rotation for our academic program to ensure all residents are exposed to all essential topics prior to the Royal College written exam. By incorporating oral exam questions into Thursday afternoon sessions, we aim to start preparing our residents early for both components of their final exam.

For the 2019 – 2020 academic year, the coordinators of the core program blocks included Dr. Paul Zakus and Dr. Zahid Sunderani, Dr. Paul Dawson, Dr. Robert McTaggart Cowan, Dr. Erin Bruce, and Dr. Chris Prusinkiewicz. We covered our Obstetrics, Monitors and Equipment, Neuroanesthesia, Cardiac Anesthesia, and Crisis Resource Management blocks.

In addition to our focus on academics, we also include sessions on the CanMEDS competencies. This academic year we included sessions on the social determinants of health, transgender health, conflict esolution, and quality and safety in Anesthesia.

Faculty members who taught in Core Program in the 2019 – 2020 academic year include:

Paul Dawson	*Meredith Hutton*
Jan Davies	*Fiona Mattatal (OBS)*
Richard Falkenstein	*Robert McTaggart Cowan*
Doug Seal	*Rosaleen Chun*
Jeff Ng	*Danae Krahn*
Lindsay MacKenzie	*Jenny Thompson*
Chris Dyte	*Erin Bruce*
Melinda Davis	*Shean Stacey*
Chris Prusinkiewicz	*Nicole Webb*
Jason Waechter	*Heather Hurdle*
Alex Gregory	*Lorraine Chow*
Paul Zakus	*David Lardner*
Mario Pehar	*Terri Tryon*
Bing Wang	*Kyle Rogan*
Chris Noss	*Duc Ha*
Colin Bands	*Nicola Morrison*
Zahid Sunderani	*Donal Finegan*
Rob Thompson	

Mentorship Program

Contribution by Dr. Alan Chu (Mentorship Teams Program Lead)

Our Mentorship Teams Program also began in 2017 alongside the initiation of CBD in a programmatic effort to encourage widespread mentorship and socialization, both personal and professional. Each team consists of a blend of junior and senior residents, recently graduated or post-fellowship junior staff, and a senior staff member. This longitudinal program provides each resident with a very close web of collegial support to help navigate the multi-faceted and often meandering path of residency. Staff participants include Drs. Michael Chong, Alan Chu, Melinda Davis, Linda Hung, and Melissa Jack along with our recent graduates Drs. Erin Bruce, Paul Dawson, Chris Dyte, Meredith Hutton, and Jenny Thompson.

Longitudinal Coaches Program

Building on the successes of the Academic Coach program for CBD residents, a similar individual coach program has rolled out to all Traditional Stream (non-CBD) residents on an optional basis. Our current Longitudinal Coaches are Drs. Michael Chong, Alan Chu, Melinda Davis, Reuben Eng, Peter Farran, Neal Maher, and Debbie McAllister. Additional staff members are happy to participate, all interested staff and residents are asked to contact Dr. Chu at aycchu@ucalgary.ca.

Simulation

Contribution by Dr. Chris Dyte & Dr. Megan Hayter (Simulation Co-Coordinators)

A wide variety of simulation training experiences are provided for our residents, with guidance and facilitation from the Simulation Committee, including ACRM (Anesthesia Crisis Resource Management), MEPA (Managing Emergencies in Pediatric Anesthesia), CanNASC (Canadian National Anesthesia Simulation Curriculum), Core Program, PGY1 Bootcamp, and an OSCE curriculum for our residents in response to the RCPSC's inclusion of an OSCE as part of the anesthesiology oral examinations.

The 2019 – 2020 academic year continued to have great success with a variety of simulation opportunities, even in the face of changes required for maintaining the safety of learners and faculty in the face of the COVID-19 pandemic. The CanNASC task force completed all five validated, evaluative simulations with the PGY4s to ensure the senior residents complete these mandatory simulations in alignment with the timeline of the upcoming CBD resident RCPSC examinations. Additional programs over the year included sessions for COVID-related PPE and management, Core Program-linked simulations, and interdisciplinary simulations with obstetrics and psychiatry.

Moving forward with plans for the 2020 – 2021 year, the ACRM program continues with the formalized, four-year curriculum designed to reinforce the importance of nontechnical skills in crisis - all while also encompassing the resuscitation and essential medical emergencies/topics based on RCPSC Required and Suggested Anesthesiology Training Experiences and Objectives and Competencies. This is a considerable undertaking and involves many simulation sessions attended by residents in small groups over the course of each year.

This curriculum brings much of the content-linked simulation exposures previously seen linked with Core Program into a more appropriate educational experience (minimizing observer roles, reduced group sizes and more appropriate focus on communication skills). Core Program continues to have occasional simulation activities, with a redirected focus on topics that can be better provided in a larger group setting. The ACRM curriculum also includes a yearly session that involves a formative, checklist-style assessment for the learner to review to additionally prepare residents for their CanNASC assessments. Unfortunately, these were the only sessions in 2019-2020 that needed to be cancelled due to COVID-19 timing, but will be reintroduced this year.

Further opportunities will also include additional exposure to multidisciplinary simulation in conjunction with Obstetrics and Psychiatry, critical care, trauma team simulations, recovery room in-situ simulation, and various part-task trainers including advanced airway and ultrasound models. The Difficult Airway Course through the University of Calgary also provides an opportunity for residents to learn skills while at a junior stage, and step into an educator role at a senior level.

Faculty members who taught resident simulation sessions in the 2019 - 2020 academic year included:

Niamh Donnelly-Warner	*Chris Dyte*
Julia Haber	*Megan Hayter*
Esther Ho	*Heather Hurdle*
Dean Jordan	*Jeremy Luntley*
Duncan McLuckie	*Nicola Morrison*
Kristi Santosham	*Nicole Webb*

Journal Club

Contribution by Dr. Paul Zakus (Journal Club Coordinator)

Two journal clubs were planned for the previous 12 months, one in November 2019 and the other in April 2020. Unfortunately due to COVID-19, the journal club in April was cancelled. For the November journal club, the first paper discussed

studied the effect of cricoid pressure compared with a sham procedure in a rapid sequence induction of anesthesia and the other paper the effect of low dose ketamine in painful orthopedic surgeries. Fortunately, Dr. Jennifer Joo graciously hosted the November journal club this year at her house. It appears that journal clubs hosted at an anesthesiologist's residence have improved attendance numbers from staff anesthesiologist which facilitates a more involved and lively discussion of the papers. For the upcoming academic year, there will be two journal clubs with one occurring this November and the other occurring in April 2021. The exact format is still to be determined due to COVID-19. With regard to funding, Merck is no longer funding journal club and no other source of funding have been secured. Unfortunately, due to current fiscal situation, it appears that other outside sources of funding are unlikely.

Safety & Quality: 2020 – 2021

Contribution by Drs. Michelle Theam & Jan Davies (Safety & Quality Co-Coordinators)

Planning for this year's Safety & Quality education is now in its final stages and all the Department of Anesthesiology faculty - Drs. Jan Davies, Donal Finegan, Judy Marois, and Michelle Theam - are very excited about the new direction this will take.

We have been fortunate to enlist the help of Professor Thomas O'Neil and his graduate students from the Department of Psychology at the University of Calgary. Tom is an Industrial Organizational Psychologist and specializes in helping to optimize work team effectiveness, especially in light of their increasing reliance on electronic communication technologies to communicate, share information, solve problems, and make decisions.

https://psyc.ucalgary.ca/profiles/thomas-o-neill

https://wpsites.ucalgary.ca/itp-lab/

One of Tom's concepts is that having class participants work together on one or more group projects helps to consolidate learning. Our plan is therefore to have the residents learn about Safety and Quality over the course of their residency, partly by having the current (newly arrived) R1s collectively complete either a Safety or Quality project. The Safety & Quality faculty will act as their preceptors, with additional team education, training and mentoring provided by Tom's students. The Safety & Quality didactic teaching component will follow the RCPSC EPAs, starting with an introduction to Safety & Quality later this month, as well as an introduction to Tom and his students, and their concepts. We strongly believe that the knowledge, skills and critical thinking that the residents will acquire to complete this project and attain their EPAs will serve them well, as residents, and in their future careers, as well as provide an asset to the Department.

Chief Residents - Dr. Courtney Phillips, Dr. Cam Williams, Dr. Oliver Hatheway

Chief Residents

Contribution by Drs. Oliver Hatheway, Courtney Phillips and Cam Williams.

Transitioning into the chief resident role during a Program Director change and in the midst of a pandemic was not exactly in the job description. But I think it's safe to say our program and residents have handled things well. As the year progresses, we look forward to further welcoming our new residents into the program and re-uniting as a group. Looking forward to working with everyone over the next year.

Resident Extra Mile Award

The resident Extra Mile Award recognizes one resident in the Department of Anesthesiology, Perioperative and Pain Medicine, chosen by their peers, who has demonstrated exemplary support and dedication to the well-being of their fellow resident physicians.

Dr. Katrina Roberts

Outstanding Junior and Senior Resident Awards

The Outstanding Junior and Senior Resident Awards recognize one resident from each of the PGY1 and PGY2 cohort and the PGY3 and PGY4 cohort who has demonstrated outstanding clinical performance and academic achievement. The recipients of these awards have had consistently exceptional performance in all clinical, scholarly and professional domains.

Outstanding Junior Resident: ***Dr. Joshua Nicholas***

Outstanding Senior Resident: ***Dr. Evan Woo***

Due to the pandemic we were not able to have our annual Graduation and Awards dinner. At this event we celebrate our graduating residents, officially welcome our incoming PGY1s and acknowledge the work of residents and faculty through awards.

Graduating Residents

The following residents successfully completed our anesthesiology residency program this year:

- Dr. Edward Choi- has joined the FMC section of anesthesiology
- Dr. Mike Gysel- is undertaking a fellowship in cardiac anesthesiology at Duke University. Upon completion Dr. Gysel will join the cardiac group at FMC
- Dr. Nadine Lam – has joined the RGH section of anesthesiology
- Dr. Chris Young – has had to postpone a medical education fellowship as a consequence of COVID-19. Dr. Young has joined the FMC section of anesthesiology.

New Residents

Following a very successful match we are thrilled to welcome the following residents to our program:

- Dr. Heather Boersma
- Dr. Simon Kwong
- Dr. Elliot Li
- Dr. Robin Macdonell
- Dr. Steven Martyniuk

Family Practice Anesthesia Program

Dr. Tony Trinh

As one of the third-year Category 1 Enhanced Skills programs offered by the University of Calgary Department of Family Medicine, the Family Practice Anesthesia Program continues its tradition of training family physicians to provide excellent anesthesia care in rural, remote, and underserved areas. The FPA program is run in conjunction with the Royal College Anesthesia Program. Our residents share in many of the same excellent learning opportunities as their specialty anesthesia counterparts.

Calgary offers a wide variety of training sites for our residents, providing exposure to pediatric anesthesia, adult anesthesia at community hospitals, and tertiary care/trauma care at the Foothills Medical Centre. Our program is proud to continue our collaboration with Stanton Territorial Hospital in Yellowknife, where our residents complete their rural anesthesia block. These rich and varied experiences provide our residents with the tools necessary to not only provide exceptional anesthesia care to their patients, but to act as medical leaders in their respective communities as well.

Recruitment and Staffing

Dr. Scott MacLeod and Dr. Matthew Hansen successfully completed the FPA program in June, 2020. Both performed with distinction and we wish them the best of luck in their future endeavors. Dr. MacLeod was the recipient of the Dr. Bryan Ward Memorial Award for his demonstrated dedication to rural medicine, leadership, and professionalism.

Our FPA program continues to offer two residency positions per year. This year, our incoming residents will be Dr. Luke Turanich and Dr. Jay Franke. Dr. Turanich is a graduate of the Rural Alberta South Family Medicine Residency Program, and Dr. Franke is a graduate of the University of British Columbia Family Medicine Residency Program.

Section/Program Eucational and Academic Activitie

The staff anesthesiologists in Calgary and at our rural training site, Stanton Territorial Hospital in Yellowknife, remain the cornerstones of our program. Their tireless dedication and passion for teaching are integral to our ongoing success. Though the majority of their time is spent in the operating room, our residents also benefit from resident teaching rounds, grand rounds, and academic half day. Our program continues to support our residents in attending enriching educational opportunities such as Anesthesia Bootcamp, a course dedicated to intensive simulation-based learning, as well as the Rural Anesthesia Conference in Banff each year.

Future Directions

It is a time of change for Family Medicine Enhanced Skills programs across the country, with the majority of programs transitioning to a structure reflective of competency-based medical education (CBME). Our FPA program remains at the forefront of these changes, and has recently completed its first year of CBME-focused training. Such a major change in the approach to learner assessment and evaluation brings great challenges and, at the same time, renewed optimism, fresh ideas, and opportunities for increased collaboration between program directors and other leaders across the country. It is an exciting time to be involved with the Enhanced Skills Program.

Anesthesia Clerkship Program

Dr. K. Darcus and Dr. M. Davis

The Department of Anesthesiology, Perioperative and Pain Medicine continues to have an important role in Undergraduate Medical Education in the Cumming School of Medicine. During the 2019-2020 academic year almost 250 students from years one to three came through our operating rooms across the city. Additionally, our faculty and residents teach in lectures and small group sessions across all three years of the medical school curriculum.

No report this year would be complete without mention of the COVID-19 pandemic. The clinical clerks were pulled from the wards from mid-March until mid-June of 2020. In order to accommodate the shortened clerkship of the class of 2021, the Anesthesia Clerkship was reduced to 5 days and combined with the abbreviated Emergency Medicine Clerkship as a two week rotation. It is hoped that the Anesthesia Clerkship will return to its usual two week rotation for the class of 2022.

The Anesthesia Clerkship Committee has continued its hard work over the last year especially in the face of the pandemic. Over the last year the membership consisted of:

Dr. Melinda Davis – Clerkship Director until June 30, 2020

Dr. Karl Darcus – Evaluations Coordinator until June 30, 2020 and then Clerkship Director starting July 1, 2020

Dr. Nina Hardcastle – Evaluations Coordinator staring July 1, 2020

Dr. Kaylene Duttchen – Site coordinator FMC

Dr. Heather Hurdle – Site coordinator FMC

Dr. Vanessa Wong – Site coordinator PLC

Dr. Ray Zhou – Site coordinator RGH

Dr. Alan Chu – Site coordinator SHC

Dr. Tiffany Rice – Site coordinator ACH

Dr. Cameron Williams – outgoing Senior Resident Representative

Dr. Joshua Nicholas – outgoing Junior Resident Representative and incoming Senior Resident Representative

Dr. Ryden Armstrong – incoming Junior Resident Representative

Ms. Niza Delic – Program Coordinator

All of the faculty across the Department have contributed to the success of the undergraduate medical education program. The Department accommodates many learners across all levels of education and experience which places demands on faculty at all sites. The Clerkship Program has worked closely with the Residency and Fellowship programs to ensure that learners are thoughtfully distributed across the city. The time and effort that faculty members contribute to teaching is appreciated by the University, the Department and especially by the medical students.

There are a few individuals that need special recognition for the work that they have done over the past year. Drs. Heather Hurdle, Joshua Nicholas, and Ryden Armstrong put an enormous amount of work in a very short period of time to create an online orientation for the 5 day Anesthesia rotation. This move to an online orientation is essential to promote physical distancing and to assist the students through the shorter Anesthesia Rotation.

Dr. Julia Haber also deserves special recognition. She worked with Dr. Davis to create new multiple choice exam questions for the Anesthesia Clerkship exam. Dr. Haber's contribution was essential to keep the Mexam fair and valid measure of student performance.

Because of the COVID-19 pandemic the Faculty and Resident Clerkship Awards have been delayed this year. It is hoped that they will be awarded sometime in the fall of 2020.

There has been a standalone Anesthesia Clerkship rotation for ten years. Prior to that Anesthesia was part of the Surgery Clerkship. In the past decade the Anesthesia Clerkship has established itself as an important part of undergraduate medical education. The Department's activities now extend beyond clerkship to include work with students in the pre-clerkship years, both as part of their regular curriculum and in career exploration activities. Quality teaching, mentorship, and role modelling are critical to demonstrate the role and scope of the practice of Anesthesia and to attract students to careers in Anesthesiology.

Continuing Medical Education

Dr. Robin Cox

2019 – 2020 was clearly an unusual period for Continuing Medical Education and Professional Development (CME/PD). Up until the time when the effects of COVID-19 became significant, section rounds were being held regularly at each of the five sites. Once the pandemic struck, some rounds continued to be held, mostly on Zoom, but, in addition, many educational activities were rapidly developed and executed that specifically addressed the issues around COVID-19. These included many adult and pediatric multi-disciplinary simulation exercises of COVID-19 scenarios, related rounds, dissemination of COVID-19 educational materials, and the creation of an OR COVID-19 video by Dr. Megan Hayter and colleagues, and a pediatric COVID-19 video by Dr. Duncan McLuckie and colleagues.

Most formal CME events during this period, such as conferences, were cancelled or modified. The Canadian Anesthesiologists' Society held a two-day virtual meeting in June 2020, which was quite well attended and effective, given the circumstances. Dr. Jill Vinall Miller PhD, Neuroscientist and Assistant Professor in our Department, based at ACH, was one of the finalists at the Richard Knill competition at that event.

Other specific CME activities have been provided by our faculty, for example:

- Dr. Neal Maher, PLC, continues to hold Section 1 accredited point of care ultrasound (POCUS) workshops, last in September 2019, specifically "Basic FATE" (Focus Assessed Transthoracic Echocardiography) and "Basic Lung/FAST" (Focused Assessment with Sonography for Trauma);
- Departmental faculty participated in the annually held "Rural Anesthesia for GP Anesthesiologists" course in Banff, AB, and associated ultrasound regional workshop, January 2020;
- Dr. Adam Spencer, ACH, was on the faculty of a pediatric POCUS workshop at the American Society of Anesthesiologists annual meeting, Orlando, FL, October 2019;
- Regular ATLS courses are held at several sites;
- The citywide Anesthesiology Journal Club is chaired by Dr. Paul Zakus. These are normally conducted several times per academic year, but due to COVID-19, the last one was held in November 2019. Each journal club session takes the form of critical review of two to three key journal articles following a specific theme. These events are held in one of the staff anesthesiologists' homes or in a hospital venue. It is anticipated that the program will resume as usual, once the pandemic situation allows;
- Drs. Donal Finegan and Robin Cox presented "Anesthesia and Perioperative Care – Pediatric and Adult." Evening Course for Primary Care, CSM, November 2019.

At an administrative level, each site continues to have an identified leader for CME/PD. These are Drs. Elisabeth Dobereiner and Nina Hardcastle (ACH), Dr. Steve Jacyna (RGH), Dr. Tad Cherry (PLC), Dr. Colin Bands (FMC), and Drs. Esther Ho and Afra Moazeni (SHC). Dr. Robin Cox is the Departmental representative on the Faculty of Medicine's CME and PD Committee and associated Strategic Planning Subcommittee. He also sits nationally on the Continuing Education and Professional Development (CEPD) Committee of the Association of Canadian University

2019 - 2020 Fellows			
Name	Fellowship	Start Date	End Date
Dr. Daniel Mok	Periop Ultrasound	Jan 13 2020	Jan 10, 2021
Dr. Nicola Morrison	SIM	Nov 18 2019	June 17, 2020
Dr. Jayden Cowan	Thoracics	Oct 1, 2020	June 30, 2021
Dr. Philippe Champagne	Regional	Oct 1, 2020	Sept 30, 2021

Departments of Anesthesia (ACUDA). There is no specific citywide Anesthesia CME/PD Committee as the Zone Anesthesia Executive Committee, the site CME leads, and the Journal Club planners serve this function.

The short to medium term objectives of CME in the Department will need to continue with a focus on COVID-19, while not ignoring other educational needs. It may well be that we continue to use Zoom and similar platforms as an effective way to provide CME for the foreseeable future. Longer term, we will need to continue with the development of assessment tools for faculty, such as simulation programs, and anesthesia feedback reports. Such methodology will allow us to tailor our learning needs to providing the best care for our patients.

Simulation Program

Dr. M. Hayter

The Alberta Health Services Calgary Zone Department of Anesthesiology, Perioperative and Pain Medicine has an established formal Simulation Committee, co-chaired by Drs. Megan Hayter and Christopher Dyte. The 2019 – 2020 academic year continued to see exciting new developments in the simulation program particularly in light of the CoVID-19 pandemic.

Several existing Department programs have been maintained and new simulation programs added. Importantly, our simulation activities target learners of all levels of training. All simulation activities are organized and run by members of the simulation committee (Drs. Hayter, Dyte, McLuckie, Haber, Gale, Donnelly-Warner, Jordan, and Santosham).

Resident Simulation (please refer to a more detailed resident simulation report in the Residency program report)

A. Anesthesia Crisis Resource Management (Dr. Hayter) - The Anesthesia Crisis Resource Management (ACRM) course continues to be an integral part of the simulation curriculum at the University of Calgary. This is a high fidelity simulation session for four of our residents (PGY 1-4) focusing on crisis resource management skills. Each simulation scenario if followed by an individualized debrief by one our simulation staff.

B. ACRM2 (Drs. Dyte and Hayter) – This new simulation program was added to our residency curriculum as an introduction to simulation for assessment for our residents.

C. Core Program Simulation Integration (Drs. McLuckie and Dyte) - Several simulation sessions have been added to each core block. These simulation sessions are developed with a content expert and focus on the medical expert role.

D. Managing Emergencies in Pediatric Anesthesia (Dr. McLuckie) - Our residents participate in several high fidelity simulation sessions in the operating room environment at Alberta Children's Hospital. MEPA is an international simulation course which focusing on managing common peri-operative pediatric emergencies.

E. CanNASC Simulation Milestones (Dr. Hayter) - Our PGY 4 and 5 residents continue to complete their CanNASC simulation milestone scenarios. These milestones are a National undertaking. This year the 5 residents completed two of these standardized scenarios. In the 2018 – 2019 academic year our PGY 4 and 5 residents will complete these scenarios in preparation for CBD.

F. Simulation Bootcamp (Drs. Hayter, Dyte) - During the first week of PGY 1, our first year residents participated in a simulation bootcamp where they focus on common intraoperative emergencies and review some technical skills.

G. Part-task trainers - Our residents have access to and participate in various sessions with different part-task trainers. These sessions include: cardiac ultrasound, respiratory bronchoscopy, and airway trainer.

I. OSCE station (Drs. Hayter and Dyte) – In 2020, our PGY 5 residents participated in a standardized patient OSCE examination in preparation for a station that Mwas added to their Royal College examination.

Sadly due to the CoVID pandemic several resident other simulation activities were canceled.

Staff Simulation

The beginning of the 2019 – 2020 academic year began as per usual with the Perioperative Crisis Resource Management (POCM) course. Although this course began as an all-day in-situ simulation course involving the entire operating room team (anesthesiologists, nurses, respiratory therapists and surgeons) at the Alberta Children's Hospital, it has evolved at each site to meet their needs. ACH continues to offer this as an all-day course. The Rockyview General Hospital and the Peter Lougheed Hospital have incorporated it into their Friday morning rounds. The Foothills Medical Centre and the South Health Campus have begun the preliminary steps to integrate simulation education for their staff. The objectives of the course remain the same: to review site specific QA/QI events with the intention of developing key take home points from the simulation session. These take home points are then shared with the entire operating room department via email as well as posted in the operating room.

A large portion of the 2019-2020 academic year staff simulation activities revolved around CoVID-19 simulations. Various in-situ simulation activities were held to practice the donning and doffing of personal protective equipment. These sessions were run several times at various locations. These sessions were not limited to anesthesiologists – we had various surgical departments reach out to us for assistance in the deliberate practice of donning and doffing of PPE. Our department also simulated in-situ site specific airway management of the CoVID-19 patient. Front of neck airway access was also simulated with assistance of Dr. Meredith Hutton in creating the model for this. Importantly, our department liaised with both the Intensive Care Unit and the Emergency Department at all sites to ensure we had a collaborative safe practice for emergency airway management. These sessions took many forms but were usually run weekly and were held either in the ICU, ED, or on the CoVID ward at each. Communication from these sessions were fed back to the department to ensure that the entire department could benefit from these sessions.

Fellowship Academic Committee

Dr. Joel Fox

Our Fellowship committee continues to offer the following fellowships: Cardiac Anesthesia, Perioperative Ultrasound, Pediatric Anesthesia, Simulation, Thoracic Anesthesia, Safety and Quality, Regional and Acute Pain, and Perioperative Medicine. With the disruption of services secondary to the Covid 19 pandemic, our current fellows have had to alter some of their work to continue in their fellowship. It is hoped that with the resumption of services at the hospitals, that previous planned academic activity can resume shortly. Our new fellows will be starting in October 2020 after the completion of the Royal College exams that were delayed until September 2020.

Our committee meets three times a year at a minimum and membership includes all fellowship supervisors, a fellow and also a member of the Academic Committee. We have managed the third meeting of this year via email due to the Covid 19 pandemic.

Our current model of funding requires that all fellows be able to work independently. As a result, all candidates must complete their FRCPC prior to starting their fellowship. We continue to promote our fellowships on the departmental website and via the Canadian Anesthesia Society (CAS) annual meeting. Unfortunately the CAS annual meeting was cancelled in June 2020 and a face-to-face promotion at this meeting did not take place.

One fellow decided to leave the fellowship prior to completion and one fellow will complete their fellowship in early 2021.

Simulation Fellowship Program

Dr. Megan Hayter

The simulation fellowship program was cut short this year due to the CoVID-19 pandemic. However, our third fellow was active in all simulation activities of the department at this time.

Our fellowship program continues to evolve as our residency and staff simulation programs grow. But currently our simulation fellow is able to participate in a wide range of simulation activities for learners at all levels of training in both in-situ simulation and high-fidelity laboratory simulation. Our fellow's academic program consists of developing the anesthesia crisis resource management curriculum, the core simulation program and the simulation for assessment program all of our residents participate in. During this time, the fellow is guided through process of developing learning objectives to scenario design and execution. Finally they practice various debriefing techniques. The fellow also helps plan the residents' simulation calendar for the academic year. There are various other inter-disciplinary simulation activities that the fellow participates in throughout the year. The fellow also participates in the various staff simulation activities which gives them the flavor for debriefing their peers.

Cardiac Anesthesia Fellowship Program

Dr. A. Gregory

The Cardiovascular Anesthesia Fellowship program offers postgraduate education in perioperative anesthetic management for open-heart surgery, associated cardiovascular procedures (such as transcatheter aortic valve replacement, EP procedures, complex lead extractions, etc.), patients with cardiac disease undergoing non-cardiac surgery, and advanced training in perioperative transesophageal echocardiography.

The fellowship is a 12-month program which relies on the hard work and excellent teaching of the entire CV operating room team. Fellows work intensely in a one-on-one environment with one of the attending cardiac anesthesiologists. They are intimately involved in the preoperative evaluation, patient optimization, intraoperative management, and transition to postoperative CVICU care. The year is made up of 13 blocks which are generally divided into nine blocks of CVOR and one block each of Echo Lab, CVICU, thoracic/vascular anesthesia, and elective time. Most of the rotations take place at the Foothills Medical Centre.

Fellows are provided a yearly salary which is funded by them receiving a one-year temporary locum position within the Department of Anesthesiology, Perioperative and Pain Medicine. In addition to funding their fellowship year, this provides flexibility to the anesthesia OR schedulers to fill in assignments when coverage is needed or help with last minute cancellations/sick calls.

I would like to thank the members of the cardiac anesthesia group, cardiac OR team, CVICU, echo lab, the members of the Department of Anesthesia and the administrative staff. Without the hard work, support, and dedication of all of these people the fellowship program could not exist.

Graduating Fellows

Dr. Justin Byers is our most recent graduate, having completed his year with our program in January 2019. He is currently an attending anesthesiologist at the UofA Hospital as a member of both the cardiac and liver transplant services.

Current/Incoming Fellows

There were no fellows in our program this year. We are currently accepting applications for fellowship positions in 2021.

Perioperative Ultrasound Fellowship Program

Dr. Alex Gregory

Perioperative Ultrasound Fellowship Program provides postgraduate training in the use of ultrasound technology across a broad spectrum of clinical applications: transesophageal echocardiography, point-of-care ultrasound (including transthoracic echocardiography), and regional anesthesia. These rotations are spread out between multiple sites: FMC, PLC and SHC. A fellowship as expansive as this, covering multiple sites and areas of expertise, is a daunting task. Fortunately, there is an incredible team of anesthesiologists representing all sites who are collaborating on the design and implementation of the fellowship.

I would like to thank the members of our Fellowship Training Committee for all their hard work over the past year, and their continuing efforts in the success of the program. I would additionally like to express my appreciation to the other members of the department for helping us out by providing learning opportunities for our fellow.

Graduating Fellows

Dr. Kristen Biefer completed her fellowship at the end of June 2019. She is currently an attending anesthesiologist at the Peter Lougheed Center and is an active preceptor in the fellowship program.

Current/Incoming Fellows

Dr. Daniel Mok is our current fellow and will complete the program in January 2021. We have no fellows starting in July 2020. We are currently accepting applications for fellowship positions in 2021.

Safety & Quality Education

Contribution by Drs. Michelle Theam & Jan Davies (Safety & Quality Co-Coordinators)

Planning for this year's Safety & Quality education is now in its final stages and all the Department of Anesthesiology faculty - Drs. Jan Davies, Donal Finegan, Judy Marois & Michelle Theam - are very excited about the new direction this will take.

We have been fortunate to enlist the help of Professor Thomas O'Neil and his graduate students from the Department of Psychology at the University of Calgary. Tom is an Industrial Organizational Psychologist and specializes in helping to optimize work team effectiveness, especially in light of their increasing reliance on electronic communication technologies to communicate, share information, solve problems, and make decisions.

https://psyc.ucalgary.ca/profiles/thomas-o-neill
https://wpsites.ucalgary.ca/itp-lab/

One of Tom's concepts is that having class participants work together on one or more group projects helps to consolidate learning. Our plan is therefore to have the residents learn about Safety and Quality over the course of their residency, partly by having the current (newly arrived) R1s collectively complete either a Safety or Quality project. The Safety & Quality faculty will act as their preceptors, with additional team education, training and mentoring provided by Tom's

students. The Safety & Quality didactic teaching component will follow the RCPSC EPAs, starting with an introduction to Safety & Quality later this month, as well as an introduction to Tom and his students, and their concepts. We strongly believe that the knowledge, skills and critical thinking that the residents will acquire to complete this project and attain their EPAs will serve them well, as residents, and in their future careers, as well as provide an asset to the Department.

Thoracic Anesthesia Fellowship

Dr. Lorraine Chow

After a couple of years of planning, we are expecting our first thoracic anesthesia fellow to begin training in Calgary. We look forward to welcoming Dr. Jayden Cowan from the University of Saskatchewan in October, 2020. The thoracic core group is working hard to develop a comprehensive clinical and academic curriculum for our inaugural fellow.

Quality and Safety Fellowship

Dr. Donal Finegan

The Cumming School of Medicine, University of Calgary offers a one-year Fellowship program in Safety and Quality in Anesthesiology. This is an academic fellowship with formal course-based work offered through the Department of Community Health Sciences, Cumming School of Medicine (CSM), as well as a Human Factors course offered through the CSM W21C. Fellows will also complete the Disclosure: Communicating Unexpected Outcomes in Healthcare course offered by Alberta Health Services. In addition, Fellows will be expected to prepare to publish in peer-reviewed journals during the term of their Fellowship.

The goal of the program is to best match the fellowship training experience with the educational goals and future practice needs of each Fellow. To that end, and depending on their specific areas of interest, fellows will be paired with experts in Safety and/or Quality. As such, the Safety and Quality Fellowship Supervisors will endeavour to provide the knowledge, skills and experiences necessary for fellows to develop and implement safety and/or quality initiatives so that fellows may work towards becoming leaders in the field.

Recent Fellows

- 2018-19 - Dr. Judy Marois –Staff Anesthesiologist in Calgary and Head of Quality Assurance Committee
- 2019-20 – No Fellow
- 2020-21 – No Fellow
- 2021-22 – Applications received and under review

Fellowship Directors

- Dr. Jan Davis
- Dr. Donal Finegan
- Dr. Michelle Theam

Academic and clinical time will be split on a 60% academic and 40% clinical basis. Academic days will allow Fellows to undertake the formal course-based work, and to plan and undertake a research project. Clinical time will be spent as an independent consultant in the operating rooms of any of the adult hospitals in the city, including FMC, PLC, RGH, and SHC. Time spent in the OR will serve to let fellows continue to develop their clinical skills; and as well, provide the income that will support their fellowship.

Department of Anesthesiology Educational Opportunities

- Grand Rounds: These are held on Friday mornings before the start of the OR.
- Journal Club: These are held on an intermittent basis.
- Scholarly Research Evening: This is held yearly.

Zone-Wide QA/QI Committee Report

Drs. D. Liepert and J. Marois

We are pleased to report that your QA/QI committee has shown continued success applying the lessons learned from our review process. Over the past year there has been increased uptake of the Case Review Request process developed to replace M&M rounds. Through this process, cases are reviewed as either a concise QAR or educational case review, followed by presentation at the site's scheduled rounds.

Over the past year Dr. Liepert and Dr. Judy Marois (Peter Lougheed Hospital) shared the role of Committee Chair with Dr. Liepert as outgoing chair and Dr. Marois as incoming chair. In addition, the Calgary Chronic Pain Clinic has joined the Anesthesia QA Committee, with Dr. Maryam Nasr-Esfahani as site-lead.

Our dedicated team of site-leads, including Dr. Leyla Bhagirzada (South Health Campus), Dr. Michelle Hokanson (Peter Lougheed Hospital), Dr. Michelle Theam (Alberta Children's Hospital), Dr. Donal Finegan (Foothills Medical Centre), Dr. David Liepert (Rockyview General Hospital) all appreciate your ongoing support and engagement, without which that would not be possible. We also want to specifically thank Dr. Gary Dobson for his ongoing guidance and support, Anne Chang from Patient Safety, and Andrew Jenkins, Brian Peffers, Amanda Weiss, Soline Isliarik and Natasha Hayter in our own Department as well.

Here is a brief summary of our completed Quality Assurance Reviews. Case description and learning points from Patient Safety and Learning Summaries are included when available.

Calgary Zone Anesthesiology Quality Assurance Subcommittee Annual Report QARs

COMPLETED Between April 1, 2019 – June 30, 2020

QAR#9039: Issues with Meningioma Resection (July 2019)

QAR#9004: Postoperative Vision Loss with Prone Positioning (Oct 2019)

QAR#9277: Intraoperative Code (Summary in progress)

QAR#10705: Post-op Code with History of OSA (Nov 2019)

QAR#11325: Multi Organ Failure and SC Injury (Summary in progress)

QAR#9825: Aggregate Post Surgery AKI Cases (Jan 2020)

QAR#11205: GI Endoscopy (May 2020)

QAR#11280: Joint Injury Post ECT (Jan 2020)

A patient presented for maintenance electroconvulsive therapy (ECT). There were no reported or documented issues relating to the patient's previous ECT treatments nor the expected associated seizures; with the patient's previous seizure lasting 58 seconds. Anesthesia management was similar to previous ECT treatments, with a 63-second seizure and vigorous movement that the ECT nurses and treatment team stated to be "normal" for the patient. The patient had an unremarkable recovery, without complaints of pain, and was noted to be moving all four extremities on the post-anesthesia care unit (PACU) record prior to discharge home. The patient awoke one morning after the ECT with bilateral shoulder pain and the inability to move both upper extremities. The patient presented to the Emergency Department. Standard x-ray views of the shoulders were reported to show "slight posterior subluxation of the humeral heads bilaterally". Axillary views were recommended, but not completed. The patient was discharged home. Eight days after the ECT, the patient sought further reassessment at the Emergency Department. Repeat shoulder x-rays noted "subtle cortical defect of the left humeral metaphysis suspicious for a nondisplaced fracture". Subsequent axillary views showed "bilateral posterior glenohumeral joint dislocations and bilateral reverse Hill-Sachs impaction fractures". The patient was admitted to the Orthopedic Surgery service for operative management of the bilateral proximal humerus fracture-dislocations. Given the patient's delayed initial symptoms following ECT, the patient was reviewed by Neurology for consideration of a possible secondary seizure during the night of the ECT. No evidence of seizures was found on history, imaging, laboratory results, or EEG on work-up completed ~2 weeks following the event. The patient was placed on medication and cessation of ECT treatment was recommended at that point. The patient is being followed by Neurology.

Learning:

- Explore the possibility of additional support from Respiratory Therapists (RTs) (preferably OR RTs) during ECTs.
- Develop and implement the use of a pre-procedure ECT checklist.
- Ensure appropriate neuromuscular blockade monitoring equipment is available for ECT.

Appendices

Appendix A - Department Membership

Foothills Medical Centre		
Anderson, Keith	Arraf, John	Balaton, John
Bands, Colin	Beriault, Michael	Caveno, Jordan
Cheung, Kenneth	Chong, Michael	Chow, Lorraine
Chun, Rosaleen	Chuquer, Maria	Davis, Melinda
Diserens, Monique	Duttchen, Kaylene	Eschun, Gerald
Falkenstein, Richard	Fermor, David	Finegan, Donal
Fox, Joel	Froelich, Jennifer	Gregory Alex
Guglielmin, Darryl	Ha, Duc	Haber, Julia
Hamming, Jeremy	Hawboldt, Geoffrey S.	Hiew, Moo-Khon
Holland, Darren	Hurdle, Heather	Illing, Kim
Illing, Leigh H.G.	Jungen, David	Korzeniewski, Peter
Lee, Alan	Ligier, Bruno	McTaggart-Cowan, Robert
Ng, Jeffrey	Noss, Christopher	Organowski, Slawomir
Pash, Michael	Prusinkiewicz, Chris	Rogan, Kyle
Seal, Douglas D.	Shing, Molly	Smith, M Heather
Stacey, Shean	Teoh, Desiree	Thompson, Robert
Todd, Andrea	Waechter, Jason	Wahba, Raouf S
Wang, Bing	Watson, Neil C	Webb, Nicole
Wilson, Joshua	Zakus, Paul	

Alberta Children's Hospital		
Carter, Kerryn	Connors, M. Ruth	Cox, Robin
Dobereiner, Elisabeth	Else, Scott	Ewen, Alastair
Farran, R. Peter	Gale, Mark	Ghazar, Nancy
Hardcastle, Nina	Kuwahara, Brian	Lardner, David
Letal, Mike	Livingstone, Margaret	Luntley, Jeremy
McAllister, Debbie L	McIntyre, Brian	McLuckie, Duncan
McMann, Jon	McMillan, Lindsay	Mulvey, Jamin
Rasic, Nivez	Rice, Tiffany	Spencer, Adam
Theam, Michelle		

South Health Campus		
Baghirzada, Leyla	Banasch, Matthew	Beauchemin-T, Marie
Bharwani, Fayaz	Brown, Nathan	Cheesman, Mark
Chu, Alan	Demarty, Jennifer	Endersby, Ryan
Fraser, Louis	French, Susan	Goldstein, David
Ho, Esther	Jack, Melissa	Joo, Jenny
Kostash, Mark	Montgomery, Shaylyn	Nemish, Ulyana
Olivieri, Lori	Schubert, Ted	Stephan, Jarad
Swedlo, Dean	Thompson, Jenny	Trinh, Tony

Peter Lougheed Centre		
Armstrong, JN	Azmaysh-Fard, Arash	Biefer, Kristen
Bishop, Graeme	Brown, Alex	Cassidy, Michael
Cherry, Tadd	Cuk, Aleksander	Darcus, Karl
Dobson, Gary	Donais, Philip	Downie, Joseph
Halpenny, David	Hokanson, Michelle	Hung, Linda
Jadavji, Nadeem	Jordan, Dean	Kozody, Raymond
Kruger, Marelise	Lim, Beatriz	MacKenzie, Lindsay
Maher, Neal	Marois, Judith	Milne, David
Moazeni Rizi, Afra	Parkinson, Bronwyn	Patterson, Steven
Pearce, Craig	Pitter, Curt A	Priddy, Richard
Rabuka, Shannon	Sandhu, Manjot	Sandhu, Sabrina
Santosham, Kristi	Stilling, Lee	Tiessen, Alan
Wassill, Diane	Wheeler, Steven	Wong, Vanessa
Wood, Daniel	Yang, Theresa	

Rockyview General Hospital		
Babyak, Yaryna	Bart, Bevan	Berchuk, Miriam
Bruce, Erin	Chan, Tommy	Dawson, Paul
Donnelly-Warner, N	Eng, Reuben	Hall, Wendy
Hardy, C. David	Hayter, Megan	Hopper, Gordon
Jacyna, Stephen	Janzen, James	Kent, David
Larsen, Udell	Lee, Brenda	Liepert, David
Morrow, Farrah	Partridge, Jill	Patel, Kiran
Phillips, Steven	Pytka, Saul	Rubin, Yair
Saayman, Marius	Samuels, Peter	Schultz, Rod
Shah, Misbah	Simon, Karl	Sims, Christopher
Soska, Mark	Sweet, Blythe	Torsher, Kevin
Tsai, Lin	Wasserman, Paula	Yont, Karrie
Zhou, Ray		

Additional Members - Community		
Archer, David	Davies, Jan	Eagle, Chris
Latour, John	Nanji, G. Mohammed	Reddy, Neville
Sachedina, Gulzar	Young, Dale – Canadian Blood Services	

Calgary Chronic Pain Centre		
Braithwaite, Philip	Montgomery, Lori	Shah, Misbah
Shinkaruk, Kelly		

Appendix B – Publications

Projects and Publications

Dr. Melissa Jack participated as a co-investigator on a research project with Dr. Marlis Sabo (principle investigator), called "Beginning, Middle, and End: Understanding the Trajectories of Rotator Cuff Surgical Patients." The paper is currently being submitted for publication.

Drs. Leyla Baghirzada, Ryan Endersby and Carlos Yu continue to recruit patients for their study "Efficacy of Ultrasound-guided Transversalis Fascia Plane Blocks for Post- Cesarean Section Analgesia".

Indranil Balki, Leyla Baghirzada, Andrew Walker, Stephen Lapinsky, and Mrinalini Balki won the 2020 CAS Conference "Best Paper in Obstetrical Anesthesia" (residents/ medical students) for "Sepsis in Pregnancy: Trends in Canada (SePTIC Study)".

Motor Blockade After Iliopsoas Plane (IPB) and Pericapsular Nerve Group (PENG) Blocks: A Little May Go A Long Way. Ryan Vincent William Endersby MD FRCPC*, Joanna J Moser PhD MD, Hai Chuan Yu MD, Esther Ching Yee Ho MD FRCPC, Adam Oscar Spencer MD MSc FRCPC. In process.

The effectiveness of a multi-faceted, group facilitated audit and feedback intervention to increase tranexamic acid use during total joint arthroplasty.Shawn Dowling, Inelda Gjata, Nathan Solbak, Sampson Law, Colin Weaver, Ryan Endersby, Leyla Baghirzada, Lori Olivieri, Lara Cooke, Kelly Burak. In process.

Implementation of a Perioperative Surgical Home for Patients Undergoing Total Joint Arthroplasty: A Comparison of Perioperative Outcomes. L. Baghirzada, A. Walker, R. Reyes, K. Denness, R. Endersby. In process.

Barrier Devices For Reducing Aerosol And Droplet Transmission in COVID-19 Patients: Thinking Outside the OR. Ryan Vincent William Endersby MD, FRCPC, Adam Oscar Spencer MD, MSc, FRCPC, Esther Ching Yee Ho MD, FRCPC, David Howard Goldstein MB, BCh, BAO, MSc FRCPC, and Edward Schubert BSc, MD, FRCPC. In process.

Endersby RVW, Spencer AO, Ho ECY, Goldstein DH, Schubert E. Clear plastic drapes for aerosol-generating medical procedures in COVID-19 patients: questions still remain [published online ahead of print, 2020 May 11]. Can J Anaesth. 2020;1. doi:10.1007/ s12630-020-01705-5

Endersby RVW, Ho ECY, Schubert E, Spencer AO. Modified tracheal extubation for patients with COVID-19. Br J Anaesth. 2020;125(1):e191-e192. doi:10.1016/ j.bja.2020.04.062

Endersby RVW, Ho ECY, Spencer AO, Goldstein DH, Schubert E. Barrier Devices for Reducing Aerosol and Droplet Transmission in Coronavirus Disease 2019 Patients: Advantages, Disadvantages, and Alternative Solutions. Anesth Analg. 2020;10.1213/ ANE.0000000000004953. doi:10.1213/ANE.0000000000004953

Sawhney M, Goldstein DH, Wei X, Pare G, Wang L, VanDenKerkhof EV. Pain and hemorrhage are the most common reasons for emergency department use and hospital admission in adults following ambulatory surgery: results of a population-based cohort study. Perioperative Medicine. In press.

Drs. Neil White (Orthopedics), Lori Olivieri, and Stephen Hunt (Orthopedics) are three of numerous authors in the multi-centre HIP ATTACK trial publication: The HIP ATTACK Investigators. Accelerated surgery versus standard care in hip fracture (HIP ATTACK): an international, randomised, controlled trial. Lancet 2020; DOI: https://doi.org/ 10.1016/S0140-6736(20)30058-1. (Fast-tracked article).

Dr. Lori Olivieri participated with Beverly Ang BSc Pharmacy, Gerard Spytkowski BSc Pharmacy and Maria Anwar, BSc Pharmacy, ACPR, MBA in a research study led by Nathaniel Morin BSc Pharmacy: "A Pharmacist- Led Intervention to Improve Perioperative Glycemic Control in Elective Surgery". In process.

Dr. Lori Olivieri participated on a panel which supported the project of a pharmacy resident Peter Herk BSc MSc PharmD. The project name is "Risk Factors for Preoperative Hyperglycemia in Surgical Patients with Diabetes: A Case-Control Study". (project preceptor: Nathaniel Morin, BSc. Pharm). In process.

Appendix C – Vi Riddell Pain and Rehabilitation Research Annual Report

A. Project Goals:

To develop an integrated, basic and clinical pediatric pain research program that will:

- Advance our understanding of the fundamental mechanisms underlying acute and chronic pain to develop novel pain therapies;
- Advance our understanding of the effectiveness of current pain management methods on the developing brain to minimize unwanted side effects of anesthetics and analgesics;
- Advance our understanding of the role of biological, psychological and social factors in the development and persistence of acute and chronic pain in children to develop novel preventative and therapeutic modalities; and
- Train the future generation of highly qualified pain researchers and clinicians.

1) Activity #1 – Determining the Effects of Anesthesia on Children

Overview: Biomedical research scientists will partner with clinical investigators to determine the effect of anesthesia on children. The safety of the repeated use of general anesthetics in neonates and children has been questioned, and it has been shown in animal models that anesthetic agents may harm the developing nervous system. However, the translatability of these findings into the clinical setting is still unclear and often unsettling for both clinicians and the families:

- Dr. Tiffany Rice, a pediatric anesthesiologist at the Alberta Children's Hospital, is involved in several translational research projects. She has established collaborations with basic science researchers at the University of Calgary, including Dr. Naweed Syed, Dr. Tuan Trang and Dr. Chad Bousman.
- Dr. Tiffany Rice heads up a study of children undergoing magnetic resonance imaging (MRI) under general anesthesia. This study is clinical and translational and will use neuroimaging, psychological assessments, biomarkers and genetics.
- Dr. Tiffany Rice co-supervises PhD student Nerea Jimenez Tellez with Dr. Naweed Syed. Nerea's PhD thesis is titled "Cellular, molecular and behavioural mechanisms underlying anesthetic-induced neurotoxicity". Nerea began her PhD work in September 2019 and passed her PhD Candidacy examination in April 2020.

Intended Outcomes:

- Generation of new knowledge about the cellular and molecular mechanisms underlying the side effects of various pain management agents and anesthetic drugs.
- Generation of new knowledge about the cytotoxic side effects of various pain management and anesthetic drugs.
- Identification of the safest, least cytotoxic anesthetic agents for safer clinical use in children and neonates.
- Identification of agents and/or strategies to help mitigate the potential cytotoxic effects of anesthetics.
- Translation of basic science findings regarding anesthetics and analgesics, with exploration of effects of these drugs in children in the clinical context.

2) Activity #2 – Clinical Research on Chronic Pain in Children

Overview: Establish a clinical pain research laboratory at the Alberta Children's Hospital (ACH) where the clinical research team will focus on the development and persistence of chronic pain in children:

- Dr. Melanie Noel's team investigates the role of biological (genetic biomarkers, sleep), psychological (internalizing mental health) and social (parent-child interactions) factors as underlying mechanisms for pediatric chronic pain, as well as identifies predisposing factors and clinical phenotypes to predict trajectories of pediatric chronic pain; and
- Dr. Jillian Vinall Miller's team uses neuroimaging to better understand neural connectivity in pain and determine treatment targets.
- Dr. Katie Birnie's team improves pain assessment and management of pediatric acute, postsurgical, and chronic pain using clinical intervention, knowledge synthesis, multi-stakeholder engagement, and implementation of science research designs. • Dr. Serena Orr's team is developing a clinical research program that aims to improve patient-centered care for children and adolescents with primary headache disorders and to better understand factors that contribute to the development and maintenance of primary headache disorders in children and adolescents.

Intended Outcomes:

- Develop and maintain research capacity to conduct the planned research successfully (faculty, space, infrastructure and personnel).
- Develop a cohort of youth newly diagnosed with chronic pain and primary headache disorders at the ACH.
- Generation of new knowledge about the role of biological, psychological and social factors contributing to the development and persistence of chronic pain and primary headache disorders.
- Development of new preventative strategies and new treatment modalities for the management of chronic pain in children.
- Ensure rapid mobilization of existing and new knowledge in pediatric pain with multi-stakeholders, including patients and families, healthcare providers, decision-makers, and policy-makers.

3) Activity #3 – Clinical Research on Acute Pain in Children

Overview: Establish a clinical pain research team at ACH focusing on acute pain in children and how to manage pain trajectories in the context of procedural pain (e.g., vaccine injections) and post-surgical pain (e.g., tonsillectomy, spinal fusion):

- Dr. Melanie Noel's team, along with Dr. Jillian Miller, are investigating the role of memory in the transition from acute (post-surgical) to chronic (pain lasting > 3 months) pain. This research will identify the neurobiological underpinnings of pain memories (i.e., brain structure and function, genetic biomarkers) in order to understand why acute pain may transition to a chronic state.
- Dr. Melanie Noel's team also investigates the role of language and memory in pain trajectories for children undergoing tonsillectomy. Dr. Noel's team has developed a parent-led memory reframing intervention, which teaches parents how to reminisce about their child's post-surgical experience in order to foster positively-biased memories, and thereby improve post-surgical pain outcomes for children.

B. Project Activities: (see Appendix for further information related to these projects)

1. The Sociolinguistic Context of Pain Memory Development in Young Children.

Authors: Vinall Miller J, Rasic N, Pavlova M, McCallum L, Graham S, Noel M (PI)

- Background: Poorly managed pain in childhood can adversely affect health into adulthood. Children's memories for pain play a powerful role in shaping their subsequent pain experiences. Remembering pain is a reconstructive process. Pain memories can become biased, which has critical implications for future pain experiences. Children who remember pain in a negatively biased way (i.e., they remember experiencing more pain as compared to their initial pain report) are more likely to experience greater fear, pain, and distress at future pain experiences than children who remember pain in an accurate or positively estimated way. Moreover, negative memory biases for pain have been implicated in the development and maintenance of pain problems (e.g., chronic pain) and avoidance of medical care. Indeed, we have demonstrated that memory for pain is more important for children's future pain experiences than the initial experience of pain itself. Therefore, it is important to understand the factors that influence pain memory development, particularly early in development before pain problems emerge, in order to inform prevention and intervention efforts aimed at reducing the deleterious impact of pain. Emerging research has identified parent and child anxiety and catastrophic thinking as important in children's pain memory development. Although parent-child language-based interactions have been proposed as a mechanism underlying these relationships, this has not yet been empirically examined.
- Aims: The objective of the proposed research study is to examine the socio-linguistic context (i.e., parent-child narratives about pain) of pain memory development in young children undergoing surgery. We will accomplish our aims by conducting a prospective study of children undergoing tonsillectomies and their parents, which utilizes observational methods to assess parent-child narratives and subsequent pain memory development.
- Progress: Completed; 147 recruited.

2. Mutual Maintaining Mechanisms Underlying the Co-occurrence of PTSD and Chronic Pain in Youth: An Integrative Examination (PATH Study)

Authors: Vinall Miller J, Rasic N, Arnold P, Sears C, Noel M (PI).

- Background: Dr. Noel's research provides compelling evidence that PTSD symptoms and chronic pain are highly comorbid in adolescence and are linked to worse pain outcomes and quality of life. Youth with chronic pain who have mental health comorbidities do not respond to conventional pain treatments, increasing risk for these issues persisting into adulthood. Nevertheless, little is known about why pediatric chronic pain and PTSD co-occur.

  Dr. Noel and colleagues published the first pediatric model of co-occurring PTSD symptoms and chronic pain. This model posits that shared cognitive (attention and memory biases), behavioral (sleep deficiency), and neurobiological (genes, neural activation patterns) factors lead to the development and maintenance of both conditions. Her cross-sectional data suggests that sleep deficiency may be a powerful mechanism underlying the PTSD-chronic pain relationship. Nevertheless, longitudinal studies utilizing rigorous, objective assessment of cognitive (attention and memory biases), behavioral (sleep deficiency), neuroimaging, and genetic mechanisms are needed to understand how these conditions are maintained. This will inform how to halt a trajectory of pain and PTSD from persisting into adulthood

- Aims: The overarching objective of the proposed research is to apply an integrative approach to identifying cognitive, behavioral, neurobiological (i.e. genetic and neuroimaging) mechanisms that

underlie the co-occurrence and maintenance of PTSD and pediatric chronic pain by prospectively following a cohort of youth with chronic pain for 3 months. We will utilize rigorous cognitive (eye-gaze tracking), behavioral (actigraphy), genetic (saliva samples) and neuroimaging (structural and functional) methods to advance clinical research in this emerging area.

- Progress: 190 recruited to date at ACH (30 scanned); 30 recruited at the IWK Health Centre; 6 recruited at The Hospital for Sick Children.

3. Neurobiological, cognitive-affective and behavioral changes following exposure to either sevoflurane- or propofol-based anesthesia in children undergoing MRI

Authors: Vinall Miller J, Rasic N, Spencer A, Noel M, Walker A, MacMaster F, Bousman C, Syed N, Rice T (PI).

- Background: The demand for magnetic resonance imaging (MRI) in pediatric patients is increasing due to its use in medical diagnosis and surveillance. Pediatric patients often require general anesthesia (GA) for MRI due to the need for prolonged immobility during the scanning process to obtain high quality images. Two widely used anesthetic techniques for pediatric MRIs are volatile-based anesthesia using sevoflurane and total intravenous anesthesia (TIVA) using propofol. There is significant evidence within the animal literature pointing to adverse effects of anesthesia on cognition. Concerns have been raised regarding the effects of exposure to anesthetics on the developing human brain given that several animal studies have demonstrated that both intravenous (IV) and volatile anesthetics cause neurodegenerative effects, trigger wide-spread neuronal apoptosis, and modify dendritic branching. The question of whether or not anesthetic agents cause short- or long-term cognitive changes in children is of upmost importance, as is the determination of which agents may be most detrimental. This project is a prospective randomized controlled trial comparing the effects of sevoflurane and propofol in pediatric patients. In addition to assessing the cognitive and behavioral effects of either sevoflurane or propofol anesthesia in young children undergoing MRI, the current project proposes to examine two pathophysiological mechanisms that may be involved in the potential detrimental effects of these agents in the immature brain: brain metabolism and inflammation.
- Aims:
  - Aim 1: Our primary aim is to determine if children exposed to sevoflurane- or propofol-based anesthesia for MRI exhibit cognitive deficits at 3 months post-MRI.
  - Aim 2: Our secondary aim is to determine if children exposed to sevoflurane- or propofol-based anesthesia for MRI exhibit cognitive or behavioral deficits within the first 2 weeks post-MRI.
  - Aim 3: A tertiary aim is to determine if exposure to sevoflurane or propofol during MRI causes immediate changes in brain metabolism and inflammatory markers, and if these changes correlate with short-term (within 14 days) or longer-term (90 days) cognitive and behavioral outcomes.
  - Aim 4: Lastly, we will examine whether or not genetic variants related to inflammation are associated with the above outcomes.
- Progress: Recruitment of patients into the trial is complete (n=50). The three-month cognitive testing follow-up is complete for all patients. Blood and buccal swab samples from the 50 patients have been processed and handled by Dr. Syed's laboratory. Serum samples have been analyzed using ELISAs to assess changes in inflammatory molecules. Dr. Bousman's laboratory has extracted DNA from the buccal swabs, the pharmacogenetic analyses have been conducted and the results are being analyzed. All of the data from the trial has been obtained and we are currently completing data analysis.

  Dr. Tiffany Rice was awarded the Canadian Anesthesiologists' Society (CAS) Research Award in Neuroanesthesia for this study (July 2018-June 2019). An abstract was submitted to the Canadian Anesthesiologists' Society 2020 Meeting reporting on some of the trial outcomes. This was presented

by Dr. J. Vinall Miller in the Richard Knill Research Oral Competition (June 2020). The abstract was awarded the Best Paper in Neuroanesthesia.

4. Effects of anesthetic agents on neuronal viability, neurite outgrowth and mitochondrial integrity

Authors: Armstrong R, Hasan S, Iqbal F, Pehar M, Thompson AJ, Jimenez Tellez N, Rice T, Syed N (PI).

- Background: There is evidence that a number of the commonly used anesthetic agents may have neurotoxic effects, especially in the immature brain. However, the specific mechanisms responsible for these effects are not well understood. It is also unclear if certain drugs may be less detrimental or even perhaps neuroprotective.
- Aims: In collaboration with Dr. Naweed Syed's laboratory, we are investigating the effects of a variety of anesthetic agents on neuronal viability, neurite outgrowth, synaptic connectivity and mitochondrial integrity in rat and snail neuronal cell culture models. Experiments are currently underway, with a number completed, comparing inhalational anesthetics (sevoflurane, desflurane) and intravenous anesthetic agents (ketamine, propofol). We are also looking at the effects of a newer anesthetic agent, dexmedetomidine, as there is some suggestion that this drug may be neuroprotective. In addition, we are examining the neuroprotective effects of a synthetic peptide. We are assessing the neuronal effects of this peptide and of dexmedetomidine using the above outcomes and examining if these agents, when administered in combination with other anesthetics, might mitigate some of the negative effects of the more commonly used agents. Ultimately, results from these studies may help guide the delivery of safer anesthetic care to pediatric patients.
- Progress: Experiments are being undertaken, with some completed. Some of this data has been presented as research posters. A couple of manuscripts are in preparation.

5. Cellular, molecular and behavioural mechanisms underlying anesthetic-induced neurotoxicity

(N. Jimenez Tellez PhD thesis project)

Authors: Jimenez Tellez N, Rice T (Co-PI), Syed N (Co-PI).

- Background: Anesthetics are commonly used for numerous clinical procedures. However, recent evidence in animal models suggests that a number of these anesthetic agents exhibit cytotoxicity and lead to deficits in cognition, behaviour, learning and memory. Human studies to date have been inconsistent and a detailed understanding of the clinical effects of anesthetic exposure on developing brains is lacking. In the Syed lab, preliminary data demonstrates that the exposure of rat cortical neurons to three different anesthetic compounds, desflurane, propofol and ketamine, results in increased cell death and unhealthy morphology, increased superoxide production and mitochondrial fragmentation, and differential effects on the total number of pre- and post-synaptic puncta. The proposed research project is poised to determine how anesthesia exposure at various developmental stages may impact brain cell viability, growth and synaptic connectivity. The objectives of this project are 1) to clarify the mechanisms of the anesthetic-mediated neurotoxicity using neuronal cultures, 2) to understand the effects of exposure to different anesthetics on cognitive and behavioural outcomes using a rat model, 3) to identify neuroprotective strategies to mitigate anesthetic-mediated cytotoxicity and 4) to identify and characterize genes that might elucidate the anesthetic-induced neurotoxicity mechanisms.
- Aims:
    - Aim 1: To determine if sevoflurane and dexmedetomidine will differentially affect neuronal viability, outgrowth and synaptic connectivity in cell culture. For this in vitro model, cortical

neurons will be extracted from rat pups at postnatal day zero and exposed to various clinically relevant concentrations of anesthetics to determine their effects on cell viability, neuronal activity, neurite growth and synapse formation.

- Aim 2: To determine if sevoflurane, desflurane, propofol, dexmedetomidine and ketamine exposure of pregnant female rats and/or newborn pups will differentially affect learning and memory. In this in vivo model, female rats at day 18 of pregnancy and newborn pups at day 7 after birth will be exposed to the aforementioned anesthetics alone or in combination with dexmedetomidine to determine whether these compounds exert a long-term effect on learning and memory as assessed by a battery of spatial learning and memory tests.
- Aim 3: To determine if anesthetic-induced neurotoxicity results from a modification of gene expression of proteins responsible for forming and maintaining proper neuronal networks. Both the cell cultures and the animal brains will be used for RNAseq analysis after exposure to different anesthetic agents in order to elucidate more comprehensively the mechanisms of toxicity.

- Progress: Experiments are being undertaken. Some of this data has been presented as research posters. Nerea Jimenez Tellez passed her PhD Candidacy examination in April 2020.

6. Neurobiological Changes Associated with Improvements in Function Following Intensive Pain Rehabilitation in Youth

Authors: Vinall Miller J, Rasic N, Harris A, Bray S, Carter K, Noel M (PI).

- Background: The Intensive Pain Rehabilitation Program (IPRP) at the Alberta Children's Hospital (ACH) was developed to target children and adolescents with chronic pain and consequent disability who are not responding to conventional outpatient therapy. Our preliminary data suggests that after 6 weeks in the IPRP, adolescents have less functional disability, generalized anxiety and depressive symptoms, better quality of life, improved school attendance and better bedtime habits, even though their pain remained unchanged. However, very little is known about the neurobiological mechanisms underlying these changes in behaviour from pre- to post treatment. We need to move beyond these earlier studies, by: 1) examining effects of intervention on youth with other types of chronic pain; 2) examining how our unique pain rehabilitation program contributes to neurobiological change; 3) characterizing changes in neuroanatomy that underlie improvements in function; and 4) linking neuroanatomical changes to improvements in outcomes over time. By answering these 4 questions we will begin to understand the mechanisms underlying changes observed over the course of treatment in our patients. Moreover, this study will also help to inform and improve upon existing therapies. By effectively intervening during a period of significant neuroplasticity, clinicians will have the opportunity to optimize neurobehavioral outcomes within this vulnerable population.
- Aims and Hypotheses: In this study, we aim to examine: 1) whether there are differences in brain structure and function between adolescents with chronic pain versus age- and sex-matched healthy controls before and after treatment, after accounting for confounding factors (e.g. stress, trauma); 2) factors (e.g pain ratings) that are predictive of neuroanatomical differences between adolescents with chronic pain versus healthy controls, after accounting for confounding factors; and 3) associations between change in structure and function between baseline and IPRP completion in relation to outcomes (e.g. functional ability, anxiety, depression) in the short- and long-term among adolescents with chronic pain.Progress: 24 with 2 scans, 4 with 1 scan.

7. Establishing a pain outcome database for children and adolescents with headaches, functional abdominal pain, and other complex pain disorders.

Authors: Noel M (PI), Rasic N, Vinall Miller J, et al.

- Background: Chronic pain is a growing problem among children and adolescents, with some epidemiological studies indicating that approximately 30% of children and adolescents experience pain that lasts for 3 months or longer. The most common pediatric chronic pain complaints include migraine, chronic daily headaches, recurrent abdominal pain, and general musculoskeletal pain, including limb pain and back pain. Chronic pain in the pediatric population is often associated with functional disability most frequently manifesting as school impairment, difficulty maintaining social contacts, decreased participation in recreational activities, impairments in health-related quality of life, and an increase in health care utilization. As a result, these patients exact high costs on the health care system. Clinch and Eccleston (2009) described childhood chronic pain as "a modern public health disaster."

  In recent years, interdisciplinary, pediatric pain rehabilitation programs have gained increasing support as the treatment of choice for chronic pain conditions in which functional restoration is emphasized. Presently, there is a dearth of research on multidisciplinary pediatric pain rehabilitation centers with particularly few studies looking at the processes or mechanisms that account for the successful outcomes of these programs. Our goal is to begin to contribute to the literature base in this area by establishing a pain outcome database that will allow us to collect the clinical data that we obtain during assessments, intervention, and follow ups to begin to study the cognitive, behavioural, physical and psychosocial outcomes of children and adolescents with pain disorders. We anticipate that this database will become a flagship for other programs across the country.

- Aims: The purpose of this research proposal is twofold:
  - We aim to monitor progress for all children and adolescents who are assessed and treated through the Vi Riddell Children's Pain and Rehabilitation Program (i.e. headache, abdominal pain, complex pain and Intensive Pain Rehabilitation Program) here at Alberta Children's Hospital. The progress monitoring will be done by the means of questionnaires that are to be completed before a 90-minute team clinical interview and treatment planning session and after the treatment is completed. Clinicians will have access to this information provided the participants grant their consent. These data will inform important ongoing research projects on the cognitive, behavioural, physical and psychosocial outcome of pediatric patients and their families with various pain presentations.
  - We aim to examine predictors of pain and health trajectories in youth with chronic pain over time.
- Progress: 168 recruited from headache clinic, 196 recruited from complex pain clinic, 7 recruited from functional abdominal pain clinic, 58 from the Intensive Pain Rehabilitation Program.

8. Pain After Tonsillectomy Study.

Authors: Noel M (PI), Rasic N, Graham S, Chorney J, Vinall Miller J, Brookes J, Yunker W, Drummond D, Hoy M, Pavlova M

- Background: Pain is a common experience in childhood. Healthy children who are compliant with medical care undergo up to 20 painful procedures by the age of 5. Moreover, millions of children undergo surgery (e.g., tonsillectomies) each year, which is commonly linked to pain and distress. Pain from, and fear of, medical experiences can influence children long after the painful stimulus is removed. Children's memories of pain are a powerful predictor of future pain experiences, and are sometimes more influential to future pain than the initial experience of pain itself. Memory is susceptible to distortion. Negative biases in pain memories (i.e., recalling higher levels of pain as compared to initial

pain report) are associated with higher subsequent pain, distress, and worse medical compliance. Recent data from our lab provides compelling evidence that parents who reminisce with their children about surgery using a particular style (e.g., more elaborative, less topic-switching) and content (e.g., less content about pain, fear, medical procedures; more explanations) have children who later remember post-surgical pain in a more accurate and positively biased way. Parental reminiscing style and content have been effectively targeted in interventions to improve children's memory development. However, memories of post-surgical pain, that can be negatively biased and lead to persistent pain problems, have not been targeted, despite a relative dearth of, and need for, interventions for this pediatric population. Moreover, existing memory reframing interventions did not employ parents, who play a critical role in children's pain memory formation and are underutilized intervention agents.

- Aims: The objective of the proposed research study is to conduct a pilot study to examine the preliminary efficacy and acceptability of a brief parent-led memory reframing intervention following pediatric surgery to foster more adaptive (i.e., less negatively biased) pain memories. The intervention will draw from our recent data and extant memory reframing and narrative-based intervention techniques to promote more accurate/positive pain memories by teaching parents more adaptive styles of reminiscing with their children about a past surgery. We will accomplish our aims by extending our existing program of research on post-surgical pain memory development of children (aged 4-7 years) and randomly assigning parents to receive a memory reframing intervention or attention control following surgery and subsequently assessing children's memories for pain.
- Progress: Completed; 86 recruited.

9. Pain After Surgery Study.

Authors: Noel M (PI), Brindle M, Rasic N, Parsons D, Ferri de Barros F, Phillips L, Pavlova M, Vinall Miller J.

- Background: Pain is a common experience in childhood. Millions of children undergo surgery each year, which is commonly linked to pain, distress, and in some cases the development of pediatric chronic pain – a growing epidemic affecting 25% of Canadians. Poorly managed pain can result in negatively-biased pain memories (i.e., recalled pain is more intense than previous/initial pain report) and chronic pain that can persist into adulthood. Indeed, research has found that youth who developed negatively-biased pain memories following spinal fusion surgery reported higher levels of pain 4 months later, precisely when pain can transition to a chronic state. Children's memories of post-surgical pain can lead to chronic pain; however, the neurobiological underpinnings of these pain memories are poorly understood, despite an urgent need for prevention and treatment targets for these youth. In adults, the shape, volume, and connectivity of the hippocampus – a brain region involved in memory – underlie the development of negatively-biased pain memories and the transition from acute to chronic pain. Nevertheless, neural correlates of pain memory biases and the transition from acute to chronic pain have not been studied in adolescence, which is a critical period for brain plasticity and development. We previously demonstrated that less negatively-biased pain memories protect youth against developing chronic post-surgical pain. Our pilot brain imaging data show that hippocampal structure and functional connectivity are different in youth with chronic pain versus controls, suggesting that the hippocampus may undergo changes as pain transitions to a chronic state. Given the role of the hippocampus in the development of negatively-biased pain memories and chronic pain in adults, as well as its plasticity in response to memory changes, it is likely that the hippocampus is integrally involved in pain memory biases and the development of chronic pain in youth.
- Aims: The goal of this research is 1.) to determine whether altered hippocampal structure predicts the development of negatively-biased pain memories, 2.) determine whether changes in hippocampal structure and functional connectivity are associated with higher pain at the time that pain can become

chronic, and 3.) determine whether changes in hippocampal structure and functional connectivity underlie the transition from acute to chronic pain.

- Progress: 43 recruited to date; 8 with baseline MRI scans and 10 with follow-up MRI scans.

10. Co-constructing the Past: Examining Mother- and Father-Child Narratives About Past Events involving Pain versus Sadness.

Authors: Noel M (PI), Graham S, Peterson C, Pavlova M

- Background: Stories form the fabric of our identities and set the stage for all future experiences. Parent-child reminiscing about past negative emotional events is an influential social transaction that is linked to a variety of social, emotional and developmental outcomes in childhood. It sends powerful information to children about their value, emotional connectedness to others, agency in the world, and is a vehicle through which future coping and reactions are shaped. But all stories are not created equal. It is parents who reminisce with children in ways that are elaborative, support children's autonomy, and use emotional language, who have children with better socio-developmental outcomes. We have a broad understanding of the influence of parent-child reminiscing about negative events on child development; however, no research has examined differences between parent-child reminiscing about different kinds of negative events (e.g., pain versus sadness) and their relation to children's socio-developmental outcomes. Given that young children have been found to exhibit different social responses to displays of sadness versus pain in others, it is likely that differences in parent-child reminiscing about sad versus painful past events also exist. Moreover, the relative influences of father-child versus mother-child reminiscing about past painful and sad events has not been examined, despite gender differences in adults' autobiographical memory and the importance of fathers in parenting and children's development.
- Aims: The goal of this research is to examine parent-child reminiscing about two salient everyday emotional contexts that children encounter in their daily lives and that likely influence socio-emotional and developmental outcomes, namely events involving sadness (e.g., conflicts with loved ones, loss) and pain (e.g., minor injuries resulting in bumps and bruises). Specifically, we will examine 1.) parent-child narratives for past autobiographical events involving pain and sadness in 4-year-olds and their concurrent relations with key socio-developmental factors (empathic and prosocial behaviors, social development, theory of mind) and 2.) differences between mother-child and father-child narratives about past events involving pain and sadness and their relative influences on socio-developmental outcomes.
- Progress: Completed; 125 recruited (54% fathers).

11. Pain in Children's Media.

Authors: Noel M (PI), Jordan A, Mueri K, Kennedy M, Pavlova M, Lund T, Neville A

- Background: Negative experiences in childhood provide powerful social learning opportunities for young children during formative developmental periods. Two frequently occurring negative events in childhood include those involving pain and sadness. Children experience 'everyday pains' (i.e., minor bumps and scrapes) when they begin walking and interpersonal sadness (e.g., separation from caregivers) from infancy. Young children are growing up in an environment saturated with various forms of media (i.e., television and movies). Given that children are introduced to media during critical developmental periods, it is imperative to understand how pain is portrayed in children's media. The way in which these experiences are depicted may influence the internalization of societal attitudes and beliefs regarding painful and sad events. As a team, we will explore the ways in which pain is portrayed and gendered in children's popular media by analyzing specific depictions of pain in movies and television.

- Aims: The aims of this research are to 1.) Examine how pain is portrayed and gendered in children's popular media by characterizing pain instances in television shows and movies, and 2.) Examine how parents and children perceive and discuss pain depicted in children's popular media.
- Progress: Completed; 60 recruited (50% fathers).

12. The Impact of COVID-19 on Youth with Chronic Pain and their Parents.

Authors: Noel M (PI), Birnie K, Kopala-Sibley D, Rasic N, Vinall Miller J, Arnold P

- Background: Chronic pain is alarmingly prevalent in adolescence (affecting 15-40% of youth) and poses a high economic burden to society ($19 billion USD per year). Left untreated, the impact of chronic pain can persist into adulthood and lead to persistent pain problems and mental health disorders. Given that chronic pain is highly complex and treatments are effective for only a small proportion of youth, understanding the development and maintenance of pediatric chronic pain is critical for disrupting its inevitable persistence into adulthood. Our existing PATH and Vi Riddell studies are the largest cohorts of children with chronic pain and their parents in the world that have robustly assessed internalizing mental health and pain in this child health population. From these data, we have demonstrated that child and parental mental health issues (PTSD, anxiety, depression) co-occur at high rates with chronic pain and are driven by key underlying mechanisms (e.g., sleep disturbance, pain-related anxiety, overprotective parenting). We have also learned that traumatic events can manifest in physical pain complaints and that pain itself can exacerbate mental health issues, leading to a vicious cycle that can worsen over time and impede responsiveness to treatment. The COVID-19 pandemic has been an unprecedented traumatic event, ridden with threat, uncertainty, fear, and loss that every child and family around the world are facing. While this pandemic is causing hardships across nearly every domain- from financial, social, health, academic/occupational, and developmental- it is particularly impacting our most vulnerable populations, such as those with pre-existing mental and physical health issues as is the case for youth with chronic pain and their families. And yet, we know from the broader mental health literature that has examined responses to natural disasters, that some even vulnerable individuals will show resilience in the face of adversity. Understanding risk and resilience in the face of this pandemic is critical for informing effective intervention and prevention approaches for these families that is urgently needed now. Moreover, understanding how the impact of this COVID-19 pandemic leads to changes in pain and mental health issues can only be done with cohorts of youth who have deeply phenotyped pain and mental health before the pandemic began. Our PATH and Vi Riddell cohorts provide an unparalleled opportunity to address these timely and urgent research questions.
- Aims: The goal of this research is to 1.) examine how the impact of the COVID-19 pandemic affects changes in mental health and pain issues over time in youth with chronic pain and their parents, and 2.) Examine the impact, perceptions, interactions, and memories of youth with chronic pain and their parents around COVID-19, and how this relates to changes in pain and mental health.
- Progress: 30 dyads recruited to date (of the 190 enrolled in the PATH study)

13. Evaluation of Pain in Youth Exposed to Traumatic Experiences.

Authors: Noel M, Jenney A, Lebel C, Mychasiuk R, Kopala-Sibley DC, Rasic N, Vinall Miller J (PI)

- Background: Pediatric chronic pain, defined as pain occurring for 3 months or more, is alarmingly prevalent in adolescence, affecting 1 in 4 Canadian youth. Moreover, it is a growing epidemic, costing upwards of $19 billion CAD/year. Treatments for pediatric chronic pain are largely ineffective, in part, because we do not understand why chronic pain develops in the first place. Furthermore, poorly managed pain in childhood can lead to chronic pain problems and mental health disorders into adulthood. PTSD is a mental health condition defined by prolonged distress following exposure

to a threat. PTSD symptoms include reexperiencing through distressing recollections of the event, avoidance of trauma-related thoughts, feelings or reminders, and alterations in arousal and reactivity. Pediatric Psychologist, Dr. Melanie Noel (Co-Investigator), was the first to demonstrate that youth with chronic pain have clinically significant elevations in PTSD symptoms (32%) as compared to their pain-free peers (1%). Moreover, among youth with chronic pain, higher PTSD symptoms are associated with higher reports of pain intensity and pain interference. It has been proposed that traumatic events and subsequent PTSD symptoms increase the risk for developing or worsening of chronic pain. This may be due to changes in shared brain networks, which are activated in response to both trauma and pain. However, this has not been empirically demonstrated. There is a growing body of literature demonstrating that as an individual transitions from an acute to chronic pain state, brain activity during resting-state functional magnetic resonance imaging (fMRI) switches from physical processing areas (e.g. somatosensory cortex) to emotional processing areas (e.g. hippocampus (highly involved in memory), amygdala (highly involved in fear response). Indeed, Dr. Vinall Miller (PI) has shown that PTSD symptoms and decreased brain connectivity between emotional and cognitive processing regions are associated with increased average headache frequency in youth with chronic pain. However, the majority of studies of pain and PTSD symptoms have been conducted concurrently or retrospectively. Therefore, it is unclear if PTSD symptoms and associated brain changes are associated with conferred risk of developing chronic pain. The earlier we identify at-risk individuals and provide targeted interventions, the more likely it is that we will be able to prevent the transition from acute to chronic pain.

- Aims: To determine whether PTSD symptoms are associated with alterations in brain structure and function, and whether these brain changes are associated with greater pain symptomology in youth.
- Progress: Ethics obtained at UCalgary/AHS. Protocol is under review with community partner, Wood's Homes.

14. Can Brain Stimulation Enhance Outcomes Associated with Intensive Rehabilitation for Youth with Chronic Pain?

Authors: Noel M, Rasic R, MacMaster FP, Kirton A, Lebel C, Rayner L, Vinall Miller J (PI)

- Background: Severe chronic pain is pain that lasts longer than 3 months and affects daily functioning across multiple domains. Severe chronic pain is a growing epidemic, affecting 5 to 8% of adolescents. In 2014, we established the first pediatric Intensive Pain Rehabilitation Program (IPRP) in Canada to target youth with severe chronic pain and consequent functional disability who do not respond to outpatient pain therapies. Most treatments to address chronic pain take a "one-size-fits-all-approach," which does not account for comorbid mental health conditions, contributing to small treatment effects. In contrast, the IPRP at the Alberta Children's Hospital (ACH) is a 3-week intensive day-treatment rehabilitation provided by an interdisciplinary team (e.g. Psychology, Physiotherapy, Family Therapy), which helps youth and their families resume engagement in normal daily functioning. At discharge, youth reported less anxiety, less depressive symptoms, greater function and better school attendance, although their self-reported pain intensity remained unchanged. In August 2016, we began inviting youth in IPRP to undergo a 3T MRI prior to starting the program (i.e. baseline), and again at discharge. Preliminary analysis of this neuroimaging data (n=23) suggested decreased functional responses to fearful stimuli in the dorsolateral prefrontal cortex (DLPFC) from baseline to discharge of affected youth, commensurate with decreases in internalizing mental health symptoms from baseline to discharge from the program. Previously, the DLPFC has been demonstrated to be a safe and effective target for repetitive transcranial magnetic stimulation (rTMS) to treat youth with treatment resistant major depressive disorder (MDD). Moreover, the DLPFC is an effective target to manage chronic pain using rTMS in adults. To the best of our knowledge, rTMS has not been utilized to manage pain and comorbid internalizing mental health conditions in youth. Using an open-label clinical trial study design, we will examine whether the addition of rTMS reduces pain intensity and enhances brain and

behavioral changes associated with IPRP to further improve outcomes of youth with chronic pain.

- Aims: The goal of this research is to: 1) Determine whether rTMS in addition to IPRP reduces self-reported pain intensity from baseline to discharge in youth with severe chronic pain; and 2) Examine whether youth that undergo rTMS in addition to IPRP versus IPRP alone have greater improvements in outcomes from baseline to discharge.
- Progress: Historical IPRP data is collected (i.e. 24 youth with 2 scans). In the next cohort we will introduce the new rTMS protocol.

15. Co-designing healthcare services to prevent chronic pain after surgery in children and adolescents

Authors: Birnie KA (PI), Stinson JN, Marianayagam J, Jordan I, Campbell F, Isaac L, Tyrrell J, Pendergast L, Rosenbloom B, Richards D, Maynard D.

- Background: One to three million Canadian youth live with chronic pain that negatively impacts their physical, emotional, and social well-being. Our Partnering For Pain team recently completed a national priority setting partnership to identify the Top 10 patient-oriented priorities for pediatric chronic pain in Canada from the perspective of youth, family members, and healthcare providers. The #1 priority is to identify effective treatments and strategies to prevent acute pain from becoming chronic in children and adolescents. Surgery provides the ideal opportunity to prevent the development of chronic pain. Of the more than 80,000 Canadian youth who undergo surgery each year, about 20% will develop chronic pain. Moreover, 3-15% of youth continue to use opioids prescribed after surgery long term. Despite this clear risk, there remains a dearth of services addressing chronic pain in pediatric perioperative care. "Transitional Pain Services" (TPS) have recently emerged in adult care as an innovative model to prevent the development of chronic postsurgical pain (CPSP). Only one such pediatric TPS is in its infancy at the Hospital for Sick Children (SickKids) with limited stakeholder input to inform its development. Other Canadian pediatric health centers, including Alberta Children's Hospital have expressed intent to develop similar TPS programs. Thus, now is a critical time to ensure that developed pediatric TPS address all patient, family, healthcare provider, and decision-maker needs in a feasible, acceptable, evidence-based, sustainable, and scalable manner.
- Aims: This project mobilizes partnerships between youth, families, multidisciplinary researchers, healthcare providers, and health systems decision-makers to: (1) co-design TPS to prevent CPSP in children and adolescents; (2) co-design a research program and identify relevant stakeholder outcomes to evaluate success of the new pediatric TPS; (3) conduct baseline evaluation of existing pediatric TPS on stakeholder-identified outcomes for future co-designed TPS implementation and evaluation; and (4) co-develop and evaluate methods of our multi-stakeholder partnership as an applied framework to guide others beyond our project.
- Progress: Research ethics is underway.

16. Identifying virtual care options to support youth with pain and their families during COVID and beyond

Authors: Birnie KA (PI), Noel M (co-PI), Stinson JN (co-PI), Campbell F, Jordan E, Jordan I, Marianayagam J, Arnold P, Killackey T, Lalloo C, Lorenzetti D, Neville A, Pavlova M.

- Background: The extreme and prolonged stress experienced by youth during the COVID-19 pandemic will set the stage for their mental and physical health well into adulthood. To prevent this, youth need early intervention now. One of the most common impacts of extreme stressors and traumatic events (e.g., natural disasters) on youth is pain. Already during the COVID-19 pandemic, youth are reporting increased pain (headaches, stomach aches). Left untreated, these pains will become chronic (lasting >3 months).

This is an urgent public health threat as-- chronic pain is a rising epidemic, affecting 1 in 5 Canadian youth and costing >$19 billion USD/year. Youth with chronic pain experience significantly greater rates of PTSD, anxiety, depression, and insomnia than their peers, with associated substance use (marijuana and opioids). Without adequate pain relief and access to care, these negative effects will be long-lasting. Chronic pain in childhood heightens risk for chronic pain, PTSD, anxiety, depression, and opioid misuse into adulthood.

Stepped care models are a recommended approach to address the surge in youth mental health needs now and post- disaster. Application of virtual stepped care during COVID-19 ensures that youth with pre-existing and new onset pain have easy access to interventions that are matched to their individual needs, which can prevent mental health and substance use impacts into adulthood. The current project uses novel evidence and gap map knowledge synthesis methodology to systematically map virtual care solutions for pain, mental health, substance use, and functioning in youth across the stepped care model. The findings will enable rapid informed decision-making for practice, policy, research, and investment to ensure effective treatment for pain and mental health in youth during the COVID-19 pandemic and beyond.

- Aims: The goals of this research are to (1) identify recommendations for virtual care best practices; (2) identify virtual care solutions; and (3) create an evidence and gap map to guide stakeholders regarding virtual stepped care solutions to improve pain, mental health, substance use, and functioning for youth with pre-existing and new onset pain and their families.
- Progress: This project began May 2020 and is underway.

17. Longitudinal outcomes in children and adolescents followed in a tertiary care Headache Clinic

Authors: Orr SL, Craddock L

- Background: The majority of children and adolescents experience recurrent headaches, with recent pooled data indicating that the estimated prevalence of headache in this age group is 58.4%. Headache is consistently reported as one of the top three reasons for referrals to pediatric neurology services. Of the headache diagnoses made in pediatric neurology practice, migraine is the most common and it represents one of the top two causes of disability worldwide. Despite the prevalence and disability associated with pediatric headache, it remains understudied. Systematic reviews on the pharmacologic preventive management of pediatric migraine have consistently reported that the pooled evidence is insufficient to make definitive treatment recommendations. The quality of the evidence for the role of psychological interventions in preventing migraine in children and adolescents is also low. Beyond migraine, data on managing other primary headache disorders in children and adolescents, such as tension-type headache and the trigeminal autonomic cephalalgias, is even more scant. Not only is clinical trial data scarce in the pediatric headache population, but clinical trials in general are limited by their focus on short-term efficacy and safety outcomes. Clinical trial data therefore cannot provide stakeholders with perspective on how real world pediatric headache care impacts long-term outcomes. Although natural history studies on pediatric headache exist, for the most part, outcomes have been limited to changes in headache diagnoses over time, rather than more specific and more clinically informative outcomes such as headache frequency, disability and health care utilization patterns.
- Aims:
  - To characterize a clinical population of children and adolescents with a variety of headache disorders, including: migraine, hemiplegic migraine, occipital neuralgia, primary stabbing headache, indomethacin-responsive headaches and trigeminal autonomic cephalalgias.

- To determine which demographic factors, clinical factors and interventions predict headache specific outcomes in pediatric patients who are followed in a tertiary care pediatric headache clinic.
- To determine which demographic factors, clinical factors and interventions predict the following health care utilization patterns in pediatric patients who are followed in a tertiary care pediatric headache clinic.
- To determine the temporal evolution of psychological symptoms and the relationship between headache and psychological outcomes in pediatric patients who are followed in a tertiary care pediatric headache clinic.
- To determine patient and family treatment preferences for acute and preventive headache treatments

- Progress: Recruitment to this study began in May 2020 and 16 participants have been recruited to date (as of June 14th 2020)

18. Association between outcomes in children and adolescents with migraine and internalizing mental health symptoms, sleep and parental responses to their child's pain: a prospective longitudinal cohort study

Authors: Orr SL, Noel M, Williamson T, Arnold P, Hershey AD

- Background: Migraine is the second most prevalent and disabling disorder worldwide, affecting approximately 1 in 10 children and adolescents (>800,000 in Canada). Children and adolescents with migraine suffer from impaired functioning in school, at home, socially, and in extracurricular activities, and often go on to become highly disabled adults at risk of opioid abuse. Only 35-55% of children and adolescents with migraine respond to standard of care treatment, which involves pill-based interventions for all and psychological interventions for select patients at the discretion of the care provider. Recent data suggest that active pill-based preventive migraine interventions are no better than placebo in children and adolescents, while psychological interventions do have supportive evidence at the meta-analysis level. Therefore, the current standard of care is inadequate, and better methods of predicting treatment outcome in children and adolescents with migraine are urgently needed.

  Achieving a greater understanding of the interaction between pediatric chronic pain (including migraine) and mental health symptoms has recently been identified by patients, families and clinicians as one of the top 10 research priorities in Canadian pediatric chronic pain research. In children and adolescents with mixed chronic pain conditions, internalizing mental health symptoms (anxiety, depression, and post-traumatic stress symptoms), disturbed sleep, and parental responses to children's pain (overprotective parenting) strongly predict chronic pain treatment outcomes. A clinical cohort study by Dr. Orr and two population-based studies have identified depression as a preliminary prognostic factor associated with poor outcomes in children and adolescents with migraine. We hypothesize that internalizing mental health symptoms, disturbed sleep, and parental responses to their child's pain are also strongly associated with outcomes in children and adolescents with migraine. As the initial critical step towards developing a paradigm-shifting personalized treatment approach, we will conduct a longitudinal cohort study that will follow children and adolescents with migraine (N=250) and assess migraine outcomes at 3 months and 1 year.

- Aims:
  - To determine if internalizing mental health symptoms and disturbed sleep are associated with treatment response and disability at follow-up.
  - To determine if parental responses to children's pain are associated with treatment response and disability at follow-up.

- Progress: We have obtained ethics approval and internal funding to carry out this project. We have created the study database and were ready to start recruitment at the end of March 2020, but this has been suspended due to COVID-19.

19. Internalizing symptoms in pediatric migraine: a systematic review

Authors: Orr SL, Falla K, Noel M, Ronksley P, Mahnaz SR

- Background: Migraine is a common and disabling disorder: worldwide, it constitutes the second most prevalent and second most important cause of disability among all diseases measured in the World Health Organization Global Burden of Diseases Study. An association between migraine and internalizing symptoms and disorders, such as anxiety, depression and post-traumatic stress disorder, has long been postulated. Numerous studies have assessed this association both in the adult and pediatric migraine populations. In the pediatric population, the association between migraine and internalizing disorders remains controversial due to heterogeneous findings in published studies.
- Aims: In the proposed systematic review, we will address the relationship between the outcome of migraine and the exposure of internalizing disorders and symptoms (i.e. subclinical symptoms) in the pediatric population.
- Progress: We have designed and published the study protocol, carried out the first screening phase (abstracts) and are presently beginning the second screening phase (full-texts).

20. Headache education in North American medical schools: a needs assessment

Authors: Orr SL, Pace A, Sprouse-Blum A, Rosen N, Safdieh J

- Background: Although primary headache disorders are highly prevalent and comprise the second most prevalent and important cause of disability worldwide, access to headache care is limited in North America. Many patients cannot access headache specialist care and research has shown that there is significant unmet need amongst patients with primary headache disorders. For example, less than a quarter of patients who meet guideline-set criteria for preventive headache treatment are prescribed appropriate interventions. One avenue for improvement in care access would be through better training of future physicians in headache medicine during medical school. At present, the state of headache medicine education in North American medical schools is unknown.
- Aims: To determine the state of headache medicine education across MD and DO schools in the United States and Canada using a survey that will be send to Neurology clerkship directors.
- Progress: We have designed the survey, compiled the list of Neurology clerkship directors and the survey will be send to its intended recipients in the next 1-2 weeks.

21. The development of the transfer packet for transition of care of the pediatric headache patient

Authors: Orr SL, Gelfand A, Hranilovich J, Irwin S, Kabbouche M, Lagman M, Lavell C, O'Brien H, Rajapakse T, Rao R, Szperka C, Werner K, Yonker M, Hershey AD

- Background: One of the key roles that pediatric providers play in caring for adolescents and young adults (AYA) with chronic diseases is transition to adult care. Although there are no specific guidance documents on how to transition AYA with headache disorders to adult care, there is a consensus statement from the American Academy of Neurology (AAN) on the neurologist's role in supporting transition of AYA with neurological disorders to adult care. In this statement, the authors outlined 8 principles that should guide the transition process; one of these items pertains to the child neurologist's role in identifying an appropriate adult provider and providing this provider with a transfer packet upon transfer of care. In addition to being recommended by the AAN, transfer packets are one of

the most commonly used structured health care transition interventions. Structured health care transition interventions, including transfer packets, can promote AYA readiness for transition of care and can improve transition outcomes.

- Aims: The objective of this project is to develop a transfer packet for AYA with headache disorders based on expert consensus and feedback. The purpose of this transfer packet is to set standards for written communication from referring to accepting providers during transition of care, and to ensure that all critical elements of the medical summary are included in these standards.
- Progress: We are currently working on a second draft of the transfer packet after having received feedback from adult and pediatric headache care providers.

22. Retrospective study on the phenotypic spectrum of pediatric indomethacin responsive headaches Authors: Orr SL, Myers K, Lagman-Bartolome M, Szperka C, Gelfand A, Hershey AD, Kacperski J, Ingelmo P

- Background: Headaches are one of the most common medical complaints; most people experience them at some point in their life. They can affect anyone regardless of age, race, and gender. Of the primary headache syndromes, a subset are notable for showing specific, and often dramatic, clinical improvement with indomethacin, while other treatments elicit little-to-no benefit. The classical indomethacin-responsive headache syndromes include paroxysmal hemicrania, hemicrania continua, primary cough headache, exercise headache, sex headache, primary stabbing headache and hypnic headache. Indomethacin-responsive headaches are rarely reported in children, but may be under recognized for a number of reasons. First, young children are less able to articulate their symptoms so the key clinical features may be missed. Secondly, doctors may be reluctant to trial indomethacin in children due to the potential for gastric irritation and other side effects.
- Aims: In this study we aim to clarify the phenotypic spectrum of indomethacin-responsive headaches in children and adolescents.
- Progress: We have completed data collection (N=12) on 12 children and adolescents with indomethacin-responsive headache disorders. This will be the largest case series to date. We are currently drafting the manuscript.

23. Patterns of perceived stress throughout the migraine cycle: A longitudinal cohort study using daily prospective diary data

Authors: Orr SL, Vives-Mestres M, Casanova A, Buse DC, Donoghue S, Houle TT, Lipton RB, Mian A, Shulman KJ

- Background: Stress has emerged from the literature as an experience that appears to fluctuate significantly across the migraine cycle. People with migraine consistently report stress as a migraine trigger, subjectively appraising it as an experience that precedes the pain phase of the migraine cycle. Several studies to date have identified that changes in subjective stress levels during the prodrome phase (prior to the pain phase) may be used to predict migraine attacks with a moderate degree of accuracy. However, all studies and predictive models to date have used aggregate-level data to assess patterns of stress across the migraine cycle and have therefore failed to determine whether or not individual people with migraine, or even individual episodes, may vary with regards to perceived stress patterns over time.
- Aims: The aim of the present study was to describe individual- and episode-level patterns of perceived stress across the various phases of the migraine cycle, to determine whether or not predominant patterns of stress variation emerge and whether or not these patterns have consistency within individuals and across migraine episodes.

- Progress: We have completed the study (N=351 adults with migraine), presented it as an abstract at the 2019 International Headache Congress and will be submitting the manuscript for publication at the end of June 2020.

24. The relationship between perceived stress and peak pain intensity in individuals with chronic migraine: A longitudinal cohort study using daily prospective diary data

Authors: Orr SL, Vives-Mestres M, Casanova A, Buse DC, Donoghue S, Lipton RB, Mian A

- Background: Chronic migraine (CM) is a disabling neurological disease characterized by high frequency severe and recurrent headaches. The diagnostic criteria for CM are met when headaches occur on at least 15 days per month with at least 8 days per month meeting criteria for migraine. Approximately 1.4-2.2% of the global population suffers from CM, and CM accounts for roughly 8% of all migraine cases. Compared to individuals with episodic migraine, those with CM have greater use of health care resources, greater loss of productive time at work and school, and greater direct and indirect costs associated with migraine. Stress is thought to play a role in a variety of aspects of CM, including CM incidence and day-to-day migraine attack risk. At present, the bulk of the data on the day-to-day relationship between perceived stress and migraine attacks comes from studies of individuals with episodic migraine. To our knowledge, only one study to date has closely examined the day-to-day relationship between perceived stress and migraine attacks in individuals with CM. ii.
- Aims:
  - To describe patterns of peak migraine intensity from day-to-day within individuals with CM
  - To describe patterns of peak migraine intensity in relation to perceived stress in individuals with CM.
- Progress: We have completed the study (N=136 adults with chronic migraine) and are presently drafting the manuscript, which we aim to submit for publication in August 2020.

Media

Television:

- Noel, M. (2019, July 22). EFIC Workshop Spotlight on The Pediatric Period: Diagnostic Uncertainty in Youth with Chronic Pain and their Parents. European Pain Federation. Interview by M. Borzsak-Schramm. Retrieved from https://twitter.com/EFIC_org/status/1153198599939006464
- Noel, M. (2019, April 16). Children's memory of pain significantly impacted by parents' anxiety: study. Interview by K. Smith. Family Matters, Global News. Retrieved from https://globalnews.ca/news/5172950/childrens-memory-of-pain-significantly-impacted-by-parents-anxiety-study/
- Noel, M. (2019, Feb 25). A Parent's Anxiety's Affect on Their Kids. Interview by T. Henley. Breakfast Television. Retrieved from https://www.btcalgary.ca/videos/a-parents-anxietys-affect-on-their-kids/

Print:

- Birnie, K. (2020, April). Fear of needles: 5 simple ways to ease vaccination pain for your child (and yourself). The Conversation Canada. Online at https://bit.ly/30HXvcw
- Ng, N. (2019, April 20). Parents and their influence on children's chronic pain. Massage and Fitness Magazine, 17, 12-19.
- McCoy, H. (2019, Feb 20). Parental anxiety can negatively affect children's post-surgical pain memories. UToday. Available at https://www.ucalgary.ca/utoday/issue/2019-02-20/parental-anxiety-can-negatively-affect-childrens-post-surgical-pain-memories

Radio:

- Noel, M. (2019, Feb 27). A Parent's Anxiety's Affect on Their Kids. Interview by Jodi Hughes. CHQR News Talk 770, Global News.

Podcast:

- Birnie, K.A. (2020, February 29). How two Canadian initiatives are advancing children's pain research and practice. Interview by Sim Jhutti. [Audio podcst]. PainBC Pain Waves Podcast. Retrieved from https://bit.ly/2MXvNk7
- Noel, M. (2019, April 22). Family Matters: Pain Memories Impacted by Parents. Interview by K. Smith. [Audio podcast]. Retrieved from https://omny.fm/shows/family-matters-canada/pain-memories-impacted-by-parents

C. Intended Outcomes & Impact:

Forty years ago, babies underwent surgery without pain relief because it was believed they couldn't feel or remember pain. Today, we know that babies do feel pain and fortunately the standard of care has evolved to demand effective pain management strategies for painful procedures for babies and children. To accomplish this, we often use analgesics and anesthetics. However, there is mounting evidence in animal research that these drugs cause deleterious effects on the developing brain. It is unclear whether there are long-term adverse effects in human babies and children.

Furthermore, evidence suggests that episodes of pain and/or trauma in early life may predispose children to chronic pain later in life. This is a complex process that involves biological, psychological and social factors that need to be unravelled to allow us to change clinical practice and target interventions earlier to prevent the conversion to chronic pain.

If chronic pain does take hold, it is generally more difficult and costly to treat. The need for further research in pediatric chronic pain is of paramount importance due to the prevalence of this condition, and the high associated disability. Chronic pain is prevalent in adolescence, affecting 1 in 4 Canadian youth, and can lead to significant disability, social isolation, and decreased quality of life. Adolescent chronic pain is associated with significant healthcare costs ($19 billion CAD/year), exceeding the costs of asthma and obesity. To compound this problem, up to two thirds of adolescents with chronic pain become adults with chronic pain, whose healthcare costs top $42 billion CAD/year. Chronic pain in adolescence co-occurs with mental health disorders which often continue into adulthood. Our current treatments are effective for only a small proportion of youth. Thus, further research is needed to understand the mechanisms underlying the development of chronic pain and to interrupt its trajectory into adult chronic pain.

Our clinical pain research team is driving a monumental shift in our understanding and treatment of adolescent and childhood pain. We have designed studies to answer important questions about pain in children that will contribute to the scientific literature, change practice and work to eradicate the $50 billion epidemic of chronic pain. Given this epidemic of chronic pain and era of opioid overuse, our research is timely and can dramatically improve the health of Canadians. Our clinical pediatric pain research is putting Calgary at the forefront of scientific innovation in our field and bringing fundamental pain relief to children everywhere.

See Project Activity section for reporting metrics.

Testimonials from patients within our clinical pain program:

"Thank you very much for accepting our son in this wonderful program. Our lives had become very dark and sad worrying about his mental and physical health. It was at times all consuming. I still worry at times, but overall am more hopeful that he will carve out a productive and happy life for himself regardless of this lifelong illness."

"This program is amazing. I would recommend it to anyone with chronic pain. The model followed is holistic and it addresses the reality faced by child and families, social, mind and body, each one being equally valuable."

"The pride and joy of seeing our child plan for a future is overwhelming emotionally. THANK YOU!!!!!!"

"The staff were amazing. I loved that it addressed all the aspects of life that are touched by pain. Meeting with the psychologists was very helpful in understanding pain, and understanding the child specific strategies for my child. There was an air of intensity and inspiration at the program and it had a positive effect. It was so important to tackle sleep issues. So valuable to learn about that as well."

"Giving Jack the tools to cope with chronic pain and flare ups and the language to describe what he is experiencing. Making sure Jack and his parents (us) are realistic in what we can expect going forward. Making sure Jack committed toward making meaningful change and ensuring that we follow up at regular intervals over the next year. Even the ability to replace the lack of a formal school environment this term with a job counselling session shows how well you customized the program to each patient. That was amazing!"

"My daughter found someone that understands what she is talking about and that has made her more confident. And it has now made her more confident in her life when it comes to new situations. It made her work out despite pain as it got her back to physical activity which is something she has always loved."

D. Budget Variances & Leveraging:

1. There are no budget line variances over 20% of the original approved budget.

2. There is not a significant amount of unspent funds at the end of the fiscal year.

3. Awards/other funding obtained:

- Birnie, K.A. (PI), Stinson, J.N., Marianayagam, J., Jordan, I., Campbell, F., Isaac, L., Tyrrell, J., Pendergast, L., Rosenbloom, B., Richards, D., Maynard, D. (2020-2021). Partnering For Pain: Mobilizing stakeholders to co-design healthcare services to prevent pediatric chronic pain. CIHR Catalyst Grant Patient-Oriented Research. ($99,998).
- Birnie, K.A. (PI) (2020-2021). Partnering For Pain: Mobilizing stakeholders to co-design healthcare services to prevent pediatric chronic pain. Canadian Pain Society/Pfizer Canada Early Career Investigator Pain Research Grant. ($50,000).
- Birnie, K.A. (co-PI), Noel, M. (co-PI), Stinson, J. (co-PI), Campbell, F., Jordan, E., Jordan, I., Marianayagam, J., Arnold, P., Killackey, T., Lalloo, C., Lorenzetti, D., Neville, A., Pavlova, M. (2020-2021). Rapid evidence and gap map of virtual care solutions for youth and families to mitigate the impact of the COVID-19 pandemic on pain, mental health, and substance use. CIHR Knowledge Synthesis: COVID-19 Mental Health & Substance Use Grant ($49,940).
- Noel, M. (PI), Graham, S., Peterson, C. (2020-2025). Co-constructing the past: The role of mother- and father-child reminiscing in children's socio-emotional development. Social Sciences and Humanities Research Council Insight Grant ($156,410).

- Vinall Miller, J. (PI), Noel, M., Jenney, A., Lebel, C., Kopala-Sibley, D., Rasic, N. (2020-2021). Evaluation of pain in youth exposed to traumatic experiences. Canadian Pain Society/Pfizer Canada Early Career Investigator Pain Research Grant ($50,000). Role: Co-investigator.
- Dewan, T. (PI), Birnie, K.A., Noel, M., Zwicker, J., Miller, M., Jordan, I. (2020-2022). Post-traumatic stress symptoms and post-traumatic stress disorder in parents of children with recurrent hospitalizations. University of Calgary Department of Pediatrics Innovation Award ($21,204.11). Role: Co-investigator.
- Noel, M. (PI), Brindle, M., Chorney, J., Katz, J., Lebel, C., Moayedi, M., Mychasiuk, R., Rasic, N., Sumpton, J., Vinall Miller, J., Williamson, T, Ferri de Barros, F., Parsons, D. (2020-2026). Elucidating the Role of Memory in the Transition from Acute to Chronic Pediatric Pain. Canadian Institutes of Health Research Project Scheme Grant ($661,725).
- Noel, M. (PI). (2019-2021). Elucidating the Role of Memory in the Transition from Acute to Chronic Pediatric Pain. Alberta Children's Hospital Research Institute Bridge Funding for the Behaviour and the Developing Brain Theme. ($30,000).
- Noel, M. (PI), Arnold, P., & Bray, S. (2018-2023). Solving the puzzle of acute and chronic pediatric pain: Integrative examinations of mechanisms and targeted treatments. Canada Foundation for Innovation John R. Evans Leaders Fund ($150,000 from CFI, $37,025 in partner funds, $44,670 in-kind).
- Noel, M. (PI), & Rasic, N. (2018-2019). Reframe the pain: A parent-led pilot intervention to alter children's memories for pain. University of Calgary University Research Grants Committee (URGC) Pilot Seed Grant ($14,949).
- Noel, M. (PI), Graham, S., Peterson, C. (2017-2019). Co-constructing the past: examining mother- and father-child narratives about past events involving pain versus sadness. Social Sciences and Humanities Research Council Insight Development Grant (SSHRC IDG) ($71,000).
- Noel, M. (PI), Griep, Y., Sears, C., Arnold, P., Palermo, T., Katz, J., & Rasic, N. (2017-2020). Identification of risk factors for chronic pain and disability in youth: An integrative approach. Shaikh Family Research Award, Alberta Children's Hospital Research Institute ($192,000).
- Noel, M. (PI), Chorney, J., Graham, S., Rasic, N., & Vinall Miller, J. (2017-2019). The role of parent-child narratives in children's pain memory development. Maternal, Newborn, Child and Youth Strategic Clinical Network/The Health Outcomes Improvement Fund Open Funding ($50,000).
- Vinall Miller, J. Fellowship ($135,000), Canadian Institutes of Health Research, Aug 2017-Aug 2020
- Vinall Miller, J. (PI) 2017-2012. The co-occurence and impact of PTSD and chronic pain in youth: neural activation patterns as a mutually maintaining mechanism. Canadian Institutes of Health Research Fellowship, ($135,000).
- Orr SL (PI), Noel M. (2019-2020). Association between outcomes in children and adolescents with migraine and internalizing mental health symptoms, sleep and parental responses to their child's pain: a pilot longitudinal cohort study, Alberta Children's Hospital Research Institute Behavior and the Developing Brain Catalyst Grant (24,900$)
- Rice T. (PI), Vinall Miller J., Spencer A., Rasic N., Noel M., Walker A., MacMaster F., Syed N. (July 2018-June 2019). Neurobiological, cognitive-affective and behavioral changes following exposure to either sevoflurane- or propofol-based anesthesia in children undergoing MRI. Canadian Anesthesiologists' Society (CAS) Subspecialty Operating Grant – CAS Research Award in Neuroanesthesia ($10,000).

E. Challenges & Adjustments:

- There will not be any changes to the project goals, intended outcomes, timelines, project lead(s), key personnel or governance structure as outlined in the funding agreement.
- No significant challenges related to the projects currently.
- Anything else to tell you about the projects? No

APPENDIX:

KATHRYN BIRNIE, PhD

Research Highlights

Awards (2019-2020)

2020 Mayday Fellow

2020 Canadian Institutes of Health Research (CIHR) Institute of Human Development Child Youth Health (IHDCYH) Video Prize

2020 Pain Awareness Award, Canadian Pain Society

Publications (June 2019-May 2020, out of 49 total)

1. Birnie, K.A., Ouellette, C., Do Amaral, T., & Stinson, J. (2020). Mapping the evidence and gaps in treatments for pediatric chronic pain to inform policy, research, and practice: A systematic review and quality assessment of systematic reviews. Canadian Journal of Pain. Epub ahead of print. doi: 10.1080/24740527.2020.1757384

2. Birnie, K.A., Heathcote, L.C., Bhandari, R.P., Feinstein, A., Yoon, I.A., & Simons, L.E. (2020). Parent physical and mental health contributions to interpersonal fear avoidance processes in pediatric chronic pain. Pain, 161(6), 1202-1211. doi: 10.1097/j.pain.0000000000001820

3. Birnie, K.A., Richardson, P., Rajagopalan, A., & Bhandari, R.P. (2020). Factors associated with agreement between child and caregiver report of child functioning with chronic pain: PROMIS® pediatric and parent-proxy report. The Clinical Journal of Pain, 36(3), 203-212.

4. Parker, D.M., Birnie, K.A., Yoon, I.A., & Bhandari, R.P. (2020). Interpersonal dyadic influences of pain catastrophizing between caregivers and children with chronic pain. The Clinical Journal of Pain, 36(2), 61-67. doi:10.1097/AJP.0000000000000773

5. Birnie, K.A., Dib, K., Ouellette, C., Dib, M., Nelson, K., Pahtayken, D., Baerg, K., Chorney, J., Forgeron, P., Lamontagne, C., Noel, M., Poulin, P., & Stinson, J. (2019). Partnering For Pain: A priority setting partnership to identify patient-oriented research priorities in pediatric chronic pain in Canada. CMAJ Open, 7(4), E654-E664. doi:10.9778/cmajo.20190060

6. Chambers, C.T., Dol, J., Parker, J.A., Caes, L., Birnie, K., Taddio, A., Campbell-Yeo, M., Halperin, S., & Langille, J. (2020). Implementation effectiveness of a parent-directed YouTube video ("It Doesn't Have To Hurt") on evidence-based strategies to manage needle pain: Descriptive survey study. JMIR Pediatrics & Parenting, 3(1), e13552. doi:10.2196/13552

7. Richardson, P., Birnie, K.A., Harrison, L.E., Rajagopalan, A., & Bhandari, R.P. (2019). Profiling modifiable psychosocial factors among children with chronic pain: A person-centered methodology. Journal of Pain. Epub ahead of print. doi:10.1016/j.jpain.2019.08.015

Manuscripts Under Revision

1. Richardson, P., Birnie, K.A., Goya Arce, A. B., & Bhandari, R. P. (revise and resubmit). Clinical correlates of opioid prescription among pediatric patients with chronic pain. American Journal of Preventative Medicine.

2. Richards, D. P., Birnie, K.A., Eubanks, K., Lane, T., Linkiewich, D., Singer, L., Stinson, J.N., & Begley, K.N. (revise and resubmit). Guidance on authorship with and acknowledgement of patient partners in patient-oriented research. Research Involvement & Engagement.

3. Eccleston, C., Fisher, E., Howard, R.F., Slater, R., Forgeron, P., Palermo, T.M., Birnie, K.A., Anderson, B.J., Chambers, C.T., Crombez, G., Ljungman, G., Jordan, I., Jordan, Z., Roberts, C., Schechter, N., Sieberg, C. B., Tibboel, D., Walker, S.M., Wilkinson, D., & Wood, C. (revise and resubmit). Time for change: A Lancet Commission on paediatric pain. The Lancet Child & Adolescent Health

Keynote and Invited Lectures (2019-2020)

1. Birnie, K.A. (2020, February). Practice in Action: Treating pediatric chronic pain in the clinic and the community. Invited presentation for Psychology Day at Alberta Children's Hospital, Calgary, AB.

2. Birnie, K.A. (2019, November). #PartneringForPain: Empowering the patient and parent voice to co-build the future of pediatric chronic pain research. Invited presentation for the Paediatric Project ECHO. Online webinar.

3. Birnie, K.A. & Rayner, L. (2019, October). The Invisible Illness: Supporting kids and teens with chronic pain in schools. Invited presentation for the Calgary Board of Education Mental Health Strategists. Calgary, AB.

Symposia (accepted and presented 2019- 2020)

1. Birnie, K.A. (2020, May). Mapping scientific evidence to patient-identified priorities in pediatric chronic pain to inform policy and practice. In K. Birnie (Chair), Engaging with people with lived experience through integrated knowledge translation: From basic pain research design to knowledge synthesis to clinical policy impact. Symposium accepted at the Annual Meeting of the Canadian Pain Society. Calgary, AB. [Cancelled due to COVID-19 pandemic].

2. Birnie, K.A. (Chair), Tupper, S., Ali, S., & Stinson, J. (2020, May). Using digital technologies for pain management and education across the age spectrum: Experiences from three provinces. Symposium accepted at the Annual Meeting of the Canadian Pain Society. Calgary, AB. [Cancelled due to COVID-19 pandemic].

3. Birnie, K.A. (2019, December). Partnering For Pain: Building partnerships to connect pediatric pain research and care. In. C. Chambers (Chair), Solutions for Kids in Pain: Building partnerships to connect pain care for kids. Symposium presented at the Children's Healthcare Canada meeting. Ottawa, Canada.

4. Birnie, K.A. (2019, June). Building sustainable and meaningful engagement of patients and families in pediatric chronic pain research and care. In K. Birnie (Chair), Beyond family-centered care: Youth and families as partners in pediatric chronic pain program planning, evaluation, and research. Symposium presented at the 12th International Symposium on Pediatric Pain. Basel, Switzerland.

5. Birnie, K.A. (2019, June). Using review evidence to identify knowledge gaps and advance the science of distraction. In L. Caes (Chair), Paying attention to distraction: A critical consideration of distraction mechanisms and effectiveness in acute and chronic pain contexts. Symposium presented at the 12th International Symposium on Pediatric Pain. Basel, Switzerland.

Research Highlights

Awards (2019-2020)

2019 University of Calgary Faculty of Arts Travel Grant ($1,000), awarded to facilitate travel to the 12th International Symposium on Pediatric Pain in Basel, Switzerland.

2019 American Pain Society John C. Liebeskind Early Career Scholar Award, awarded in recognition of early career achievements that make or show substantial promise of making an outstanding contribution to pain scholarship.

Publications (June 2019-May 2020, h-index = 30, out of 96 total, trainees' names are underlined)

1. Wauters, A., Van Ryckeghem, D.M.L., Sanchez Lopez, A., Noel, M., Vervoort, T. (revision submitted). The relationship between child pain-related attention and memory biases and the moderating role of parental (non-)pain attending verbalizations. Eur J Pain.

2. Hurtubise, K., Blais, S., Noel, M., Brouselle, A., Dallaire, F., Rasic, N., Camden, C. (accepted). Is it worth it? Comparison of an intensive interdisciplinary pain treatment and a multimodal treatment for youth with pain-related disability. Clin J Pain.

3. Salberg, S., Sgro, M., Noel, M., Mychasiuk, R. (accepted). The development of adolescent chronic pain following traumatic brain injury and surgery: The role of diet and early life stress. Dev Neurosci.

4. Bueno, M., Stevens, B., Rao, M., Riahi, S., Lanese, A., Li, S-A., Willan, A., Synnes, A., Estabrooks, C., Chambers, C., Harrison, D., Yamada, J., Stinson, J., Campbell-Yeo, M., Barwick, M. A., Noel, M., Gibbins, S., LeMay, S., Isaranuwatchai, W. (in press). Usability, Acceptability and Feasibility of the Implementation of Infant Pain Practice Change (ImPaC) Resource. Paediatric and Neonatal Pain.

5. Soltani, S., van Ryckeghem, D., Vervoort, T., Heathcote, L., Sears, C., & Noel, M. (in press). Attentional biases in pediatric chronic pain: An eye-tracking study assessing the nature of the bias and its comparison to pain-free controls. PAIN. Selected as the Editor's Choice article.

6. Kwan, V., Plourde, V., Yeates, K., Noel, M., Brooks, B. (2020). Headache long after pediatric concussion: Presence, intensity, interference, and association with cognition. Brain Inj. 34(4), 575-582.

7. Falla, K., Ronskley, P., Noel, M., Orr, S. (2020). Internalizing symptoms in pediatric migraine: a systematic review protocol. Headache. 60(4):761-770.

8. Fales, J., Noel, M. (2020). The effects of brief social exclusion on pain perception and pain memory in adolescents. J Adolesc Health. 66(5), 623-625.

9. Neville, A., Griep, Y., Palermo, T., Vervoort, T., Schulte, F., Yeates, K.O., Sumpton, J., Mychasiuk, R., Noel, M. (2020). A 'dyadic dance': Pain catastrophizing moderates the daily relationships between parent mood and protective responses and child chronic pain. PAIN. 161(5), 1072-1082.

10. Pavlova, M., Kopala-Sibley, D., Nania, C., Mychasiuk, R., Christensen, J., McPeak, A., Tomfohr-Madsen, L., Katz, J., Palermo, T., Noel, M. (2020). Sleep disturbance underlies the co-occurrence of trauma and pediatric chronic pain: A longitudinal examination. PAIN. 161(4), 821-830.

11. Bueno, M., Stevens, B., Barwick, M. A., Riahi, S., Li, S-A., Lanese, A., Willan, A., Synnes, A., Estabrooks, C., Chambers, C., Harrison, D., Yamada, J., Stinson, J., Campbell-Yeo, M., Noel, M., Gibbins, S., LeMay, S., Isaranuwatchai, W. (2020). A cluster randomized clinical trial to evaluate the effectiveness of the Implementation of Infant Pain Practice Change (ImPaC) Resource to improve pain practices in hospitalized

infants: a study protocol. Implement Sci. 21(1), 16-27.

12. Jaaniste, T., Noel, M., Yee, R.D., Bang, J., Tan, A.C., Champion G.D. (2019). Why unidimensional pain measurement prevails in the pediatric acute pain context and what multidimensional self-report methods can offer. Children. 6(12), 132.

13. Birnie, K.A., Dib, K., Ouellette, C., Dib, M.A., Nelson, K., Pahtayken, D., Baerg, K., Chorney, J., Forgeron, P., Lamontagne, C., Noel, M., Poulin, P., Stinson, J. (2019). Partnering for Pain: A priority setting partnership to identify patient-oriented research priorities for pediatric chronic pain in Canada. CMAJ Open. 7(4), E654-E664.

14. Salberg, S., Noel, M., Burke, N., Vinall, J., Mychasiuk, R. (2019). Utilization of a rodent model to examine the neurological effects of early life adversity on adolescent pain sensitivity. Dev Psychobiol. 62(3), 386-399.

15. Tutelman, P.R., Chambers, C.T., Urquhart, R., Fernandez, C.V., Heathcote, L.C., Noel, M., Flanders, A., Guilcher, G.M.T., Schulte, F., Stinson, J.N., MacLeod, J. & Stern, M. (2019). When "a headache is not just a headache": A qualitative examination of parent and child experiences of pain after childhood cancer. Psycho-Oncol. 28(9), 1901-1909.

16. Soltani, S., Kopala-Sibley, D., & Noel, M. (2019). The co-occurrence of pediatric chronic pain and depression: A narrative review and conceptualization of mutual maintenance. Clin J Pain. 35(7), 633-643.

17. Noel, M., Rosenbloom, B., Pavlova, M., Campbell, F., Isaac, L., Pagé, M.G., Stinson, J., Katz, J. (2019). Remembering the pain of surgery one year later: A longitudinal examination of anxiety in children's pain memory development. PAIN. 160(8), 1729-1739.

18. Neville, A., Jordan, A., Beveridge, J. K., Pincus, T., & Noel, M. (2019). Diagnostic uncertainty in youth with chronic pain and their parents. J Pain. 20(9),1080-1090.

19. Noel, M., Pavlova, M., Lund, T., Jordan, A., Chorney, J., Rasic, N., Brookes, J., Hoy, M., Yunker, W., & Graham, S. A. (2019). The role of narrative in the development of children's pain memories: influences of father- and mother-child reminiscing on children's recall of pain. PAIN. 160(8), 1866-1875.

20. Van Ryckeghem, D., Noel, M., Sharpe, L., Pincus, T., Van Damme, S. (2019). Cognitive biases in pain: An integrated functional-contextual framework. PAIN. 160(7), 1489-1493.

21. Poppert Cordts, K.M., Stone, A.L., Beveridge, J.K., Wilson, A.C., & Noel, M. (2019). The (parental) whole is greater than the sum of its parts: A multifactorial model of parent factors in pediatric chronic pain. J Pain. 20(7), 786-795.

22. Pavlova, M., Graham, S. A., Jordan, A., Chorney, J., Vinall, J., Rasic, N., Brookes, J., Hoy, M., Yunker, W., & Noel, M. (2019). Socialization of pain memories: parent-child reminiscing about past painful and sad events. J Pediatr Psychol. 44(6), 679-691.

23. Aaron, R.V., Noel, M., Dudeney, J.E., Wilson, A.C., Holley, A.L., & Palermo, T.M. (2019). The role of sleep quality on the relationship between posttraumatic stress symptoms and pain in women. J Behav Med. 42(5), 924-933.

24. Fischer, S.D., Vinall, J., Pavlova, M., Graham, S., Jordan, A., Chorney, J., Rasic, N., Brookes, J., Hoy, M., Yunker, W.K., & Noel, M. (2019). Role of anxiety in young children's pain memory development after surgery. PAIN. 160(4), 965-972.

25. Christensen, J., Noel, M., & Mychasiuk, R. (2019). Neurobiological mechanisms underlying the sleep-pain relationship in adolescence: A review. Neurosci Biobehav Rev. 96, 401-413.

26. Hurtubise, K. Brousselle, A., Noel, M., Camden, C. (2019). What really matters in pediatric chronic pain rehabilitation? Results of a multi-stakeholder nominal group technique study. Disabil Rehabil. 42(12), 1675-1686.

Manuscripts Under Revision

1. Beveridge, J.K., Pavlova, M., Katz, J., Noel, M. (revision requested). The parent version of the Sensitivity to Pain Traumatization Scale (SPTS-P): Development and preliminary validation. Can J Pain.

2. Neville, A., Noel, M., Clinch, J., Pincus, T., Jordan, A. (revision requested). 'Drawing a line in the sand': Clinician diagnostic uncertainty in pediatric chronic pain. Eur J Pain.

3. Neville, A., Kopala-Sibley, D., Soltani, S., Asmundson, G.J.G., Jordan, A., Carleton, R.N., Yeates, K.O., Schulte, F., Noel, M. (revision submitted). A longitudinal examination of fear-avoidance models in pediatric chronic pain: The role of intolerance of uncertainty. PAIN.

Manuscripts Under Review

1. Nimbley, E., Caes, L., Jones, A., Fisher, E., Noel, M., Jordan, A. (under review). A linguistic analysis of future narratives in adolescents with Complex Regional Pain Syndrome and their pain-free peers. Eur J Pain.

2. Pavlova, M., Graham, S.A., Peterson, C., Lund, T., Kennedy, M., Nania, C., Noel, M. (under review). The socialization of young children's empathy for pain: The role of mother- and father-child reminiscing. J Pediatr Psychol.

3. Moline, R.L., McMurtry, C.M., Chambers, C.T., McGrath, P.J., & Noel, M. (under review). Parent-child interactions during pediatric venipuncture: Investigating the role of parent traits, beliefs and behaviors in relation to child outcomes. Can J Pain.

4. Neville, A., Noel, M., Clinch, J., Pincus, T., Jordan, A. (under review). 'Drawing a line in the sand': Clinician diagnostic uncertainty in pediatric chronic pain. Eur J Pain.

5. Bell, T., Stokoe, M., Khaira, A., Webb, M., Noel, M., Amoozegar, F., Harris, A. (under review). GABA and glutamate changes in pediatric migraine. PAIN.

6. Neville, A., Jordan, A., Pincus, T., Nania, C., Schulte, F., Yeates, K.O., Noel, M. (under review). Diagnostic uncertainty in pediatric chronic pain: Nature, prevalence, and consequences. PAIN Rep.

7. Hurtubise, K., Brousselle, A., Noel, M., Jordan, A., White, J., Rasic, N., Camden, C. (under review). Youth and parent perceptions on participating in specialized multidisciplinary pain rehabilitation options: A qualitative timeline effect analysis. Can J Pain.

8. Miller, J.V., Andre, Q., Timmers, I., Simons, L., Rasic, N., Lebel, C., Noel, M. (under review). Posttraumatic stress symptoms and brain structure in youth with chronic headaches. Neuroimage Clin.

9. Patton, M., Racine, N., Afzal, A.R., Russell, B., Forbes, C., Trepanier, L., Khu, M., Neville, A., Noel, M., Reynolds K., Schulte, F. (under review). The pain of survival: An examination of prevalence, patterns, and predictors of pain in survivors of childhood cancer. Cancer.

10. Jones, K.M., Wilcox, G., Nordstokke, D.W., Dick, B., Schroeder, M., Noel, M. (under review). Executive functioning in youth with and without chronic pain: A comparative analysis. Clin J Pain.

11. Ofoghi, Z., Rohr, C., Dewey, D., Signe, B., Yeates, K., Noel, M., Barlow, K.M. (under review). Functional connectivity of the anterior cingulate cortex with pain-related regions in children with post-traumatic headache. PAIN.

12. Beveridge, J.K., Pavlova, M., Katz, J., Noel, M. (under review). The parent version of the Sensitivity to Pain Traumatization Scale (SPTS-P): Development and preliminary validation. Can J Pain.

13. Jones, A., Caes, L., Eccleston, C., Noel, M., Rugg, T., Jordan, A. (under review). Loss-adjusting: Young people's constructions of a future living with Chronic Regional Pain Syndrome. Clin J Pain.

14. Bueno, M., Stevens, B., Barwick, M. A., Riahi, S., Li, S-A., Lanese, A., Willan, A., Synnes, A., Estabrooks, C., Chambers, C., Harrison, D., Yamada, J., Stinson, J., Campbell-Yeo, M., Noel, M., Gibbins, S., LeMay, S., Isaranuwatchai, W. (under review). A cluster randomized clinical trial to evaluate the effectiveness of a multifaceted knowledge translation resource to improve pain practices in hospitalized infants: The Implementation of Infant Pain Practice Change (ImPaC) Resource. Implement Sci.

Book Chapters

1. Pavlova, M., Vinall, J., McGrath, P. J., & Noel, M. (accepted). Pediatric chronic pain and mental health. In P. J. McGrath, S. Stevens, G. Hathway, & W. Zempsky (Eds.), The Oxford Textbook of Pediatric Pain (2nd ed.). Oxford University Press.

2. Pavlova, M., Soltani, S., Asmundson, G.J.G, & Noel, M. (2019). Illness, disability and emotion. In S. Hupp & J. Jewell (Eds.), Encyclopedia of Child and Adolescent Development. 1-14. Wiley-Blackwell.

Keynote and Invited Lectures (2019-2020)

1. Noel, M. (July 2020). Remembering the pain of childhood. Invited keynote speaker at "The Brain Behind the Pain: from Neural Encoding to the Patient Experience" for the Toronto Summer Institute in Pain Planning Committee, Toronto, ON. [Cancelled due to COVID-19 pandemic].

2. Noel, M. (Feb 2020). Remembering the pain of childhood. Invited keynote speaker at the 2020 San Diego Pain Summit, San Diego, CA.

3. Noel, M. (June 2019). Memory for Pain in Childhood: Development, Impact and Intervention. Invited keynote speaker at the Conference for Registered Massage Therapists, Toronto, ON.

4. Noel, M. (March 2019). Growing up: How do pain memories shift long term trajectories? Invited plenary speaker at PainAdelaide, Adelaide, Australia.Noel, M. (June 2020). Preventing pain after surgery in children: Harnessing pain memories. International Association for the Study of Pain Webinar on Pain Prevention After Surgery, Virtual Meeting.

5. Noel, M. (June 2020). The co-occurrence of mental health comorbidities and pediatric chronic pain. 12th Pediatric Pain Master Class, Minneapolis, MN. [Cancelled due to COVID-19 pandemic].

6. Noel, M. (June 2020). Remembering the pain of childhood. 12th Pediatric Pain Master Class, Minneapolis, MN. [Cancelled due to COVID-19 pandemic].

7. Noel, M. (May 2020). Trauma and Pain Across the Lifespan. Ontario Association of Osteopathic Manual Practitioners Annual Conference, Mississauga, ON. [Cancelled due to COVID-19 pandemic].

8. Noel, M. (May 2020). Remembering the pain of childhood. Ontario Association of Osteopathic Manual Practitioners Annual Conference, Mississauga, ON. [Cancelled due to COVID-19 pandemic].

9. Noel, M. (April 2020). Children's Memory for Pain: Development, Impact, and Intervention. Pacific Northwest Child Life Association Spring Conference, Virtual Meeting.

10. Noel, M. (April 2020). Trauma and Pediatric Pain: An Intergenerational Problem. Pacific Northwest Child Life Association Spring Conference, Virtual Meeting.

11. Noel, M. (Mar 2020). Children's Memories for Pain: Development, Impact and Intervention. Pediatric Research Grand Rounds at Children's Healthcare of Atlanta and Emory University. Atlanta, GA. [Cancelled due to COVID-19 pandemic].

12. Noel, M. (Feb 2020). Trauma and Chronic Pediatric Pain. Pediatric Pain Seminar, Alberta Children's Hospital, Calgary, AB.

13. Noel, M. (Feb 2020). Patient Engagement in Research at CPN - A Case Study. Canadian Pain Society Pilot Mentorship Program Webinar hosted by the CIHR Chronic Pain Network, Calgary, AB.

14. Noel, M. (Jan 2020). On becoming a Paediatric Pain Clinician-Scientist: A personal journey. Canadian Child Health Clinician Scientist Program (CCHCSP) Chapter Conference, Calgary, AB.

15. Noel, M. (Jan 2020). Remembering the Pain of Childhood: Development, Impact and Modification of Children's Memories for Pain. Society of Pediatric Psychology Pain Special Interest Group Webinar, Boston, MA.

16. Noel, M. (Oct 2019). Pain Memory: How do we prevent chronic pain before it begins? Vi Riddell Family Visit to the Alberta Children's Hospital, Calgary, AB.

17. Noel, M. (Oct 2019). Hey Doc – Why do I hurt? The Psychology behind pain. American Academy of Pediatrics 2019 National Conference & Exhibition, New Orleans, LA.

18. Noel, M. (Sept 2019). Remembering the Pain of Childhood. Psychologists' Association of Alberta's 2019 Professional Development Day, Edmonton, AB.

19. Noel, M. (July 2019). Children's Memories for Pain: Development, Impact, and Intervention. National Institute of Dental and Craniofacial Research Workshop on Dental Fear and Anxiety, Bethesda, MD.

20. Noel, M. (June 2019). Remembering the pain of childhood: Development, impact and modification of children's pain memories. Adolescent Development: Longitudinal Models and Research Lecture Series at Utrecht University, Trier, Germany.

Symposia (accepted and presented 2019- 2020)

1. Noel, M. (Mar 2020). A Cognitive Underpinning of Pain Avoidance: Memory for Pain. In A. Meulders (Chair), Krypotos, A., & Noel, M. Novel developments in pain-related fear, avoidance, and memory biases and their role in chronic disability. 2020 American Psychosomatic Society (APS) Annual Meeting, Long Beach, CA. [Cancelled due to COVID-19 pandemic].

2. Noel, M. (Nov 2019). Passing the torch and lighting the way: A journey across academic generations of clinical psychologists studying pediatric pain. In C. Chambers (Chair), Noel, M., Pavlova, M. Pain and Child Health (PICH2GO) Conference, Montreal, QC.

3. Noel, M. (Sept 2019). The pediatric period: The nature and impact of diagnostic uncertainty in adolescents with chronic pain and their parents. In A. Jordan (Chair), Pincus, T., & Noel, M. Addressing the elephant in the room: A detailed exploration of diagnostic uncertainty in adult and paediatric chronic pain settings. Pain in Europe XI: The 11th Congress of the European Pain Federation EFIC, Valencia, Spain.

4. Noel, M. (July 2019). Effective reassurance for people with LBP across their entire pain journey: What training do our colleagues need? In T. Pincus (Chair), Hill, J., & Noel, M. Addressing the elephant in the room: A detailed exploration of diagnostic uncertainty in adult and pediatric chronic pain settings.16th International Forum on Back and Neck Pain Research in Primary Care, Quebec City, QC.

5. Noel, M. (June 2019). Unravelling the relationship between Adverse Childhood Experiences, post-traumatic stress, and pediatric chronic pain: An integrative examination. In M. Noel (Chair), Mychasiuk,

R., Nelson, S., & Gold, J.I. Trauma and Pediatric Pain: Translational Examinations of Cognitive, Behavioural, Interpersonal, and Neurobiological Mechanisms.12th International Symposium on Pediatric Pain, Basel, Switzerland.

6. Noel, M. (June 2019). The pediatric period: Diagnostic uncertainty in youth with chronic pain and their parents. In A. Jordan (Chair), Noel, M., Heathcote, L., & Simons, L. Acknowledging the "elephant in the room": Uncertainty in the context of pediatric pain.12th International Symposium on Pediatric Pain, Basel, Switzerland. 7. Noel, M. (May 2019). Disentangling the Relationship between PTSD and Pediatric Chronic Pain: A Translational Examination of Mutual Maintenance. In A. Meulders (Chair), Simons, L., Noel, M., Patrick, F. Novel Insights into Psychological Factors Contributing to the Development and Maintenance of Chronic Pain across the Lifespan. 31st Association for Psychological Science Annual Convention, Washington, DC.

Poster presentations (2019-2020)

1. Miller, J.V., Andre, Q., Timmers, I., Simons, L., Rasic, N., Lebel, C., Noel, M. (May 2020). Early life trauma and alterations to brain structure underlying the chronification of headaches in youth. Canadian Pain Society 41st Annual Scientific Meeting, Calgary, AB. [Cancelled due to COVID-19 pandemic].

2. Mueri, K., Kennedy, M., Pavlova, M., Neville, A., Lund, T., Noel, M. (May 2020). The sociocultural context of pediatric pain: A multi-method examination of portrayal of pain in children's popular media. Canadian Pain Society 41st Annual Scientific Meeting, Calgary, AB. [Cancelled due to COVID-19 pandemic].

3. Neville, A., Kopala-Sibley, D., Soltani, S., Asmundson, G., Noel, M. (May 2020). Updating the pediatric fear-avoidance model of chronic pain: The transdiagnostic role of parent and youth intolerance of uncertainty. Canadian Pain Society 41st Annual Scientific Meeting, Calgary, AB. [Cancelled due to COVID-19 pandemic].

4. Kennedy, M., Pavlova, M., Lund, T., Noel, M. (May 2020). Talk more, repress less? Parental beliefs about reminiscing with young children about pain. Canadian Pain Society 41st Annual Scientific Meeting, Calgary, AB. [Cancelled due to COVID-19 pandemic].

5. Lund, T., Pavlova, M., Kennedy, M., Nania, C., Noel, M. (May 2020). Father and mother reminiscing style about past pain is differentially associated with young children's cognitive abilities. Canadian Pain Society 41st Annual Scientific Meeting, Calgary, AB. [Cancelled due to COVID-19 pandemic].

6. Podgorny, P., Yeung, A.K., Kennedy, M., Nania, C., Noel, M. (May 2020). Chronic abdominal pain related to higher rates of depression and anxiety and lower quality of life in children & adolescents. Canadian Pain Society 41st Annual Scientific Meeting, Calgary, AB. [Cancelled due to COVID-19 pandemic].

7. Forbes, C., Charnock, C., Guilcher, G., Noel, M., Schulte, F. (May 2020). The pathway to pain-free: Pain experiences in adolescent recipients of hematopoietic stem cell transplant to cure sickle cell disease. Canadian Pain Society 41st Annual Scientific Meeting, Calgary, AB. [Cancelled due to COVID-19 pandemic].

8. Charnock, C., Patton, M., Forbes, C., Russell, B., Noel, M., Khu, M., Neville, A., Reynolds, K., Schulte, F. (May 2020). Exploring the relationships between post-traumatic stress symptoms, pain catastrophizing, and pain outcomes in survivors of childhood cancer and their parents. Canadian Pain Society 41st Annual Scientific Meeting, Calgary, AB. [Cancelled due to COVID-19 pandemic].

9. Wihak, T., Pavlova, M., & Noel, M. (May 2020). Parent sleep quality as a potential mechanism in the relationship between parent PTSD symptoms and child chronic pain outcomes. Canadian Pain Society 41st Annual Scientific Meeting, Calgary, AB. [Cancelled due to COVID-19 pandemic].

10. Patton, M., Russell, B., Noel, M., Khu, M., Neville, A., Reynolds, K., Schulte, F. (May 2020). Chronic pain in long-term survivors of childhood cancer. Canadian Pain Society 41st Annual Scientific Meeting, Calgary, AB. [Cancelled due to COVID-19 pandemic].

11. McPeak, A., De Chastelain, A., Rasic, N., Noel, M. (May 2020). Improvements in youth functional outcomes following physical therapy within intensive pain rehabilitation. Canadian Pain Society 41st Annual Scientific Meeting, Calgary, AB. [Cancelled due to COVID-19 pandemic].

12. Hurtubise, K., Brousselle, A., Noel, M., Rasic, N., Camden, C. (May 2020). Is it worth it? Is an intensive interdisciplinary pain treatment program making a difference to youth with pain related disability? Canadian Pain Society 41st Annual Scientific Meeting, Calgary, AB. [Cancelled due to COVID-19 pandemic].

13. Fischer, S., Beveridge, J., Noel, M. (May 2020). The social context of parent and child pain: A gender analysis. Canadian Pain Society 41st Annual Scientific Meeting, Calgary, AB. [Cancelled due to COVID-19 pandemic].

14. Nania, C., & Noel, M. (May 2020). Parent surgical history: A root of children's post-surgical pain? Canadian Pain Society 41st Annual Scientific Meeting, Calgary, AB. [Cancelled due to COVID-19 pandemic].

15. Beveridge, J., Pavlova, M., Katz, J., Noel, M. (May 2020). Parent version of the Sensitivity to Pain Traumatization Scale: Development, preliminary validation, and longitudinal examination. Canadian Pain Society 41st Annual Scientific Meeting, Calgary, AB. [Cancelled due to COVID-19 pandemic].

16. Kennedy, M., Noel, M. (April 2020). The role of parental mental health in pediatric chronic pain. The Chronic Pain Network Annual General Meeting, Hamilton, ON. [Postponed due to COVID-19 pandemic]. 17. Tutelman, P.R., Chambers, C.T., Urquhart, R., Fernandez, C.V., Flanders, A., Guilcher, G.M.T., Heathcote, L.C., Noel, M., Schulte, F., Stinson, J.N., MacLeod, J. & Stern, M. (April 2020). "Am I getting a needle today?" Exploring parent and child experiences of medical tests and surveillance after completion of cancer treatment. Poster abstract submitted for the Dalhousie Department of Pediatrics Research Day, Halifax, NS. [Postponed due to COVID-19 pandemic].

18. Kwan, V., Lebel, M., Noel, M., Yeates, K.O. (Feb 2020). Pain and cerebral blood flow in children following mild traumatic brain injury compared to orthopedic injury. International Neuropsychological Society Meeting, Denver, CO.

19. Bell, T., Khaira, A., Sandhu, M., Webb, M., Noel, M., Amoozegar, F., Harris, A. (Dec 2019). Examining excitation and inhibition in children with migraine. Alberta Children's Hospital Research Retreat, Calgary, AB.

20. Beveridge, J.K., Pavlova, M., Katz, J., Noel, M. (Nov 2019). Risk for becoming traumatized by your child's chronic pain: Development and preliminary validation of the parent version of the Sensitivity to Pain Traumatization Scale. Pain in Child Health Conference (PICH2GO), Montreal, QC (*selected for a Hot Topics Presentation*).

21. Patton, M., Racine, N., Neville, A., Trepanier, L., Khu, M., Noel, M., Reynolds, K., Schulte, F. (Oct 2019). The pain of survival: An examination of the prevalence, patterns, and predictors of pain in long-term survivors of childhood cancer. 51st Annual Congress of the International Society of Paediatric Oncology, Lyon, France.

22. Tutelman, P.R., Chambers, C.T., Urquhart, R., Fernandez, C.V., Heathcote, L.C., Noel, M., Flanders, A., Guilcher, G.M.T., Schulte, F., Stinson, J.N., MacLeod, J. & Stern, M. (Oct 2019). When "a headache is not just a headache": A qualitative examination of parent and child experiences of pain after childhood cancer. 51st Annual Congress of the International Society of Paediatric Oncology, Lyon, France.

23. Tutelman, P.R., Chambers, C.T., Urquhart, R., Fernandez, C.V., Heathcote, L.C., Noel, M., Flanders, A.,

Guilcher, G.M.T., Schulte, F., Stinson, J.N., MacLeod, J. & Stern, M. (Sept 2019). When "a headache is not just a headache": A qualitative examination of parent and child experiences of pain after childhood cancer. International Psycho-Oncology Society World Congress, Banff, CA.

24. Patton, M., Noel, M., Khu, M., Russell, B., Neville, A., Reynolds, K., Schulte, F. (Sept 2019). Pain, intolerance of uncertainty, and fear of cancer recurrence in long-term survivors of childhood cancer. Oral presentation at the International Psycho-Oncology Society World Congress, Banff, CA.

25. Koceja, E., Bambilla, A., Stone, A., Noel, M., Fales, J. (Aug 2019). The effects of brief social exclusion on pain perception and pain memory in healthy adolescents. American Psychological Association (APA) 127th Annual Convention, Chicago, IL.

26. Beveridge, J., Mychasiuk, R., & Noel, M. (June 2019). Intergenerational transmission of risk: Parent chronic pain, trauma symptoms, and pain catastrophizing predict poorer outcomes for youth with chronic pain. 12th International Symposium on Pediatric Pain, Basel, Switzerland.

27. Neville, A., Griep, Y., Schulte, F., Yeates, K., Palermo, T., Noel, M. (June 2019). A 'dyadic dance': Pain catastrophizing as a moderator of daily relationships between parent protective responses, mood, and youth pain. 12th International Symposium on Pediatric Pain, Basel, Switzerland.

28. Le May, S., Khadra, C., Paquin, D., Fortin, J.S., Ballard, A., Perreault, I., Bouchard, S., Noel, M., Déry, J. & Hupin, M. (June 2019). Decreasing REcurrent pain and Anxiety in Medical procedures with a paediatric population (DREAM): A pilot study. 12th International Symposium on Pediatric Pain, Basel, Switzerland.

29. Patton, M., Noel, M., Khu, M., Russell, K. B., Neville, A., Schulte, F. (June 2019). Pain and fear of cancer recurrence in long-term survivors of childhood cancer. 12th International Symposium on Pediatric Pain, Basel, Switzerland.

30. Wauters, A., Noel, M., Van Ryckeghem, D., Vervoort, T. (June 2019). Remembering past pain and expecting future pain: A preliminary analysis on the role of child attention to pain parental (non-) pain attentive behaviour. 12th International Symposium on Pediatric Pain, Basel, Switzerland.

31. Birnie, K., Rasic, N., Noel, M. (June 2019). Child and parent predictors of healthcare utilization amongst children and adolescents with chronic pain. 12th International Symposium on Pediatric Pain, Basel, Switzerland.

32. Rasic, N., McPeak, A., Vinall, J., Rayner, L., Noel, M. (June 2019). Changes in parent protective responses influence changes in child functioning and pain acceptance over the course of intensive pain rehabilitation. 12th International Symposium on Pediatric Pain, Basel, Switzerland.

33. Rasic, N., Rayner, L., Vinall, J., McPeak, A., Noel, M. (June 2019). Parent outcomes and parent perception of youth outcomes following intensive pediatric chronic pain rehabilitation at the Alberta Children's Hospital. 12th International Symposium on Pediatric Pain, Basel, Switzerland.

34. Wihak, T., McPeak, A., Noel, M. (June 2019). Depression mediates the relationship between insomnia and pediatric chronic pain over time. 12th International Symposium on Pediatric Pain, Basel, Switzerland.

35. Jones, A., Caes, L., Noel, M., Jordan, A. (June 2019). How adolescents with Complex Regional Pain Syndrome (CRPS) think about their future. 12th International Symposium on Pediatric Pain, Basel, Switzerland.

36. Pavlova, M., Graham, S.A., Peterson, C., Lund, T., Kennedy, M., & Noel. M. (June 2019). Parent-child reminiscing about past pain and children's prosocial behaviours. Owerko Centre Conference 2019, Calgary, AB.

37. Patton, M., Racine, N., Neville, A., Trepanier, L., Khu, M., Noel, M., Reynolds, K., Schulte, F. (May 2019). The pain of survival in long-term survivors of childhood cancer. Oral presentation at the Vi Riddell Pediatric Rehabilitation Research Symposium, Calgary, Canada.

38. Johnstone, C., Debert, C., Noel, M., Schneider, K. (May 2019). Heat, cold and pressure pain thresholds following a sport-related concussion. Vi Riddell Rehabilitation Research Symposium, Alberta Children's Hospital, Calgary, AB.

39. Bell, T., Webb, M., Noel, M., Amoozegar, F., Harris, A. (May 2019). Quantifying changes in excitation and inhibition in childhood migraine. International Society for Magnetic Resonance in Medicine 27th Annual Meeting, Montreal, QC.

40. Stevens, B., Bueno, M., Riahi, S., Lanese, A., Li, S-A., Willan, A., Synnes, A., Estabrooks, C., Chambers, C., Harrison, D., Yamada, J., Stinson, J., Campbell-Yep, M., Barwick, M., Noel, M., Gibbins, S., LeMay, S., Isaranuwatchai, W. (May 2019). Usability evaluation of a knowledge translation intervention for neonatal pain: the Implementation of Pain Practice Change (ImPaC) resource. 10th COINN Conference, Auckland, NZ.

41. Stanton, T., Braithwaite, F., Noel, M. (April 2019). Reframe the pain: Dividing attention and altering memory to reduce needle pain and distress in children. Australian Pain Society 39th Annual Scientific Meeting, Broadbeach, AU.

42. Lee, R., Pearson, J., Spencer, A., Noel, M., Bell-Graham, L., Beran, T.N. (April 2019). Effectiveness of MEDi® for the management of children's pain and fear during IV induction: Help from a humanoid robot. Canadian Pain Society 40th Annual Scientific Meeting, Toronto, ON.

43. Birnie, K., Rasic, N., Noel, M. (April 2019). Child and parent predictors of healthcare utilization amongst children and adolescents with chronic pain. Canadian Pain Society 40th Annual Scientific Meeting, Toronto, ON.

44. Varshney, V., McPeak, A., Vinall, J., Rasic, N., Noel, M. (April 2019). Sociodemographic factors in Alberta's pediatric pain rehabilitation program. Canadian Pain Society 40th Annual Scientific Meeting, Toronto, ON.

45. Patton, M., Noel, M., Khu, M., Russell, B., Neville, A., Schulte, F. (April 2019). Pain and post-traumatic stress disorder symptoms in parents of childhood cancer survivors. Canadian Pain Society 40th Annual Scientific Meeting, Toronto, ON.

46. McPeak, A., Rasic, N., Vinall, J., Rayner, L., Noel, M. (April 2019). Parent protective behaviours influence youth pain-related outcomes following intensive pain rehabilitation. Canadian Pain Society 40th Annual Scientific Meeting, Toronto, ON.

47. Beveridge, J., Mychasiuk, R., & Noel, M. (April 2019). Accumulating risk: Parent chronic pain and trauma symptoms predict poorer outcomes for youth with chronic pain. Canadian Pain Society 40th Annual Scientific Meeting, Toronto, ON.

48. Nania, C., Wihak, T., Mychasiuk, R., Noel, M. (April 2019). PTSD symptoms as a mediator in the relationship between pre-sleep arousal and chronic pain in youth. Canadian Pain Society 40th Annual Scientific Meeting, Toronto, ON.

49. Wihak, T., McPeak, A., Mychasiuk, R., Noel, M. (April 2019). A multimethod, longitudinal mediation analysis of sleep, anxiety, and pediatric chronic pain. Canadian Pain Society 40th Annual Scientific Meeting, Toronto, ON.

50. Dhillon, A., Sedov, I., Noel, M., McKinnin, A.L., & Tomfohr-Madsen, L. (March 2019). The temporal relationship between insomnia and pain interference in pregnancy. American Psychosomatic Society (APS) 77th Annual Scientific Meeting, Vancouver, BC. (March 6th-9th, 2019)

51. Patton, M., Kunin-Batson, A., Heathcote, L., Alberts, N., Racine, N., Karlson, C., Olson-Bullis, B., Banerjee, P., Hocking, M., Noel, M., Krull, K., Schulte, F. (Feb 2019). Measuring pain in survivors of childhood cancer. Arnie Charbonneau Cancer Institute Research Symposium, Calgary, Canada.

52. Kwan, V., Vo, M., Noel, M., & Yeates, K. (Feb 2019). A scoping review of pain in children after traumatic brain injury: Is there more than headache? International Neuropsychological Society 2019 Annual Meeting, New York, NY.

SERENA LAURA ORR, MD, MSc

Current Awards (2019-2020)

American Headache Society Emerging Leaders Program (November 2019)
Travel and accommodations award: 2,300$

International Headache Society Junior Travel Grant (September 2019)
Travel and accommodations award: 1,100$

Current Funded Projects (2019-2020)

Funder: Alberta Children's Hospital Research Institute - Behaviour & The Developing Brain Research Grant
Term: August 2019 – June 2020
Amount: 24,900$
Role: Principal Investigator Title: Association between outcomes in children and adolescents with migraine and internalizing mental health symptoms, sleep and parental responses to their child's pain: a prospective longitudinal cohort study

Current Trainee Supervision (2019-2020)

1. Undergraduate

University of Calgary
Period: November 2019 – Present
Role: Supervising a medical student research project (Katherine Falla, MS1)

2. Graduate

University of Calgary
Period: December 2019-Present
Role: On thesis supervision committee for two graduate students in the Department of Psychology (Maria Pavlova, PhD candidate and Tatiana Lund, MA)

3. Postgraduate

University of Calgary
Period: September 2019-Present
Role: Supervising a Pediatrics resident research project (Elise Martin, PGY1)

Selected Publications (2019-2020)

1. Falla K, Ronksley P, Noel M, Orr SL. Internalizing symptoms in pediatric migraine: protocol for a systematic review of the literature. Headache 2020;60(4):761-70.

2. Orr SL, Turner A, Kabbouche MA, Horn PS, O'Brien HL, Kacperski J, LeCates S, White S, Weberding J, Miller MN, Powers SW, Hershey AD. The profile and prognosis of youth with status migrainosus: results from an observational study. Headache 2020;60(5):878-88.

3. Hanes I, Orr SL, Davila J, Kirton A, Sell E. Thrombolysis without large vessel occlusion in a child with acute arterial ischemic stroke. Can J Neurol Sci 2020;47(2):275-77.

4. Strasser LE, Orr SL, McMillan HJ, Callen DJA. Pediatric neurology workforce in Canada: a 5 year update. Canadian Journal of Neurological Sciences 2019;00:1-9.

5. Hammond NG, Orr SL, Colman I. Early life stress in adolescent migraine and the meditational influence of symptoms of depression and anxiety in a Canadian cohort. Headache 2019; 59(10):1687-1699.

6. Orr SL, Turner A, Kabbouche MA, Horn PS, O'Brien HL, Kacperski J, LeCates S, White S, Weberding J, Miller MN, Powers SW, Hershey AD. Predictors of short-term prognosis while in pediatric headache care: an observational study. Headache 2019;59(4):543-555.

Selected Posters (2019-2020)

1. Orr SL, Vives-Mestres M, Donoghue S, Shulman K, Mian A. Individual-level patterns of perceived stress throughout the migraine cycle: a longitudinal cohort study using daily prospective data [accepted for poster presentation at 2019 International Headache Society Congress, September 2019, Dublin, Ireland]

2. Orr SL, Gelfand A, Hershey A. Trajectory of response to migraine preventive interventions: a meta-analysis [accepted for poster presentation at 2019 International Headache Society Congress, September 2019, Dublin, Ireland]

3. Venkateswaran S, Orr SL, Wood T, Pugh D, Humphrey-Murto S, Callen D. Development and Validity of NITECaP; the National In-Training Exam for Canadian Pediatric Neurology Residents [accepted for poster presentation at the ICRE 2019, September 2019, Ottawa, Canada]

4. Orr SL, Vives-Mestres M, Donoghue S, Shulman K, Mian A. Individual-level patterns of perceived stress throughout the migraine cycle: a longitudinal cohort study using daily prospective data [accepted for presentation at 2019 International Headache Society Congress, July 2019, Philadelphia, PA]

5. Hammond N, Orr SL, Colman I. Early life stress in adolescent migraine and the meditational influence of symptoms of depression and anxiety in a Canadian cohort [accepted for poster presentation at the Canadian Neurological Sciences Federation congress, June 2019, Montreal, Quebec]

NIVEZ RASIC, MD, FRCPC

Research Highlights

Awards (2019-2020)

2020 Mayday Fellow

2019 Excellence in Postgraduate Medical Education Award, Department of Anesthesia, University of Calgary

Publications

1. Hurtubise, K., Blais, S., Noel, M., Brouselle, A., Dallaire, F., Rasic, N., Camden, C. (accepted). Is it worth it? Comparison of an intensive interdisciplinary pain treatment and a multimodal treatment for youth with pain-related disability. Clin J Pain.

2. Noel, M., Pavlova, M., Lund, T., Jordan, A., Chorney, J., Rasic, N., Brookes, J., Hoy, M., Yunker, W., & Graham, S. A. (2019). The role of narrative in the development of children's pain memories: influences of father- and mother-child reminiscing on children's recall of pain. PAIN. 160(8), 1866-1875.

3. Pavlova, M., Graham, S. A., Jordan, A., Chorney, J., Vinall, J., Rasic, N., Brookes, J., Hoy, M., Yunker, W., & Noel, M. (2019). Socialization of pain memories: parent-child reminiscing about past painful and sad events. J Pediatr Psychol. 44(6), 679-691.

4. Fischer, S.D., Vinall, J., Pavlova, M., Graham, S., Jordan, A., Chorney, J., Rasic, N., Brookes, J., Hoy, M., Yunker, W.K., & Noel, M. (2019). Role of anxiety in young children's pain memory development after surgery. PAIN. 160(4), 965-972.

Manuscripts Under Review

1. Hurtubise, K., Brousselle, A., Noel, M., Jordan, A., White, J., Rasic, N., Camden, C. (under review). Youth and parent perceptions on participating in specialized multidisciplinary pain rehabilitation options: A qualitative timeline effect analysis. Can J Pain.

2. Miller, J.V., Andre, Q., Timmers, I., Simons, L., Rasic, N., Lebel, C., Noel, M. (under review). Posttraumatic stress symptoms and brain structure in youth with chronic headaches. Neuroimage Clin.

Symposia Accepted

1. Intensive Interdisciplinary Pain treatment: A New Frontier in Pediatric Pain Management? Rasic N, William S, Coghill W. Canadian Pain Society, Calgary AB, May 2020. Symposium Presentation. (Accepted)

Posters

1. Miller JV, Andre Q, Timmers I, Simons L, Rasic N, Lebel C, Noel M. Early life trauma and structural brain changes underlie the chronification of headaches in youth. IASP. Amsterdam, Netherlands. August 2020. Poster presentation.

2. Miller JV, McPeak A, Spencer A, Rasic N, Noel M, Jones K, Hai T, Epping K, Walker A, Bousman C, Syed N, MacMaster FP, Rice T (June 2020). [Selected for the Richard Knill Research Oral Competition] Cognitive and behavioral changes following exposure to either sevoflurane- or propofol-based anesthesia in children undergoing MRI. Canadian Anesthesiologists's Society Annual Meeting, Virtual Meeting. Awarded best paper in Neuroanesthesia.

3. Miller JV, McPeak A, Spencer A, Rasic N, Noel M, Jones K, Hai T, Epping K, Walker A, Bousman C, Syed N, McMaster F, Rice T. Cognitive and behavioural changes following exposure to either sevoflurane- or propofol-based anesthesia in children undergoing MRI. Canadian Anesthesiologist's Society Annual Meeting. June 2020. Poster presentation.

4. Miller, J.V., Andre, Q., Timmers, I., Simons, L., Rasic, N., Lebel, C., Noel, M. (May 2020). Early life trauma and alterations to brain structure underlying the chronification of headaches in youth. Canadian Pain Society 41st Annual Scientific Meeting, Calgary, AB. [Cancelled due to COVID-19 pandemic].

5. McPeak, A., De Chastelain, A., Rasic, N., Noel, M. (May 2020). Improvements in youth functional outcomes following physical therapy within intensive pain rehabilitation. Canadian Pain Society 41st Annual Scientific Meeting, Calgary, AB. [Cancelled due to COVID-19 pandemic].

6. Murray B, Heaton An, Miller R, Rayner L, Richardson J, Rasic N. Partnering in health and education: Developing and testing a process to award high school credit for hospital-based therapeutic learning. Canadian Pain Society, Calgary AB, May 2020. [Cancelled due to COVID-19 pandemic].

7. Hurtubise, K., Brousselle, A., Noel, M., Rasic, N., Camden, C. Is it worth it? Is an intensive interdisciplinary pain treatment program making a difference to youth with pain related disability? Canadian Pain Society 41st Annual Scientific Meeting, Calgary AB, May 19-22nd, 2020. [Cancelled due to COVID-19 pandemic].

8. Murray B, Heaton An, Miller R, Rayner L, Richardson J, Rasic N. Partnering in health and education: Developing and testing a process to award high school credit for hospital-based therapeutic learning. Children's Healthcare Canada Conference, Ottawa ON, December 8-10, 2019. Poster presentation.

9. Birnie, K., Rasic, N., Noel, M. (June 2019). Child and parent predictors of healthcare utilization amongst children and adolescents with chronic pain. 12th International Symposium on Pediatric Pain, Basel, Switzerland.

10. Rasic, N., McPeak, A., Vinall, J., Rayner, L., Noel, M. (June 2019). Changes in parent protective responses influence changes in child functioning and pain acceptance over the course of intensive pain rehabilitation. 12th International Symposium on Pediatric Pain, Basel, Switzerland.

11. Rasic, N., Rayner, L., Vinall, J., McPeak, A., Noel, M. (June 2019). Parent outcomes and parent perception of youth outcomes following intensive pediatric chronic pain rehabilitation at the Alberta Children's Hospital. 12th International Symposium on Pediatric Pain, Basel, Switzerland.

12. Newell C, Leduc-Pessah H, Carter K, Rasic N (May 2019). Quality and quantity evaluation and enhancing the preparation of families before surgery. ACH Quality Forum, Calgary. Poster presentation. (Accepted)

13. Murray B, Heaton A, Miller R, Rayner L, Richardson J, Rasic N (May 2019). Bridging health and education: Youth in hospital-based programs gaining high school credit by honouring therapeutic work. ACH Quality Forum, Calgary. Poster presentation. (Accepted)

14. Birnie, K., Rasic, N., Noel, M. (April 2019). Child and parent predictors of healthcare utilization amongst children and adolescents with chronic pain. Canadian Pain Society 40th Annual Scientific Meeting, Toronto, ON.

15. Varshney, V., McPeak, A., Vinall, J., Rasic, N., Noel, M. (April 2019). Sociodemographic factors in Alberta's pediatric pain rehabilitation program. Canadian Pain Society 40th Annual Scientific Meeting, Toronto, ON.

16. McPeak, A., Rasic, N., Vinall, J., Rayner, L., Noel, M. (April 2019). Parent protective behaviours influence youth pain-related outcomes following intensive pain rehabilitation. Canadian Pain Society 40th Annual Scientific Meeting, Toronto, ON.

17. Rayner L, Rasic N, Vinall J, McPeak A, Noel M (April 2019) Improvement in outcomes of parents of youth with chronic pain following intensive pain rehabilitation at the Alberta Children's Hospital. Canadian Pain Society, Toronto, ON, Canada. Poster presentation. (Accepted)

<u>Oral Presentations</u>

Lake Louise Anesthesia Conference. Lake Louise, AB. (March 2020)

1. Pediatric Update: Current Topics for Low Risk Generalist Pediatric Practice.

2. Pain Management in Pediatrics---Getting the Basics Right

3. Persistent Postsurgical Pain---Current Knowledge

"Aches & Anxiety in the Classroom: What to do and how to help?" Calgary City Teacher's Convention. Calgary, Canada (February 2020)

"Function First: Our approach to treatment". Vi Riddell Multidisciplinary Pain Team. Calgary Pediatric Pain Seminar, ACH (February 2020).

"The Epidemic of Pain in Children: Are we making any progress?" Department of Pediatrics Grand Rounds, ACH (November 2019)

Pain Society of Alberta Conference (First conjoint conference with BC, Saskatchewan and Manitoba). "Transitional Pain- Exploring new frontiers in pain medicine." (Acted as moderator for workshop), (October 2019).

"Chronic pain in kids: Managing the epidemic of this invisible disease." Pearls for Family Practice Conference presenter. (October 2019)

"Optimizing pain management for OMF surgery in the era of the opioid crisis." (Canadian Oral Maxillofacial Surgery (CAOMS) Annual Conference, Calgary AB. (Invited Oral Presentation) (May 2019)

Complex Pain in Kids: Managing the Epidemic of this Invisible Disease. 6th ACH Pediatric Update Conference, Calgary AB, (May 2019).

Improving Pain for Albertans: What's happening in the province? (Panel Discussion) Calgary Pain Conference, MRU, Calgary AB (May 2019).

TIFFANY RICE, PhD, MD, FRCPC

Research Highlights

Peer Reviewed Manuscripts

1. Iqbal F, Thompson AJ, Riaz S, Pehar M, Rice T, Syed NI. Anesthetics: From modes of action to unconsciousness and neurotoxicity, J Neurophysiol 122(2): 760-787 (2019).

2. Casha S, Rice T, Stirling DP, Silva C, Gnanapavan S, Giovannoni G, Hurlbert J, Yong VW. Cerebrospinal fluid biomarkers in human spinal cord injury from a phase II minocycline trial, J Neurotrauma 35(16): 1918-1928 (2018).

3. Armstrong R, Riaz S, Hasan S, Iqbal F, Rice T, Syed N. Mechanisms of anesthetic action and neurotoxicity: lessons from Molluscs, Front Physiol 8:1138 (2018).

4. Rice T, Larsen JEA, Li H, Nuttall RK, Larsen PH, Casha S, Hurlbert J, Edwards DR, Yong VW. Neuroprotection by minocycline in murine traumatic spinal cord injury: Analyses of matrix metalloproteinases, Neuroimmunol Neuroinflammation 4: 243-253 (2017).

Manuscripts in Preparation

1. Moser JJ, Archer DP, Walker AM, Dewey DM, Rice TK, McAllister DL. Cognitive outcomes of premature infants exposed to sedation and anesthesia (being revised for submission to CJA).

2. Iqbal F, Pehar M, Thompson AJ, Azeem U, Jahanbakhsh K, Jimenez Tellez, N, Sabouny R, Batool S, Syeda A, Chow J, Machiraju P, Shutt TE, Yusuf K, Shearer J, Rice T, Syed NI. A synthetic peptide protects rat cortical neurons from anesthetic-induced toxicity (submitted to The Journal of Physiology).

3. Rice T, Yong VW. Evaluation of the role of glucocorticoids in the endogenous modulation of neuroinflammation after spinal cord injury in mice (in preparation).

Abstracts

1. Jimenez Tellez N, Iqbal F, Pehar M, Rice T, Syed N. Dexmedetomidine, a novel anesthetic with neuroprotective effects. Research Poster. HBI Research Day (2020).

2. Miller JV, McPeak A, Spencer A, Rasic N, Noel M, Jones K, Hai T, Epping K, Walker A, Bousman C, Syed N, MacMaster FP, Rice T. Cognitive and behavioral changes following exposure to either sevoflurane- or propofol-based anesthesia in children undergoing MRI. Canadian Anesthesiologists' Society Annual Meeting, Virtual Meeting (June 2020). [Selected for the Richard Knill Research Oral Competition, Award for Best Paper in Neuroanesthesia]

3. Jimenez Tellez N, Iqbal F, Rice T, Syed NI. Dexmedetomidine protects against sevoflurane-induced neurotoxicity. Research Poster. ACHRI Retreat (2019).

4. Moser JJ, Archer DP, Walker AM, Rice TK, McAllister DL. Cognitive outcomes of premature infants exposed to sedation and anesthesia. Research Poster Abstract. Canadian Anesthesiologists' Society Meeting (2019).

5. Schneider C, Bogden BJ, Busse J, Gendron L, Gilron I, MacDermid J, Rice T, Sessle B, Sumpton J, White M, Buckley N, Begley K, Marfisi D. The Patient-Oriented Research of the Chronic Pain Network. Research Poster Abstract. Canadian Journal of Pain, 2:1, A71-A184 (2018). DOI: 10.1080/24740527.2018.1476313

6. Gilron I, Dick B, San-Martin-Feeney D, DeBow C, Buckley N, Baerg K, Banfield J, Bisson E, Brown A, Campbell F, Choiniere M, Duggan S, El- Gabalawy R, Finley A, Harris L, Jarvi K, Khoo E-L, Kilborn K, Lau S, Lynch M, MacInnes A, McMahon C, McPeak A, Noel M, Patterson L, Poulin P, Rashiq S, Rasic N, Rice T, Schneider C, Shir Y, Stinson J, Verrier M, White M, Zacharias R, Dhillon J, and Ferguson L. The chronic pain network's (CPN) clinical research network (CRN). Research Poster Abstract. Canadian Journal of Pain, 2:1, A71-A184 (2018). DOI: 10.1080/24740527.2018.1476313

7. Vinall J, Connors A, Rice T, Rasic N, Noel M. Parent emotional availability is associated with reduced preoperative anxiety in children undergoing a tonsillectomy procedure. Abstract for American Pain Society's Scientific Summit. The Journal of Pain, 19(3 Suppl): S61 (2018). DOI: https://doi.org/10.1016/j.jpain.2017.12.159

Awards

1. Canadian Anesthesiologists' Society (CAS) Subspecialty Operating Grant – CAS Research Award in Neuroanesthesia, Principal investigator/Primary applicant. "Neurobiological, cognitive-affective and behavioral changes following exposure to either sevoflurane- or propofol-based anesthesia in children undergoing MRI" (July 2018-June 2019)

Other Funding

1. Canadian Anesthesiologists' Society (CAS) Subspecialty Operating Grant – CAS Research Award in Neuroanesthesia, Principal investigator/Primary applicant. "Neurobiological, cognitive-affective and behavioral changes following exposure to either sevoflurane- or propofol-based anesthesia in children undergoing MRI" ($10,000) (July 2018-June 2019)

Awards (2019-2020)

Canadian Institutes of Health Research Project Scheme Grant ([Co-Investigator] $661,725), Canadian Institutes of Health Research, Jan 2020 – Jan 2025

Strategy for Patient Oriented Research ([Co-Investigator] $376,368), Canadian Institutes of Health Research, Sept 2016-Sept 2021

Early Career Investigator Pain Research Grant ([Principal Investigator] $50,000), Canadian Pain Society/Pfizer Canada, June 2020-June 2021

Best Paper in Neuroanesthesia, Canadian Anesthesiologists' Society, June 2020

Fellowship ($135,000), Canadian Institutes of Health Research, Aug 2017-Aug 2020

Bridge Funding ([Co-Investigator] $30,000), The Alberta Children's Hospital Research Institute for Child and Maternal Health Behaviour and the Developing Brain Theme, Jan 2019-Jan 2020

Research Award in Neuroanesthesia ([Co-Investigator], $10,000), Canadian Anesthesiologists' Society, May 2018-May 2019

Health Outcomes Improvement Fund ([Co-Investigator] $50,000) Maternal Newborn Child & Youth Strategic Clinical Network, Mar 2017-Mar 2019

Published Referred Papers

1. Salberg S, Noel M, Burke N, Vinall J, Mychasiuk R (2020). Utilization of a rodent model to examine the neurobiological effects of early life adversity on adolescent pain sensitivity. Developmental Psychobiology, 62(3):386-99.

2. Pavlova M, Graham SA, Jordan A, Chorney J, Vinall J, Rasic N, Brookes J, Hoy M, Yunker W, Noel M (2019). Socialization of pain memories: a comparative analysis of parent-child reminiscing about past events involving pain and sadness. Journal of Pediatric Psychology, 44(6):679-91.

3. Fischer S, Vinall J, Pavlova M, Graham S, Jordan A, Chorney J, Rasic N, Brooks JT, Hoy M, Yunker WK, Noel M (2019). Role of anxiety in young children's pain memory development following surgery. Pain, 160(4):965-72.

Chapters

1. Grunau RE, Miller JV, Chau CMY (in press). Long-term effects of pain in children, Chapter 4 in the Oxford Textbook of Pediatric Pain 2nd Edition, Oxford University Press, New York, NY.

2. Pavlova M, Miller JV, McGrath PJ, Noel M (in press). Pediatric chronic pain and mental health, Chapter 15 in the Oxford Textbook of Pediatric Pain 2nd Edition, Oxford University Press, New York, NY.

Papers Under Review

1. Miller JV, Andre Q, Timmers I, Simons L, Rasic N, Lebel C, Noel M (under review). Posttraumatic stress symptoms and brain microstructure in youth with chronic headaches. Neuroimage: Clinical.

2. Miller JV, Chau V, Synnes A, Miller SP, Grunau RE (submitted). Early brain development and maternal behavior in relation to neurodevelopmental outcomes at 3 years in children born very preterm. Brain.

Oral Presentations

1. Miller JV, McPeak A, Spencer A, Rasic N, Noel M, Jones K, Hai T, Epping K, Walker A, Bousman C, Syed N, MacMaster F, Rice T (June 2020). [Selected for the Richard Knill Research Oral Competition] Cognitive and behavioral changes following exposure to either sevoflurane- or propofol-based anesthesia in children undergoing MRI. Canadian Anesthesiologists' Society Annual Meeting, Web Presentation.

2. Miller JV (June 2020). The winding road to becoming an Assistant Professor (Invited Presentation). Cyber Pain in Child Health (PICH): A Virtual Mentorship Panel for PICH Trainees, Web Presentation.

3. Miller JV (March 2020). PTSD symptoms and chronic pain in youth: shared neurobiology as a mutually maintaining mechanism (Invited Presentation). Stress Retreat 2020, Kananaskis, AB.

4. Miller JV (February 2020). Mechanisms underlying the transition to chronic pain. Calgary Pediatric Pain Seminar (Invited presentation). Calgary, AB.

5. Vinall J (June 2019). Effects of pain and anesthesia on the developing brain (Invited Presentation). Online Neonatal Conference 2019, GOLD Learning: Online Continuing Education.

6. Vinall J, Simons L, Timmers I, Rasic N, Noel M (April 2019). PTSD symptoms and chronic pain in youth: shared neurobiology as a mutually maintaining mechanism (Symposium). Annual Canadian Pain Society Scientific Meeting, Toronto, ON.

Posters

1. Miller JV, Andre Q, Timmers I, Simons L, Rasic N, Lebel C, Noel M (May 2020). Early life trauma and alterations to brain structure underlying the chronification of headaches in youth. Canadian Pain Society 41st Annual Scientific Meeting. Calgary, Alberta.

2. Swanson V, Miller JV, Barrie K. Chronic Pain in LGBTQ2S+ Youth: A Scoping Review (May 2020). Canadian Pain Society 41st Annual Scientific Meeting. Calgary, Canada.

3. Rasic N, McPeak A, Vinall J, Rayner L, Noel M (June 2019). Changes in parent protective responses influence changes in child functioning and pain acceptance over the course of intensive pain rehabilitation. 12th International Symposium on Pediatric Pain. Basel, Switzerland.

4. Rasic N, Rayner L, Vinall J, McPeak A, Noel M (June 2019). Parent outcomes and parent perception of youth outcomes following intensive pediatric chronic pain rehabilitation at the Alberta Children's Hospital. 12th International Symposium on Pediatric Pain. Basel, Switzerland.

5. McPeak A, Rasic N, Vinall J, Rayner L, Noel M (April 2019). Parent protective behaviors influence youth pain-related outcomes following intensive pain rehabilitation. 40th Annual Canadian Pain Society Scientific Meeting. Toronto, ON.

6. Rayner L, Rasic N, Vinall J, McPeak A, Noel M (April 2019). Improvement in outcomes of parents of youth with chronic pain following intensive pain rehabilitation at the Alberta Children's Hospital. 40th Annual Canadian Pain Society Scientific Meeting. Toronto, ON.

7. Varshney V, McPeak A, Vinall J, Rasic N, Noel M (April 2019). Sociodemographic factors in Alberta's pediatric pain rehabilitation program. 40th Annual Canadian Pain Society Scientific Meeting. Toronto, ON.

Supervision

1. Undergraduate Health Sciences Summer Student Jen Guo (May 2020 – August 2020)

    Project: Literature review of the effects of surgery and anesthesia exposure on the brain and neurodevelopmental outcomes of infants born very preterm.

2. Medical Resident, Ryden Armstrong (April 2020 – Present)

    Project: Decreases in neural hyperactivity in response to emotional expressions following pediatric Intensive Pain Rehabilitation.

3. Medical Resident, Joel Janssen (March 2020 – Present)

    Project: Posttraumatic stress symptoms and pain sensitization in youth with chronic pain.

4. Undergraduate Neuroscience Student, Karen Cobos (Feb 2020 – Present)

    Project: The influence of parent and youth trauma symptoms on brain activity and headache chronicity in youth.

5. Medical Resident, Christopher Durr (Jan 2020 – Present)

    Project: Thalamic changes associated with improved outcomes in youth undergoing Intensive Pain Rehabilitation.

6. Medical Student, Vanessa Swanson (Nov 2019 – Present)

    Project: Chronic Pain in LGBTQ2S+ youth: a scoping review.

Knowledge and Technology Translation

Symposium Speaker, Teachers Convention, Calgary AB (February 2020).

    Experience: Speaking to local teachers about, "A Neuroscience Perspective of a Child's Brain," for the Teacher's Convention Symposia entitled, "Supporting Wellness in the Classroom: Brains, Pains & Mental Health."

Additional Research Experience

Bachelor of Health Sciences Mentorship Program, Cumming School of Medicine, University of Calgary, Calgary AB (October 2017 – Present).

    Experience: I was contacted to partake in the Bachelor of Health Sciences (BHSc) Mentorship Program, which matches undergraduate students with a professional contact. Over the course of 2-3 meetings, students gain insight into their career path of interest. Number of mentees: 5.

Internal Peer Reviewer, Graduate Science Education, University of Calgary, Calgary AB (September 2017 – Present)

    Experience: Internal review of graduate student applications for Tri-council awards. This position requires one-on-one mentorship with students to improve the quality of their applications. Number of applications reviewed: 3.

Memberships

Full Member of the Hotchkiss Brain Institute (May 2020 – Present)

Full Member of The Mathison Centre for Mental Health Research & Education (April 2020 – Present)

Full Member of the Alberta Children's Hospital Research Institute (February 2020 – Present)

Pain in Child Health Faculty (January 2020 – Present)

Member of the International Association for the Study of Pain (January 2020 – Present)

Member of the Canadian Pediatric Anesthesia Society (January 2020 – Present)

Member of the Canadian Anesthesiologists' Society (January 2020 – Present)

Member of the Canadian Pain Society (November 2018 – Present)