

Department of  
Critical Care Medicine  
Calgary

# **DEPARTMENT OF CRITICAL CARE MEDICINE**

## **2018 ANNUAL REPORT**



# Alberta Health Services

## OUR VISION

Healthy Albertans.  
Healthy Communities.  
**Together.**

## OUR MISSION

To provide a patient-focused, quality health system that is accessible and sustainable for all Albertans.

## OUR VALUES

### compassion

We show kindness and empathy for all in our care, and for each other.

### accountability

We are honest, principled and transparent.

### respect

We treat others with respect and dignity.

### excellence

We strive to be our best and give our best.

### safety

We place safety and quality improvement at the centre of all our decisions.



# University of Calgary

## VISION

We partner with University leaders to support the "Eyes High" vision.

"Eyes High" is the University of Calgary's bold and ambitious vision to become one of Canada's top five research universities, grounded in innovative learning and teaching and fully integrated with the community of Calgary, by the university's 50th anniversary in 2016.

## MISSION

By creating and delivering exemplary human resources services, processes, and outcomes we contribute to and share in the University's mission and goals to:

- Sharpen focus on research and scholarship;
- Enrich the quality and breadth of learning;
- Fully integrate the university with the community.

## VALUES

The strategy also articulates eight core values shared by the university community: curiosity; support; collaboration; communication; sustainability; globalization; balance; and excellence.

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## Cumming School of Medicine: Strategic Plan 2015-2020

## VISION

Creating the future of health

## MISSION

We must fulfill our social responsibility to be a school in which the common goal of improved health guides service, education and research. We must foster the collective pursuit of knowledge and its translation, through education and application, to better the human condition.

## VALUES

Excellence | Collaboration | Engagement | Respect

## STRATEGIC GOALS

We are committed to maintaining the public's trust and respect as a premier academic health science centre by meeting the following goals:

- Serve our diverse communities by understanding and responding to their health needs and by effectively stewarding the resources entrusted to us by Albertans.
- Generate knowledge that has both local and global impact by fostering novel collaborative alignments among basic and clinical scientists, physicians and educators.
- Train the next generation of health-care pioneers and providers by rejuvenating the education and career development of biomedical innovators.

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## Message from the Department Head



I'm pleased, on behalf of my colleagues, to present our department's annual report. Our report details important work and accomplishments. We are a clinical and academic department where clinical programs, education, and research are seamlessly integrated to provide critically ill patients with progressively better care and health. Our greatest resource are our people who are dedicated to the service of others. This report will outline a few of our collective accomplishments including:

- The breadth of expertise of our ICU medical staff
- Clinical Programs
- Education
- Research

Caring for patients and their families is a great privilege. With that privilege comes significant responsibility. I hope we demonstrate through our work that we are meeting our obligations.

**Dr. Tom Stelfox, MD, PhD, FRCPC**

# Department of Critical Care Medicine

## Strategic Plan: 2019 – 2024

### OUR VISION

Exceptional patient-and-family-centered critical care.

### OUR MISSION

We lead critical care medicine through our commitment to clinical care, education and research.

Our definition of critical care excellence is: best clinical outcomes, exceptional patient and family experience and zero preventable patient and staff harm.

### GUIDING PRINCIPLES

Excellence	Safety	Collaboration	Respect	Accountability
We exceed expectations and push boundaries in pursuit of better care.	We mitigate risk of physical and psychological harm.	We empower each other and work together.	We demonstrate mutual admiration for the experience and expertise of others.	We do what we say and take ownership for the outcome of our actions.
<i>How do we know that we are following our guiding principles?</i>				
Nationally recognized for best care practices and best patient outcomes.	We report near misses and adverse events and focus on system improvement.	Teamwork is evident in our clinical care, education and research.	DCCM is regarded by members to be a great place to work.	Clear expectations & regular feedback.

FOCUS AREA	GOAL	OBJECTIVE	ACTIVITIES	TARGET
CLINICAL CARE	1. Exceptional patient care that uses best practices to optimize patient health outcomes.	1. Develop a framework for quality management.	<ol style="list-style-type: none"> <li>1. Identify the needs of patients and clinicians to optimize patient care, and co-develop metrics to measure performance.</li> <li>2. Develop a strategy to align clinical guidelines, pathways and performance metrics with current and future clinical information systems.</li> </ol>	<ul style="list-style-type: none"> <li>• Develop clinical metrics by July 2020.</li> <li>• Develop and implement a clinical care review &amp; feedback strategy by July 2021.</li> </ul>

FOCUS AREA	GOAL	OBJECTIVE	ACTIVITIES	TARGET
EDUCATION	1. Successful transition of residency program to Competence By Design (CBD).	1. Successful implementation of CBD transition plan.	<ol style="list-style-type: none"> <li>1. Train all members on the fundamentals of CBD and support them during the transition.</li> <li>2. Evaluate effectiveness of the CBD program.</li> <li>3. Incorporate educational activities into the accountabilities of all DCCM members.</li> </ol>	<ul style="list-style-type: none"> <li>• Implement member development sessions by July 2019.</li> <li>• Develop &amp; implement CBD metrics by July 2020.</li> <li>• Develop a local CBD evaluation plan by July 2020.</li> </ul>
	2. Professional development to support DCCM members pursuit of excellence.	1. Continuous growth and development of DCCM members.	<ol style="list-style-type: none"> <li>1. Solicit feedback to inform professional development opportunities.</li> <li>2. Establish standards for participation in DCCM professional development activities.</li> <li>3. Foster mentorship relationships for all members.</li> </ol>	<ul style="list-style-type: none"> <li>• Professional development plans for all members by September 2019.</li> <li>• All DCCM members to have a mentor by July 2020.</li> </ul>

FOCUS AREA	GOAL	OBJECTIVE	ACTIVITIES	TARGET
RESEARCH	1. Build research infrastructure.	1. Maximize impact of departmental investments in research.	1. Complete implementation of existing DCCM Clinical Research Strategic Plan. 2. Develop and implement a framework for prioritizing investments in research that leverage existing departmental strengths <sup>##</sup> . 3. Develop a strategy to identify and leverage funding and philanthropic opportunities.	<ul style="list-style-type: none"> <li>Develop &amp; implement departmental research metrics by July 2019.</li> <li>25% increase in No. peer reviewed publications by 2024 (compared to 2019)<sup>*</sup>.</li> <li>10% increase in grant funding \$ by 2021 (compared to 2019)<sup>^</sup>.</li> <li>50% increase in No. members involved in research projects by 2021 (compared to 2019)<sup>#</sup>.</li> <li>Develop a fundraising strategy by July 2020.</li> <li>Develop a research training strategy by July 2021.</li> </ul>
	2. Increase member capacity for research.	1. Capacitate members to engage in research.	1. Incorporate research activities into the accountabilities of all DCCM members. 2. Encourage development of research teams among members with synergistic interests and expertise. 3. Develop a research training strategy.	

\* Number of publications with at least one DCCM member in the authorship list (no double counting for multiple DCCM authors)

<sup>^</sup> Grant funding awarded to DCCM members as Nominated Principal Investigator or Principal Investigator (no double counting for multiple DCCM members)

<sup>#</sup> Involvement in research spans a spectrum from identifying eligible patients, consenting eligible patients, being site Principal Investigator, to being a study Principal Investigator.

<sup>##</sup> Immunology/inflammation, neurocritical care, medical education, health services research and recovery from critical illness.

FOCUS AREA	GOAL	OBJECTIVE	ACTIVITIES	TARGET
LEADERSHIP	1. Develop a just culture. <sup>1</sup>	1. Provide leadership and support for a just culture.	1. Leadership communication to all DCCM members that patient and staff safety is a departmental priority. 2. Discuss quality of care at every ICU executive meeting.	<ul style="list-style-type: none"> <li>Develop a leadership strategy for implementing vision, mission &amp; guiding principles into all DCCM activities.</li> <li>Develop &amp; implement an evaluation strategy for a just culture by July 2020.</li> </ul>
		2. Align all quality assurance activities with just culture principles.	1. Educate all members on the principles of just culture, and their application to DCCM. 2. Task the Quality Assurance Committee to champion just culture principles that includes patient and clinician perspectives.	

<sup>1</sup> AHS Just Culture philosophy supports an environment where everyone feels safe, encouraged, and enabled to discuss quality and safety issues where reporting and learning are key elements. This means that reporting is conducted within a psychologically safe environment where there is demonstrated respect and support for the individual, and the potential for human and systems fallibility is acknowledged. Everyone can trust that those within the organization will demonstrate, through their behaviours and decisions, a fair and consistent approach to responding to issues raised.

# Awards & Recognitions

## Recognitions

**Dr. Braedon McDonald** is nominated for 2 prestigious awards, Banting award and Borrough Welcome award.

**Dr. Amanda Roze des Ordon**s received the Outstanding Commitment to Residency Education Award at the 2018 PGME Appreciation Awards. This award recognizes the outstanding contributions made by an individual to Residency Education through teaching, administration, program development and/or contributions to educational research which benefit residency education.

She is the current program director for the new palliative care residency program, she plays an important role in the continuing professional development series offered to current faculty to update their education skills, and she has had approximately 15 publications in the domain of medical education/end-of-life care in the past 4 years (including 4 since the start of this year). In particular she was recognized for her work in competency based education in communication. Her program for ICU fellows (and others) is an excellent example of competency based education changing from 'skills in communication' to 'skillful communication'.

**Dr. Jason Waechter**- Student's Union Teaching Excellence Awards Winner 2017/18

**Dr. Jason Waechter**- Top of the hill nomination for doing such an amazing job with the patient's and their family.

### Critical Care Medicine Teaching Awards:

**Dr. Chip Doig** -Dean Sandham 2017 Clinical teaching award

**Dr. Dan Zuege** -2017 Rotating Resident Teacher of the Year Award

**Dr. Ken Parhar** -2017 Research Mentor Award

**Dr. Christopher Noss (Anesthesia)**-2017 Off-Service Preceptor of the Year Award

**Dr. Jonathan Gaudet**- 2017 Outstanding Physician of the Year award. In recognition of excellent medical/clinical expert, advocate for patients, scholarly Knowledge, professionalism and leadership and excellence in communication and collaboration.

**Dr. Kirsten Fiest** was recognized with an O'Brien Institute Emerging Research Leader Award.

**Dr. Kirsten Fiest** is a recipient of a Top 40 under 40 award. <https://www.avenuecalgary.com/City-Life/Top-40-Under-40/2018/Dr-Kirsten-Fiest/>

**Dr. Richard Novick**, is a recipient of 2018 "postgraduate teacher of the year award" in Cardiac Surgery. The jury for this was the Cardiac Surgery residents.

**Dr. Dan Niven** on having his research highlighted by the New York Times. This is a huge accomplishment and reflects the impactful work that members of our Department are doing. <https://www.nytimes.com/2018/09/10/upshot/its-hard-for-doctors-to-unlearn-things-thats-costly-for-all-of-us.html>

# Awards & Recognitions

## UME Teaching awards:

A number of faculty are recipients of awards within UME (demonstrating our collective impact and commitment: as a department, we are punching above our weight. Here are the most recent awards (in alphabetical order):

### Dr. Luc Berthiaume

- Associate Dean's Letter of Excellence for Lecturing
- Associate Dean's Letter of Excellence for Small Group Teaching
- Associate Dean's Letter of Excellence for Clinical Core
- Platinum Award for Teaching

### Dr. Philippe Couillard

- Associate Dean's Letter of Excellence for Small Group Teaching
- Associate Dean's Letter of Excellence for Clinical Core
- Platinum Award for Teaching

### Dr. Chip Doig

- Associate Dean's Letter of Excellence for Clerkship Teaching

### Dr. Mike Dunham

- Associate Dean's Letter of Excellence for Clerkship Teaching

### Dr. Jonathan Gaudet

- Associate Dean's Letter for Excellence for Clinical Core
- Bronze Award for Teaching

### Dr. Ken Parhar

- Associate Dean's Letter of Excellence for Clinical Core

### Dr. Amanda Roze des Ordons

- Bronze Award for Teaching

### Dr. Jason Waechter

- Associate Dean's Letter of Excellence for Lecturing
- Silver Award for Teaching

### Dr. Dan Zuege

- Associate Dean's Letter of Excellence for Clinical Core
- Bronze Award for Teaching

**Dr. Andre Ferland and Dr. Philippe Couillard** were recognized as Top 10 preceptors.

The collective recognition of our faculty is really amazing. It's also really impressive that department members have been recognized across all aspects of UME teaching!

## Promotions:

The Promotions Committee at the Cumming School of Medicine unanimously recommended Dr. Andre Ferland for promotion to Clinical Professor.



# Awards & Recognitions

## Graduate Education:

**Ms. Kyla Brown**, a Master's student with Tom Stelfox and Kirsten Fiest, was successful in the defense of her thesis entitled: Evaluating the Association between Delirium in the Intensive Care Unit and Subsequent Neuropsychiatric Disorders Post-Stay.

**Ms. Jamie Boyd**, a Master's student with Tom Stelfox who was successful in the defense of her thesis entitled: Development and Evaluation of Risk Models to Predict Readmission or Death Following Discharge from an Adult General Systems Intensive Care Unit.

**Mr. Ian Blanchard**, a doctoral student in our program, was successful at both his proposal

defense, and his Field of Study (Candidacy Exam) defenses: these are the final major steps prior to the actual dissertation defense which is planned for next summer.

A former graduate student (**Suk Joon Ji or as we know him Michael**) was accepted into medical school at the U of C...I'm sure we all soon be seeing him in medical skills, Course 3, clinical correlations, and shadowing.

**Dan Lane** (a former graduate student of Tom Stelfox and one of our former research coordinators), recently completed his PhD with Damon Scales at the U of T, was also admitted to the medical school.

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## Physician Leadership:

At the conclusion of the fall AMA Representative Forum, **Dr. Paul Boucher** was recognized for his 8 years of service on the AMA Board. This has been a considerable time commitment for Paul. His leadership, and broad understanding of hospital and community based health care, has been greatly appreciated at the AMA. He is an excellent representative of our discipline.

**Dr. Luc Berthiaume** has been an instrumental force in developing the Specialty Care Alliance in the AMA. Together with Daryl LaBuick from the Primary Care Alliance, Luc is leading an initiative on Transitions of Care in the AMA. This included a special session at the AMA presenting the Greg Price video with Greg's father.

**Dr. John Kortbeek** received a Medal for Distinguished service from the AMA at the Fall Representative Forum. Dr. John Kortbeek has been repeatedly honored for his work as a teacher, as a surgeon and as a clinician in the areas of trauma, surgery and critical care. His career has been dedicated to the care of patients and their families, to continuously raising the standards of care in surgery, and to teaching and training young physicians and surgeons. He has led many improvements in the organization and processes of care in Alberta, including developing and implementing trauma center standards; establishing a trauma system with adult and pediatric tertiary trauma centers in Edmonton and Calgary and five provincial regional trauma centers; and introducing trauma system accreditation standards across Canada. His influence has been felt across the country – indeed, around the world. Dr. Kortbeek introduced a number of changes to update the Advanced Trauma Life Support Program, curriculum, policies and procedures. These changes helped ensure the ongoing success and promulgation of a program which has had a tremendous impact on trauma care around the world. He has personally taught and lectured in over 30 countries. Dr. Kortbeek is in demand as a visiting lecturer and professor across the country.

# Awards & Recognitions

## 2018 Calgary Zone Department of Critical Care Medicine Awards

ICU Colleagues nominate peers from each of our ICU's. A selection committee representing all disciplines chooses site/zonal recipients; their colleagues must hold in the highest regard. Following are the winners of the site (and zone) awards.

- Bow Award -Early Career Achievements - PLC ICU, Zonal, **Kayla Hoffman**
- Crowsnest Award -Caring for your Colleagues - FMC ICU, Zonal, **Tanya Harvey**
- Mount Alberta Award -Excellent Lifestyle & Wellbeing - PLC ICU, Zonal, **Tina Roe**
- Mount Assiniboine Award -Outstanding Clinician - PLC ICU, Zonal, **Maureen Tosh**
- Mount Robson Award -Outstanding Patient/Family Centered Care - PLC ICU, Zonal, **Chantelle Majkovic**

# Clinical Programs

## Foothills Medical Centre Intensive Care Unit



The Foothills Medical Centre (FMC) ICU continues to support the largest hospital in Calgary by providing intensive care, code blue and outreach services to over 1000 inpatient beds that support many key programs for the zone; neurosurgery, stroke, hepatobiliary surgery, head and neck cancer reconstructive surgery, burn care, thoracic surgery, and the bone marrow transplant programs, to name a few. The unit is physically organized into three separate pods: each pod has 12 physical spaces and there are currently 28 funded beds.

Patients and families are embraced as partners in care at the FMC ICU and we encourage their participation in daily interdisciplinary rounds. We have a very active and engaged Patient and Family Centred Care Committee with three Family/Patient Advisors as members. The last year has focused on improving awareness of patient personal preferences through a “Getting to Know Me” tool, in addition to Name, Occupation and Duty (NOD) identification and bedside whiteboard use. The committee is currently working on improving family presence and visitation processes through creation of a unit based guideline. Future initiatives will include improving the signage and resources provided to families upon admission.

Addressing the incidence and prevalence of delirium is one of the main priorities at FMC ICU. The adoption and use of delirium screening tools, delirium management guidelines, and multiple targeted interventions has become part of daily practice with a

focus on early mobility in this last year. We continue to work closely with our colleagues across the province through the Critical Care SCN Delirium Collaborative.

In the fall of 2017, the zone wide model change for the ICU Outreach Program was implemented at FMC, moving from a physician led to an RN/RRT ramp up model. This significant change has been successful to date and evaluation is ongoing. In 2018 the Outreach Team responded to 724 Code 66 calls on the site.

In an effort to create a workplace environment where all staff feel empowered to communicate with each other, town hall meetings for the unit occur quarterly. These meetings provide a forum for feedback on quality measures and safety issues and are meant to encourage open, honest dialogue between all team members.

We have been working closely with the Cancer SCN on the early recovery after surgery program (ERAS) for major head and neck cancer surgery. This program has been very successful demonstrating many positive metrics such as improved outcomes, reduced complications and hospital stays.

Two specific critical care programs within FMC ICU that support all Southern Alberta include the Neurocritical Care program and the Burn program for management of critically injured burn patients.

One of our ICU pods has been specifically designated to support trauma and neurologically injured patients. The neurocritical care program has three lead Neurointensivists who work alongside specialized Registered Nurses, Registered Respiratory Therapists and Clinical Nurse Educators to provide comprehensive care that is tailored to the patient through multi-modality monitoring. This includes monitoring of intracranial pressure, cerebral temperature and oxygenation levels and continuous EEG. This team approach helps to provide the highest standard of care to this complex patient population.

## Clinical Programs

FMC ICU also supports care of critically injured burn patients for Southern Alberta. Through close collaboration with the FMC Burns & Plastics Unit, we ensure burn patients are supported with standardized and evidence based best practice.

Research and education are important activities across the unit to improve our processes, disseminate good practices and promote multidisciplinary collaboration.

***Dr. Philippe Couillard, FMC Site Director***

***Kelly Coutts, FMC Patient Care Manager***

## Foothills Medical Centre Cardiovascular Intensive Care Unit

Unit 94 (CVICU) continues to provide high quality care for the post cardiac surgery patients without restriction or postponement despite the increasing demands for cardiac surgery, through amazing dedication, teamwork, and collaboration.

The Cardiovascular Intensive Care Unit (CVICU) at the Foothills Medical Center, is the only CVICU serving Southern Alberta. With almost 1600 admissions in 2018, and projected increasing demands, the CVICU was increased from 14 to 16 funded beds. In September 2018 a new satellite unit, PCU 104, opened and the new combined physical capacity is 22 beds.

Over the past year the FMC CVICU was one of the first in Canada to implement new Cardiac Arrest after Cardiac Surgery protocol adopted from the new European Resuscitation Council guidelines. This was a large multidisciplinary collaborative project which utilized simulation as an integral part of the roll-out, training of over 100 Interprofessional team members. Other ongoing initiatives include patient delirium, decubitus ulcer prevention and donation after cardiac death. In February of 2018 a multi-unit, multidisciplinary team reviewed current sternal precaution guidelines following cardiac surgery and are excited to launch a new initiative in early 2019.

The CVICU patient and family centered committee, continues to build the foundation to include patients and family members as partners in healthcare. This multidisciplinary team has

implemented communication initiatives to improve the CVICU experiences of patients and families. Some of which include, pagers for waiting family members, leadership rounding and standardizing first communication with family members.

Our dynamic multidisciplinary CVICU team continues is successful work in quality improvement projects including:

- Sternal precaution protocols
- Prevention of decubitus ulcers
- Pain and sedation protocols (updated)
- Peripheral nerve block management for minimally invasive mitral valve surgery
- Identification and management of delirium post op concentrating on early mobilization
- Management of cardiac arrest post sternotomy
- Standardization of VV and VA ECMO care pathways
- Early removal of Foley catheters
- Airway management protocols (AMP)

The CVICU continues to support the Extracorporeal Life Support Program for southern Alberta. A new ExtraCorporeal Membrane Oxygenation (ECMO) guideline coincided with the launch of the Cardiohelp ECMO systems recently acquired with the assistance of the Calgary Health Trust. There were 21 patients treated with ECMO in 2018.

***Dr. Andre Ferland, FMC CVICU Site Director***  
***Kevin Orton, FMC CVICU Patient Care Manager***  
***Kari France, FMC CVICU Unit Manager***

# Clinical Programs

## Peter Lougheed Centre Intensive Care Unit



The Peter Lougheed Intensive Care unit supports patients with life threatening medical and surgical illnesses as well as limb threatening situations.

The PLC ICU is the second largest intensive care unit in the Calgary zone and currently has 18 funded medical/surgical ICU beds with the capacity to expand to 22 physical spaces during times of overcapacity. We support the 500+ bed inpatient and outpatient units at the Peter Lougheed Centre as required for patients experiencing a sudden decline in health status through our physician consult service, 24/7 Code Blue team (cardiac and/or respiratory arrest) or our Outreach team. Our Outreach team is available for inpatient as well as outpatients who urgently need to be assessed. The outreach team also completes follow-up visits on those patients who require them when discharged from our ICU to the inpatient units.

We are a closed unit, therefore all admissions to the unit are accepted by our intensivists. The PLC ICU is a teaching unit that includes Fellows, various levels of Residents, Clinical Clerks, Respiratory Therapy and Nursing students in their final practicum and the advanced stream of critical care from Mount Royal University.

The ICU also supports patients requiring ICU care for the Southern Alberta Renal Program, which covers southern Alberta, southern BC and areas of Saskatchewan.

Additionally, the PLC also houses the Chronic Ventilator Program for the Calgary zone. The Peter Lougheed is the Vascular Center for Southern Alberta and Eastern British Columbia, so the ICU frequently supports these complex patients. The site also houses the ARCH (addiction recovery community health) team.

On average we have over 83% of our beds occupied in the year with peaks of 116% occupancy. PLC patients on average, are invasively ventilated for 6.1 days and 7.5 days for noninvasive ventilated patients. The Peter Lougheed Hospital has around 450 days annually of continuous renal replacement therapy running. Most of our population has multisystem organ dysfunction, sepsis, ILI (influenza like illness) or complicated vascular patients with other health issues. We also admit all vascular patients for limb salvage therapy requiring catheter directed TPA therapy.

Our current staffing model consists of a multidisciplinary team including Registered nurses, Registered Respiratory Therapists, Health Care Aides support by Clinical Nurse educators, Unit Clerks, Dietician, Physiotherapist, Occupation therapist, Clinical Pharmacist and a Social Worker. We also have access to the zonal shared resource of a Clinical Nurse Specialist and a QI Specialist that we can consult as needed and who provide support to the various initiatives either on site or as part of the Calgary zone.

We continue to work on a number of Quality Improvement projects, including Delirium, OR to ICU handover and ICU to OR handover, and DCD (donation after cardiac death).

## Clinical Programs

The PLC ICU is focused on patient and family centered care. We encourage family participation during rounds conducted by the team. We have open visiting and open doors except at night after 2100 hrs.

We are actively participating in many varied research projects within the Calgary zone and the University of Calgary.

***Dr. Luc Berthiaume, PLC Site Director***

***Patty Infusino, PLC Patient Care Manager***



# Clinical Programs

## Rockyview General Hospital Intensive Care Unit



The Rockyview Hospital is a 650 bed hospital with over 80,000 emergency visits and the center of excellence for urology in Southern Alberta.

The Rockyview ICU/CCU is a combined unit with 10 beds allocated to the Intensive Care area and 7 beds to the Coronary Care area. The day to day operations for both units is overseen by the manager and unit manager in conjunction with 24/7 clinicians.

All admissions to the unit are accepted by our Intensivists, as it is a closed unit. The RGH is a teaching unit; medical coverage is also supported by residents, medical students, ICU fellows and extenders for CCU.

The Outreach team at RGH does over 400 calls per year on the site. The new Outreach model relies on the RN/RT team to be the first point of contact with the Most Responsible Health Practitioner. This new model ensures that ICU physicians/ delegates are only called when necessary.

Our current staffing model consists of a multidisciplinary team including Registered Nurse, Registered Respiratory Therapists, Nursing attendants, clinical Pharmacists, Allied Health, and unit clerks who are supported through clinical nurse educators.

The ICU/CCU has been on the capital infrastructure list for many years with a shelled in space above the emergency ready for construction.

The unit is very active in the following initiatives which are supported by the Zone Critical Care

resources including a Quality improvement specialist and Clinical Nurse specialist.

### Patient and Family Centered Care

- Time to Contact
- Family presence at Rounds
- Critical Care Information wall/ Digital Signage
- Family Journals / Pagers
- Family Room upgrade
- Visitor/Patient Internet access
- End of Life Care Champions and Checklist
- White Rose – Compassion Cart program
- Leadership Rounds
- Donation After Cardiac Death

### Quality Improvement Initiatives

- Delirium Assessment and Management Processes
- Readiness to Mobilize Assessment
- Early Mobilization
- Medication Reconciliation on Admission, Transfer and Discharge
- Safety Audits
- Safety Rounds
- Patient and Family Satisfaction Audits
- iPUP survey (PRESSURE ULCER Prevention and Management processes survey)
- Braden Scoring on admission and daily
- Hand Hygiene Auditing
- VTE (venous thromboembolism prophylaxis) audits
- Fall Risk assessment
- Falls Prevention
- Least Restraints
- Hazardous Medication
- Collaborative Approach to Arterial Line Insertion Project
- Inhaled Anesthetic Delivery Device Project – AnaConda
- Patient Care Rounds Improvement Project
- OR to ICU Handover Project

**Dr. Jessica C. Wang, RGH Site Director**

**Melissa Redlich, RGH Patient Care Manager**



# Clinical Programs

## South Health Campus Intensive Care Unit



The South Health Campus is the newest ICU/CCU in Calgary and celebrated its sixth birthday in February. The unit is a 10 bed ICU and 2 bed CCU that operates within the 4 pillars of the Campus: Innovation, Collaborative Practice, Wellness and Patient and Family Centered Care.

The ICU/CCU is a very collaborative team working toward achieving patient care goals. The nursing staff is comprised of all RNs along with Nurse Practitioners, Respiratory Therapists, Nursing Attendants, Service Workers, Unit Clerks, Physiotherapists, Dieticians, Pharmacists, Social Workers and Occupational Therapists. Our

Intensivist team are responsible for all patients within the ICU with Cardiology leading the CCU.

The ICU/CCU supports the site with an Outreach Team as well as a Code Blue Team.

### Unit Accomplishments

- Successful implementation of PLEX. Twenty seven patients received this therapy with 146 runs from May 1, 2018 – February 7, 2019
- Participation with the SCN Delirium Innovative Collaborative and subsequent unit work and practice changes. Provincially our unit was recognized as having the most improvement regarding delirium metrics within the ABCDEF bundle.
- Currently collaborating with OR teams in establishing the OR to ICU handover process at SHC with anticipated roll out Spring 2019
- Work initiated with Donation after Cardiac Death (DCD) with anticipated roll out February 28, 2019

***Dr. Juan Posadas, SHC Site Director***

***Rachel Taylor, SHC Manager***

## Quality & Safety Improvement

The DCCM Quality Assurance Committee (QAC) is a multidisciplinary multi-site committee within the AHS QAC framework. Chaired by Quality Improvement Medical Director Dr. Selena Au and Critical Care Executive Director Caroline Hatcher, QAC meets monthly to provide a mechanism to review clinical adverse events which may or does result in injury or harm to patients, family or staff. Events with contributing system factors undergo quality assurance reviews (QARs) facilitated by the QAC to generate recommendations that, if implemented, may mitigate risk to future patients. Figure 1 describes the DCCM Roadmap to Patient Safety to encompass the response to adverse events for improved patient care.

Since 2016 the DCCM QAC has completed 1 aggregate and 3 comprehensive QARs, with the last two completed in 2018. Of the total 17 recommendations, 2 were completed, 5 are in progress, and 10 have not been started. 5 of the recommendations were referred to external departments.

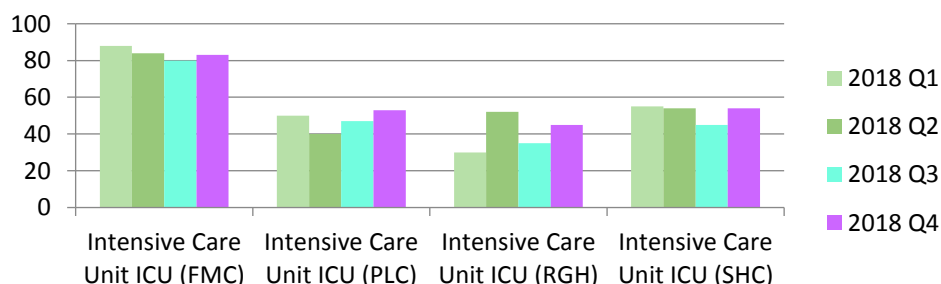
Functioning as a part of the DCCM QAC, the Mortality Working Group (MWG) partners with the Department of Pathology to review all deaths occurring in ICU or within 72 hours of ICU transfer or discharge. Systems findings from MWG meetings are brought to the QAC monthly for review and discussion to assess if further

investigation is required. Safety learnings from reviews are edited to protect confidentiality and shared with staff, patient, and families in summary newsletters. For the 2018 year, 34 patient safety cases with an additional 44 autopsies, have been presented under the zonal MWG format. Of these 78 cases, 16 were presented before the QAC committee for discussion and follow up.

A strong safety culture within the ICU promotes reporting any safety concerns directly to management and the Patient Safety office via the AHS Reporting & Learning System (RLS). The AHS RLS is a voluntary reporting system that provides an opportunity for staff/physicians to report hazards, close calls and adverse events with varying degrees of harm. All RLS reports are reviewed by management and/or medical leadership. A QAC Notifiable Events Guideline has been developed to guide and encourage staff in reporting events for review. RLS events that offer opportunities to improve system safety move forward to QARs.

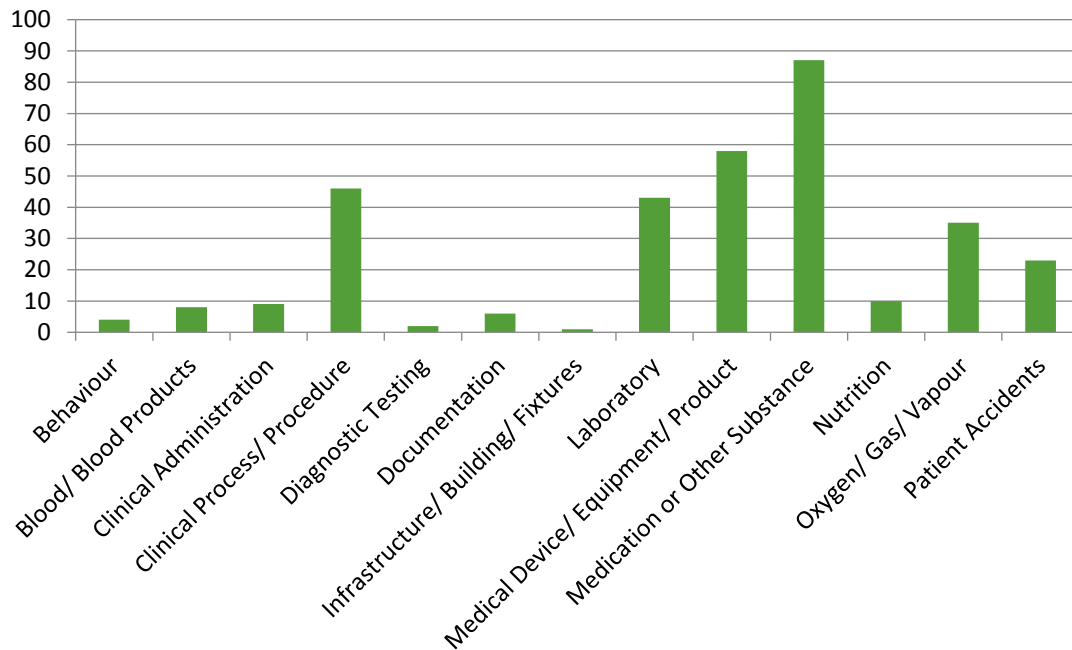
For 2018, 895 reports related to patients in the ICUs were submitted by staff and physicians. The number of reports received by each unit in each quarter is shown in the first figure. The second figure displays the trends in event types reported in all 4 adult ICUs. The subsequent figures display event types for each of the 4 adult intensive care units in the Calgary Zone.

Incidents by Location Details: Exact location and RLS: Date reported (Quarter)

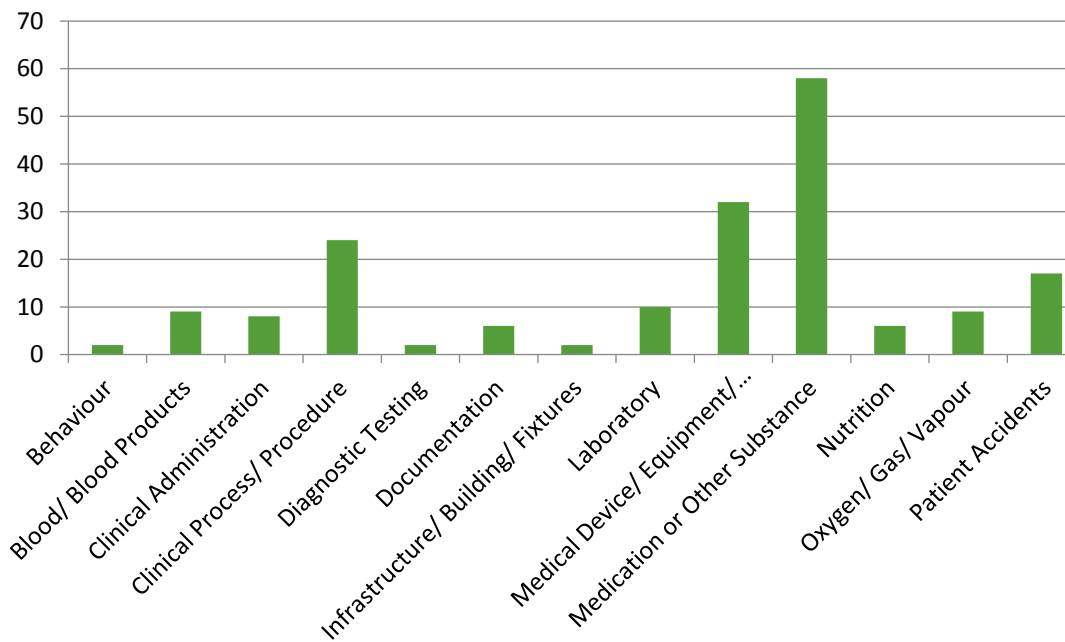


## Clinical Programs

### FMC Incidents by RLS: Event type

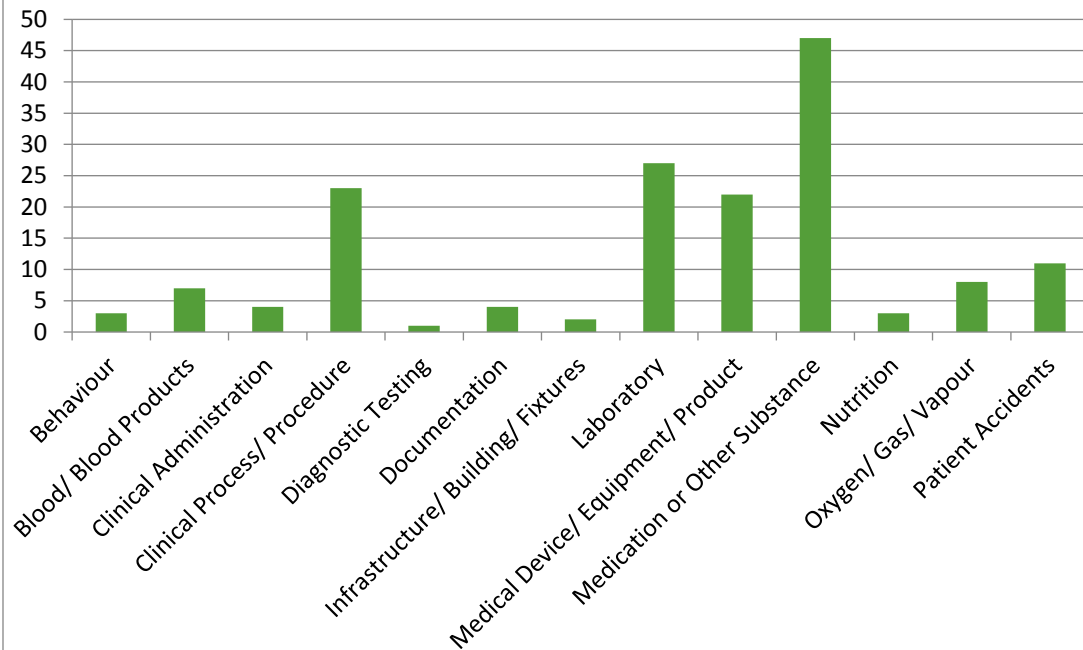


### PLC Incidents by RLS: Event type

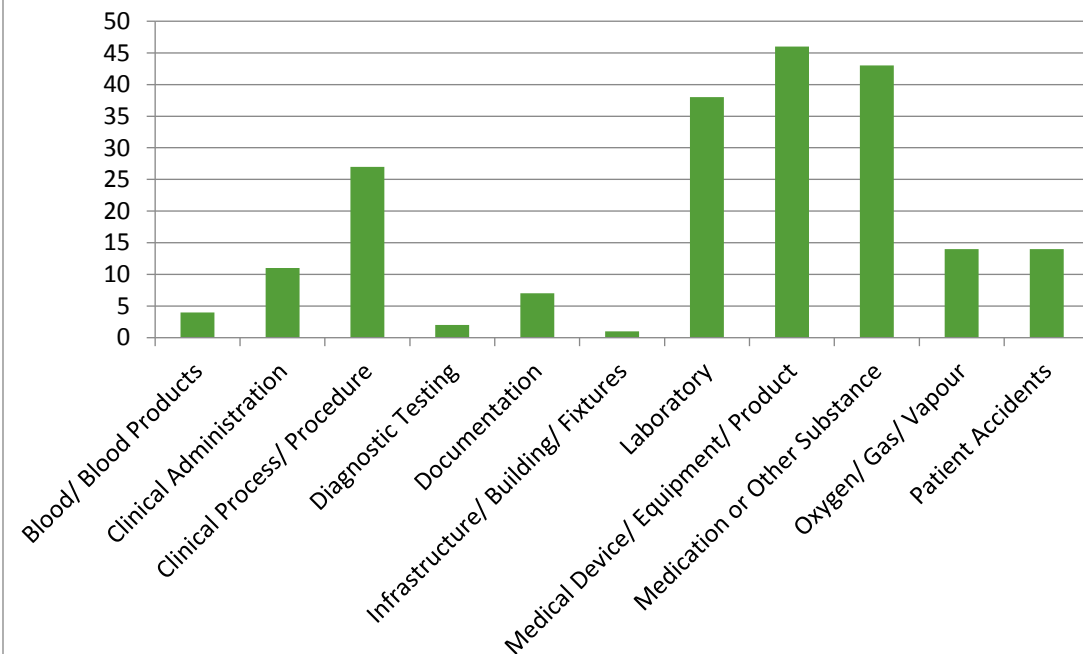


# Clinical Programs

## RGH Incidents by RLS: Event type



## SHC Incidents by RLS: Event type



## Quality Improvement

### Quality Improvement at a National Level

The Department of Critical Care Medicine (DCCM) is committed to excellence in patient care and supports initiatives that focus on quality improvement (QI). Improvement work includes sharing information with the community of providers locally, and with health care jurisdictions within and outside of Canada.

### Quality Improvement at a Local Level

The DCCM defines and prioritizes QI initiatives annually. Site leadership and Medical Directors from each ICU endorse and engage continuous improvement work. Every QI initiative has interdisciplinary representation at the table discussing the issues along with accountable leadership, partnering in and sponsoring the improvement work.

The interdisciplinary teams use tools from the Lean, 6Sigma, IHI Improvement Advisor, and Alberta Improvement Way (AIW) tool kits to guide the QI work. PROSCI change management principles are at the foundation of every QI project, supporting implementation of improvements at the front-line.

## Quality Improvement Priorities

### OR-ICU Handover Project Process

QAC reviews conducted in the former Calgary Health Region noted a system deficiency with the handover process from the Operating Room (OR) to the ICU (Intensive Care Unit). A recommendation was made to develop a standardized handover process to address this deficiency.

Development of a standardized inter-departmental handover process between OR, PACU, and ICU began at the Foothills Medical Centre (FMC) in November 2014 by an interdisciplinary team. Successful implementation of the standardized process occurred in April 2016.

Spread and development of the standardized OR to ICU handover process occurred at the Peter Lougheed Centre (PLC) in 2017. Concurrently, the PLC engaged in the successful development of the inverse handover process - ICU to OR. Implementation of both processes occurred in November 2017 with positive reviews.

The OR to ICU process continues to be relevant and important work across the zone as work continues at the South Health Campus (SHC) and Rockyview General Hospital (RGH). The SHC has been working diligently to tailor the process to be suitable for their environment; there is a plan to implement in the Summer of 2019. RGH has started work with their team and have plans to implement at the end of the year. The inverse process, ICU to OR process, will be completed at FMC, RGH and SHC.

### Review & Rebooting Reportable Events List

Patient safety event reporting is an integral component for detecting harms, near misses and clinical adverse events. In order to provide guidance and clarity as to what to report, work has been underway this past year to review and reboot the list of reportable safety events for the DCCM. The goal of this work is to provide frontline personnel with a succinct list of reportable events specific to the DCCM.

### Implementation of the ICU Transfer Summary

Research and QI methodology was used to define elements for an electronic medical transfer summary for the ICU. In collaboration with the Sunrise Clinical Manager (SCM) team, the ICU transfer summary developed in 2017 was and piloted and implemented in the summer of 2018. To support users with the adoption of the new medical transfer tool, education and audit feedback was provided. The quality of transfer summaries is being measured for completeness, availability at transfer and user ratings.

### Calgary Zone Patient and Family Centered Committee

Based on recommendations from the PFCC Steering Committee and approval from ICU Executive, site based PFCC committees were formed in early 2017.

The site based PFCC committees are composed of family advisors and interdisciplinary representation from the unit. The PFCC committees meet regularly and bring forward any opportunities for improvement to the QI Lead and ICU Executive. Site operational and medical leadership guide these meetings.

***Devika Kashyap, Quality Improvement Lead***

## Extracorporeal Life Support Program

Extracorporeal Life Support (ECLS) is a modality of life support used to oxygenate and remove carbon dioxide from the blood outside of the body in patients with catastrophic cardiac and respiratory failure. ECLS includes veno-venous extracorporeal membrane oxygenation (VV-ECMO), which is used to treat refractory respiratory failure, as well as veno-arterial extracorporeal membrane oxygenation (VA-ECMO), which is used to treat refractory cardiac failure.

ECLS has been provided at the Foothills Medical Center CVICU for several years. During the 2008/2009 H1N1 influenza epidemic there was a renewed interest in expanding the use of ECLS worldwide and also locally. Since then it has been used increasingly for refractory respiratory and cardiac failure. In 2015 a multidisciplinary ECLS committee was created to oversee and improve the delivery of ECLS within Calgary. The objectives of the ECLS committee have been to prioritize the provision of this resource intensive modality to those patients most likely to benefit, whilst improving safety and reducing morbidity during ECLS runs. 2016 was the first full year of the formalized ECLS program.

In 2018, 19 runs of in ECLS were performed in total (15 VA-ECMO and 4 VV-ECMO). In addition several notable accomplishments were made. The Calgary Health Trust generously agreed to support the

upgrade of our equipment to a new state of art CardioHelp system. These units arrived in fall 2018 and are now live and ready for use. The CardioHelp system will further promote patient safety through improved monitoring and ease of transport while minimizing risks to the patients such as air emboli and clotting. We conducted our first ECLS Education day in conjunction with the ECLS program at Alberta Children's Hospital. The turnout was excellent with positive feedback. We will be continuing this as a recurrent event annually. We also revised an up to date comprehensive clinical practice guideline for the use of ECLS that will reduce variability in practice and improve safety.

In 2019, we look to continue our momentum by rolling out our new training and simulation exercises for the cannulation and use of ECLS. We will continue to strengthen our collaborations with the ECLS program at the Alberta Children's Hospital to work on areas of mutual interest. Finally, we will continue to put the pieces in place to move towards being accredited by the international Extracorporeal Life Support Organization as a further commitment to providing the highest quality of care for patients requiring ECLS.

***Dr. Ken Parhar, ECLS Committee Chair***  
***Dr. Andre Ferland, CVICU Unit Director***

## Neurocritical Care

The Neurocritical Care service offers consultations for departmental members of Critical Care Medicine and Cardiac Sciences throughout Calgary and Central/Southern Alberta. Clinical rounds with the neurosurgical team occur three times per week with the aim of integrating patient care, education and research specifically for patients with neurological injuries and diseases in the Foothills Medical Center multi-system ICU. The program supports and benefits from close collaboration with flagship teams such as the Calgary Comprehensive Epilepsy program, the Calgary Stroke program, the University of Calgary Spine program and the Regional Trauma Services.

Recently the Neurocritical Care service has expanded after the successful recruitment of Dr. Julie Kromm who completed her Neurocritical Care training at Columbia and Cornell Universities in addition to her Critical Care Medicine and Neurology training in Alberta. Dr. Kromm also brings with her certification in electroencephalography, evoked potentials, and

transcranial doppler ultrasonography. Plans are underway to expand and build on the current program, with hopes of recruiting one additional fellowship trained neurointensivist.

Four neurologists and a neurosurgeon have trained in the DCCM residency program. Currently, we are investigating the potential to expand the Neurocritical care training in Calgary to include a fellowship program.

Multi-center research studies that are ongoing or have recently been completed include the landmark TBI Prognosis Study, Hemotion Trial (transfusion thresholds in traumatic brain injury), SaHaRA Trial (transfusion thresholds in subarachnoid hemorrhage), INDEX study (CT perfusion in the neurological determination of death), and CAN TBI (biomarkers to predict outcome in traumatic brain injury).

***Dr. Andreas Kramer***

***Dr. Julie Kromm***

***Dr. Philippe Couillard***



## Critical Care Rehabilitation

The Calgary ICU Recovery Clinic ([www.ahs.ca/icurecovery](http://www.ahs.ca/icurecovery)) continues to mature. In the past year we have expanded to include an outpatient clinic at the South Health Campus. Now, in addition outpatient follow-up at the Foothills Medical Centre, we are able to follow-up patients at the South Health Campus. This has been well received, as it provides our patients with more options for follow-up. We continue to focus on populations at risk of post-critical illness sequelae (e.g. long ICU stays, patients receiving ECLS, etc.)

In addition to clinical work, a nascent critical-illness recovery research program is taking form. Broadly, we are focusing on three areas. First, we are interested in aspects of mental and cognitive recovery following critical illness. In the past year, efforts on this front have included providing music therapy to patients at the Foothills Medical Centre ICU as well as supporting researchers from the Werklund School of Education. Dr. Mudry (psychology) was successful in being awarded seed grant funds from the SCN to test outpatient psychology approaches to address stress symptoms

post-ICU. Second, we are interested in aspects of physical recovery from critical illness. These efforts currently centre primarily on using in-unit imaging measures (abdominal CT imaging, bedside ultrasound) to help understand changes in muscle health during critical illness. Finally, we continue to focus on developing measures and metrics to internally assess the effectiveness of the ICU Recovery Clinic as a program.

In the coming year, we will continue to collaborate nationally with groups focusing on ICU recovery (e.g. <https://www.ccctg.ca/Programs/RECOVER.aspx>). We look forward to seeing how Edmonton's launch of an ICU Recovery Clinic develops, and we will continue to focus on helping formerly critically ill Calgarians recover in the community.

***Dr. Chris Grant, MD, Physical Medicine & Rehabilitation***

***Joanna Everson, NP, Critical Care Medicine***

***Christiane Job-McIntosh, PhD, Kinesiology***

## Organ & Tissue Donation

Whenever possible, offering the option of organ and tissue donation after death is an important aspect of high quality end-of-life care. Some patients and families find great comfort in knowing that something positive is occurring despite their own personal tragedy and grief. It is the responsibility of critical care professionals to identify potential donors and provide this option to surrogate decision makers. If donation is an option, it is also important to check the provincial donation registry to ensure patients' first-person authorization for donation is respected. Registration status can be easily obtained simply by paging the SAOTDP donation coordinator on call.

In 2018, there were 57 patients referred for organ donation in the Calgary Zone. Of these, organs were procured and transplanted in 36 cases. This was the highest annual number on record and included 18 donors following neurological determination of death (NDD), 14 after cardio-circulatory death (DCD), and 4 that were referred for DCD but subsequently progressed to NDD. DCD is now available in all Calgary ICUs (as of March, 2019).

During the first three years of DCD availability in Calgary, there have been 28 DCD organ donors and 13 that converted to NDD after consent for DCD was obtained. Organs that have been procured and transplanted include kidneys, liver, and lungs. The cause of death in potential DCD donors, in order of frequency, has included the following: hypoxic ischemic encephalopathy, traumatic brain injury, intracerebral hemorrhage, subarachnoid hemorrhage, and ischemic stroke.

ICU is by far the largest source of referrals for tissue donation in Calgary, accounting for about 28% of referrals in 2018. There were 29 ocular or non-ocular tissue donors for the year (unfortunately, many deceased patients have contraindications to tissue donation).

A highlight of the year was a very successful DCD Symposium that was hosted in Calgary and Edmonton in April. The day in Calgary had more than 200 attendees, and the list of speakers included several Department members (Chip Doig, Amanda Roze, Philippe Couillard, Andreas Kramer, and Pam Hruska), as well as donation / transplantation experts from across the country.

Andreas Kramer continues to be a member of the Canadian Blood Services Deceased Donation Advisory Committee and the Canadian Donation and Transplantation Research Program.

Organ and tissue donation is an active area of research within the Department of Critical Care Medicine. We participated in the CANADA-DONATE study, which was a national prospective cohort study of deceased organ donation in Canada. Numerous publications arising from this study are expected within the next 1-2 years. We also recently completed a multi-center retrospective study of all DCD activity in Western Canada from 2008-2017, and are participating in a national research program aimed at better understanding the experience of families of organ donors.

***Dr. Andreas Kramer, Clinical Associate Professor  
Medical Director, Southern Alberta Organ &  
Tissue Donation Program***

## ICU Outreach Program

The ICU Outreach Program continues to function at all four adult acute care sites. The system was recently redesigned into a tiered response further described below. The redesign was based on an analysis of calls and interventions provided in our own program, an analysis of published data on team design and outcomes, and comparison with other Alberta based programs. The tiered response is led by an experienced ICU Registered Nurse (RN) and Respiratory Therapist (RRT), with direct access to critical care physician support when needed. The tiered response ensures an effective response to meet staff and patient expectations, recognizes expertise in ICU Outreach nursing and respiratory therapy staff and their ability to provide guidance and support independent of the ICU physician, the importance of ensuring engagement of the most responsible health practitioner for a patient during these calls, and efficient use of Outreach team resources. Level 1 calls require the attendance of the Outreach physician whereas Level 2 and 3 calls are attended by the ICU RN and RRT.

### Program Objectives:

- Reduce cardiac arrest rates, Code Blue calls and overall hospital mortality through early recognition of changes in patient's physiology and clinical status
- Decrease the number of admissions and re-admissions to the ICU by promoting continuity of care for patients discharged from ICU and provision of specific follow-up visits for patients deemed at high risk of ICU admission
- Improve care delivery to patients by sharing critical care skills and expertise through an educational partnership with non-critical care unit staff.
- Facilitate positive relationships between health care teams
- Ensure optimal use of Critical Care resources

## System Improvement

When the ICU Executive Council endorsed the plan to transition from a physician led model to a RN/RT led, physician supported model, a multidisciplinary working group was convened with the purpose to define how this model would be implemented. This team was led by the Nursing Director for Critical Care and the DCCM QI Lead. The team: (1) developed a process map of the current state and defined the future state to ensure clarity around processes and roles and responsibilities of each team member; (2) constructed processes (or future state process mapping) that outlined the response of the team for different call categories; and (3) redefined the follow-up process for patients discharged from ICU. The working group reviewed all guiding documents surrounding the Outreach team (26 in total) replaced these with three new documents: (1) Code 66 Response Policy, (2) Code 66 Internal Guiding Document, and (3) Outreach Follow-Up Guidelines. Other work has included Outreach Program measures (key performance indicators).

# Clinical Programs

Data collected since the model change demonstrates no significant change in the overall rate of cardiac arrests; it is reassuring to note that there were no unintended consequences. The rate of cardiac arrests below 1 per 1,000 adult admissions is consistent with successful programs at other centres. The overall decrease in rapid response calls is a consistent trend which preceded the model change. This may reflect the positive role in the Outreach team supporting the skills of staff in non-critical care wards to recognize and or

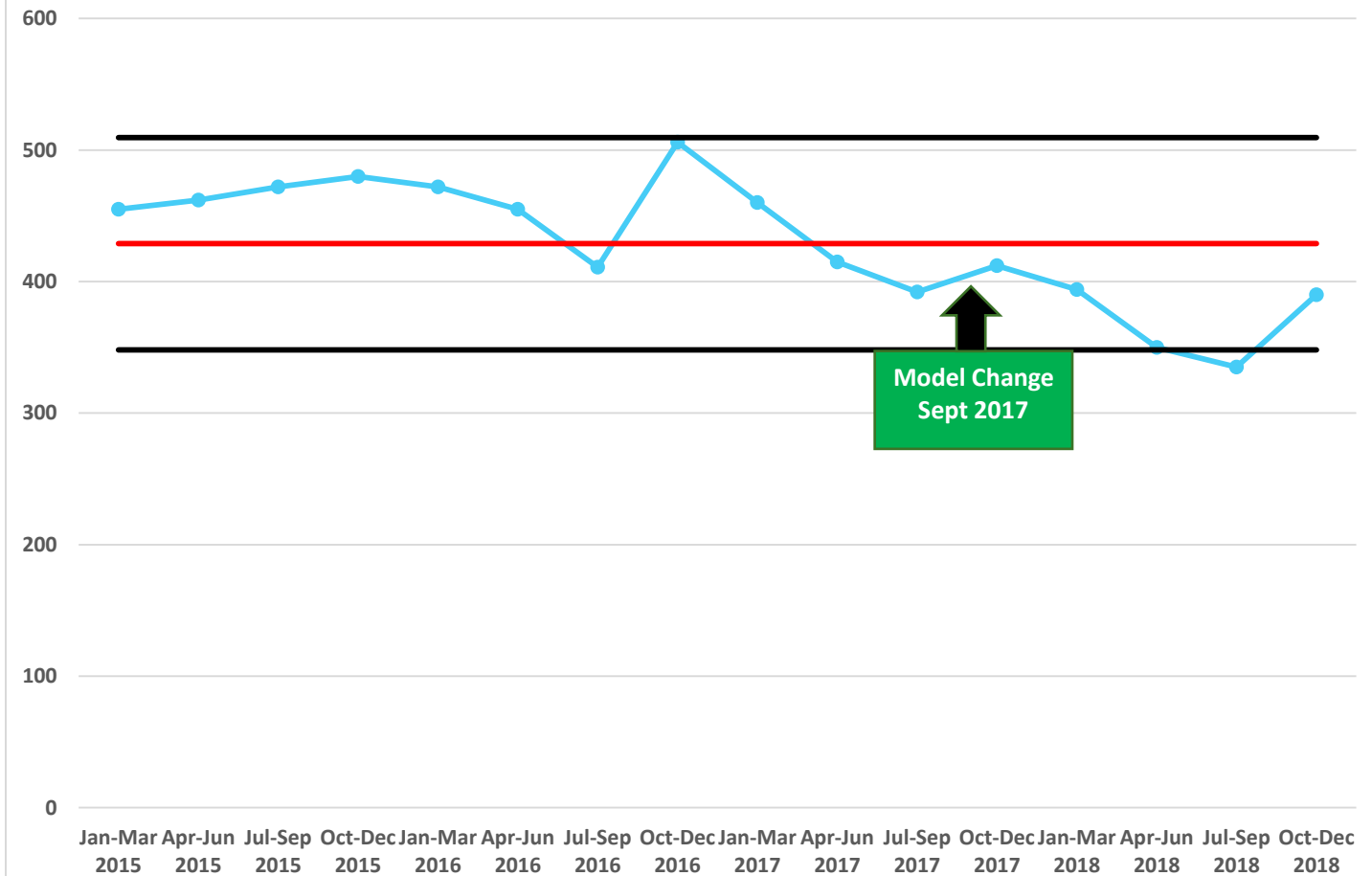
respond to early deterioration in their patients. The increased percentage of calls at the Foothills Medical Centre which required the ICU outreach physician may reflect the overall complexity of patients admitted to the site, and the increased ICU admissions is congruent with patients being sicker when the Outreach team attends. The only somewhat discouraging result which may require attention is the overall proportion of calls when most responsible physician (or designate) attends a Code 66 call on one of their patients.

**Dr. Chip Doig, ICU Outreach Program Director**  
**Devika Kashyap, Quality Improvement Lead**  
**Kevin Sedor, ICU Outreach Program Assistant**

	FMC				PLC				RGH				SHC				Total					
# calls	728				235				332				174				1469					
Level of Call	I 53%	II 33%	III 6%		I 32%	II 53%	III 13%		I 32%	II 49%	III 9%		I 34%	II 53%	III 13%		I 42%	II 42%	III 8%			
Time spent at a call	62 minutes				40 minutes				44 minutes				43 minutes				51 minutes					
% admitted to ICU	23%				14%				14%				13%				19%					
MRP responded	65%				66%				70%				56%				65%					
MRHP directed care	48%				60%				58%				48%				52%					
GOC	R 69%	M 21%	C 0.1%	U 1%	R 65%	M 32%	C 0%	U 2%	R 54%	M 33%	C .3%	U 3%	R 72%	M 23%	C 0%	U 5%	R 65%	M 25%	C .1%	U 2%		
Change in GOC	R-M 2%		R-C 1%		Other 68%				R-M 2%		R-C 1%		Other 59%				R-M 2%		R-C 1%		Other 65%	
Code 66 72h dc from ICU	0.3%				0.9%				0.3%				0%				0.3%					
Readmit within 72h	2%				2%				1%				2%				2%					

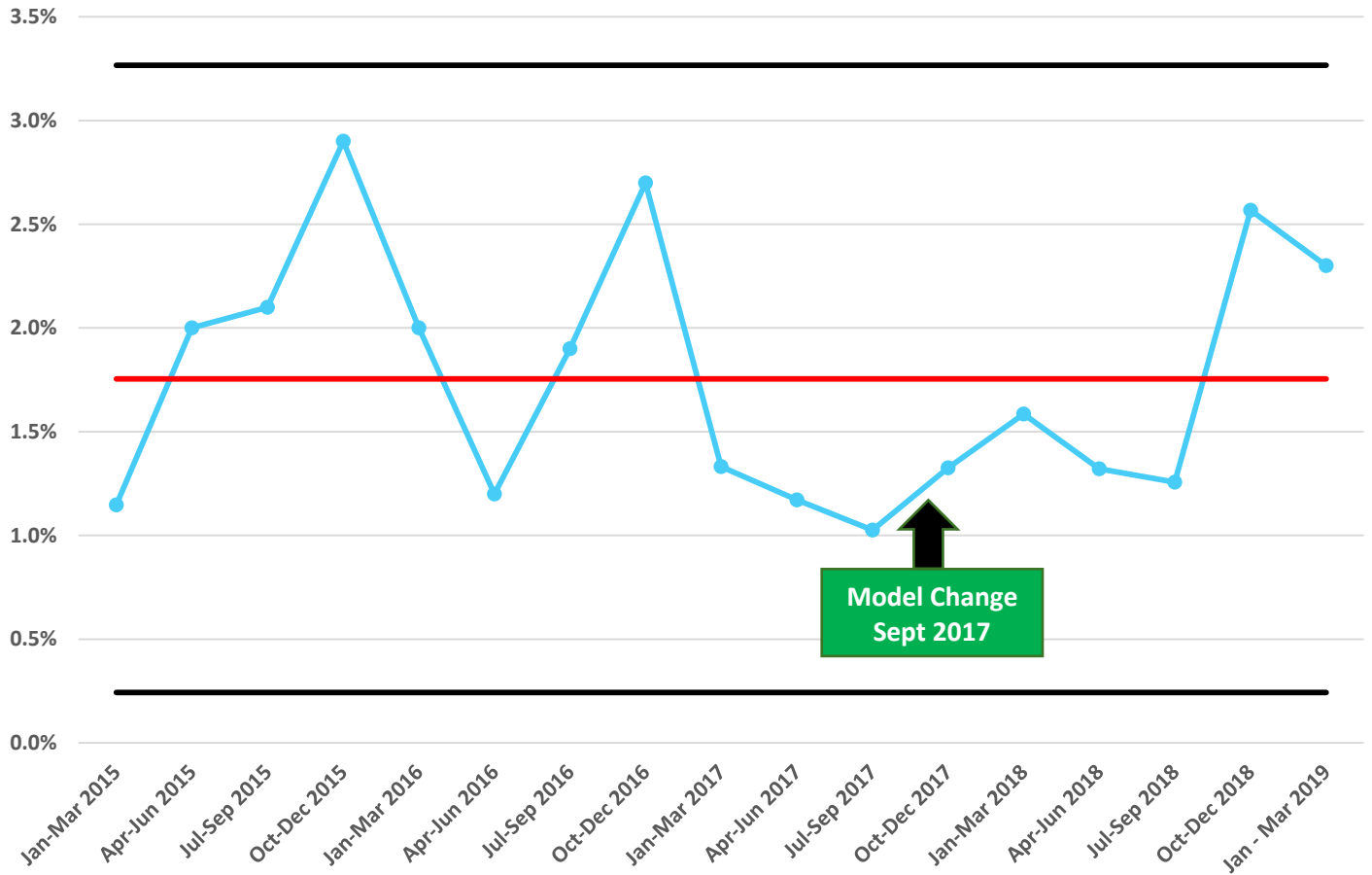
# Clinical Programs

**Volume of Rapid Response Calls, Calgary Zone  
2015-2018**



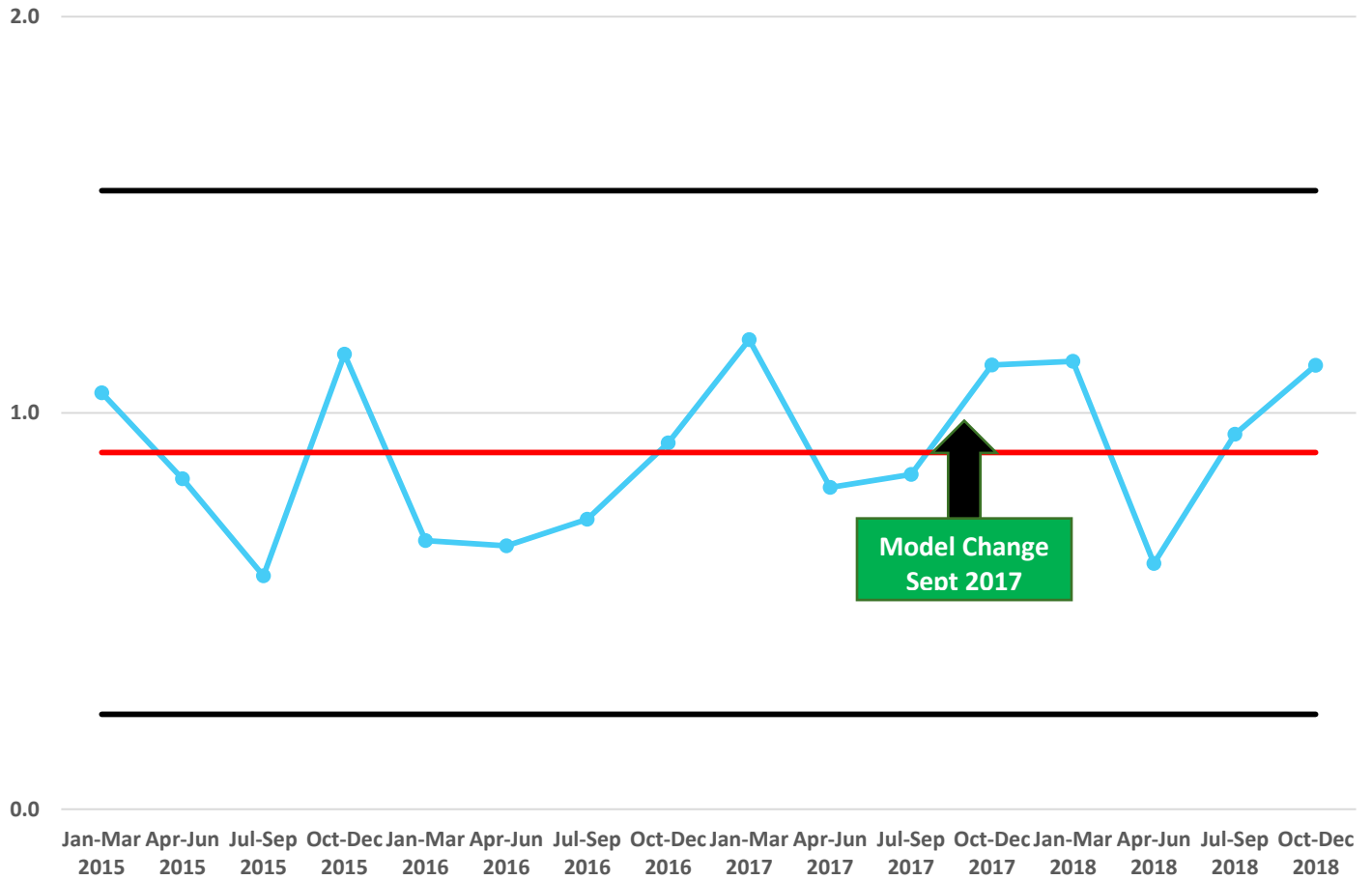
# Clinical Programs

**Readmission Rate to the ICU @72 hours, Calgary Zone  
2015-2018**



# Clinical Programs

**Cardiac Arrest per 1000 Adult Admissions  
2015-2018**



## Department of Critical Care Medicine Education Office Highlights

### Critical Care Medicine Residency Program

The Department of Critical Care Medicine (DCCM) at the University of Calgary has been fortunate to have trained adult Critical Care Medicine (CCM) physicians since 1988. The Royal College of Physicians and Surgeons survey fully accredited our CCM Training Program once again in February 2015. Physicians who have graduated from our Training Program have gone on to practice in a variety of both tertiary and secondary centers across Canada and the United States and have helped to shape the modern practice of CCM, not just as clinical leaders but as administrators, researchers and educators in the respective centers.

Presently, there are eight trainees in our CCM Training Program from a variety of base specialty backgrounds (e.g., Internal Medicine, Respiriology, Neurology and General Surgery). We continue to provide entry positions for four trainees each year with a guarantee of two years of funding. Fortunately, recruitment was again highly successful last year with four applicants from across Canada choosing to pursue CCM training at the University of Calgary. Over the years the Training Program has built a solid national reputation, if one trusts the fact that we have witnessed strong numbers of external applicants and that we consistently match into all of our offered training positions.

### Education Curriculum

In addition to outstanding clinical patient care opportunities afforded at the University of Calgary, we continue to strive to improve and grow our formal educational curriculum for CCM trainees. Notable aspects include: a weekly core content curriculum, monthly journal club, monthly morbidity and mortality working group, monthly clinicopathological correlation, multi-professional high-fidelity simulation as well as weekly city-wide grand rounds.

Our core content curriculum covers the foundational expertise required of a CCM specialist across all CanMEDS domains. Educational sessions as part of the core content curriculum are provided by a combination of Departmental attending physicians and local experts and are designed in a small-group, interactive format to maximize participation. Our residents also continue to participate in a variety of PGME-sponsored workshops, including sessions on Teaching techniques, Biomedical Ethics and Medico-Legal aspects of practice. Our trainees also enrolled into a variety of clinical workshops during the year, including Introduction to Bronchoscopy and Difficult Airway Management. This full day workshop integrates didactic and hands-on skills stations to develop strategies and refine techniques for dealing with patients with difficult airways. This interprofessional collaboration is now in its seventh year and targets approximately 40 participants per workshop from a number of disciplines including CCM, Anesthesia, Emergency Medicine, Otolaryngology and Respiriology. It also includes involvement from the regional Respiratory Therapists as well as our Critical Care Outreach physicians and DCCM nurse practitioners and physician assistants. This year we were pleased to continue our expanded enrolment to also include residents from Cardiology and General Internal Medicine in our participant pool.

### Multi-professional Simulation

The last twelve months have witnessed substantial reengagement in embedding and improving multi-professional simulation as an educational tool within our Department. Our monthly Level II or advanced simulation sessions see our CCM trainees, ICU nurses and respiratory therapists participate in high-fidelity simulation scenarios preceptored by DCCM faculty and supported by our nurse educators and respiratory therapists as well as our provincial eSIM colleagues. Participant feedback has been very positive. This year we delivered on our vision to develop engaging



simulation opportunities for DCCM attending physicians by offering our first Level III high-fidelity, multi-professional simulation sessions with our own ICU attending physicians as participants. We anticipate this will prove fruitful in augmenting

## Continuing Professional Development

High caliber citywide CCM Grand rounds continue to be a weekly staple as part of our continuing professional development. These are recorded and archived along with the presentation slides. Both are available for review on our website:

<http://iweb.calgaryhealthregion.ca/clin/icu/education/index.html>.

## MDSC Program

A number of years ago a Critical Care MSc/PhD graduate training program was developed within the University of Calgary Department of Medical Sciences in an attempt to better support departmental academic activities. It offers CCM residents and graduate students an improved and more structured education environment to further their academic pursuits. Presently there are 3 graduate courses offered: The Fundamental Basis of Critical Illness (UofC course #623.02) and Advanced/Applied Pulmonary Physiology (UofC courses #623.03 and #623.04 respectively). Currently, multiple students are enrolled in this program pursuing graduate degrees. Students have successfully presented their basic science and clinical research at local and national conferences and have been published in well-respected, peer-reviewed scientific journals.

## Curriculum Innovations

Several new curriculum innovations have been implemented in recent years as well. In 2018 our didactic and hands-on curriculum on application of ultrasound and echocardiography in the ICU continued to mature. State of the art on-line educational modules to augment the didactic and practical experiences as part of the curriculum were developed and implemented in 2016. Since

team-based competence and multi-professional trust in our Department. Preliminary feedback has been positive and we're expanding this continuing medical education opportunity to all sites within the Department in the months ahead.

then, a novel IT solution enabling image archiving of ultrasounds acquired at each of the various sites in the city has been put in place to facilitate expert feedback on image acquisition and image quality. We have also purchased four hand-held ultrasound platforms to allow our CCM trainees to more easily be able to develop their echocardiography skills at the point of care.

More recently, clinicopathological case rounds (CPC) rounds have been developed as a new curriculum innovation to have a forum to improve clinical reasoning skills. These monthly rounds are a joint educational activity between the DCCM and the Division of Anatomic Pathology / Department of Pathology & Laboratory Medicine to provide multidisciplinary teaching around interesting presentations of common diseases, common presentations of uncommon diseases, or otherwise diagnostically and therapeutically challenging disease presentations in critically ill patients. These rounds have been extremely well received by participants and will continue for the foreseeable future due to the high-quality teaching and learning opportunity they afford us.

Two additional important curricula continue to grow in 2018, serving to nicely round out our educational offerings. A novel communication skills curriculum that explores fundamental aspects of effective communication including goals of care discussions, addressing conflict and disclosure of unanticipated medical events has been implemented relying on simulated patients to allow CCM residents to grow their skills. Recognizing the increasing importance for physicians to develop comfort and fluency with Quality Improvement and patient safety (QIPS), we have also developed a QIPS curriculum to familiarize our trainees with foundational concepts and to help them develop

skills necessary to lead QIPS projects in their future careers. This year we have expanded our offerings to include a full day workshop that we shared with our counterpart training programs in adult and pediatric CCM at the University of Alberta. This cross-pollination will enable further sustained growth and maturation of the curriculum going forward.

## Community ICU

To further enhance our clinical and academic collaboration with our referring rural centers, the Training Program continues to integrate a one-month community-based rotation at the Red Deer Regional Hospital intensive care unit. This several of our fellows participated in this rotation supported by the Distributed Learning and Rural Initiative Program offered by the U of C. The educational experience and professional development afforded by this rotation has been universally well-regarded by our trainees. We're appreciative of our Red Deer colleagues for fostering such a great experience for our trainees.

## Undergraduate and Post-Graduate Medical Education

In addition to the CCM Training Program, the DCCM continues to support undergraduate and post-graduate medical education at the University of Calgary. The DCCM supervised nearly 200 months of CCM training for rotating residents this past academic year. Rotating residents came from the following core programs: Internal Medicine, Respiriology, Cardiology, Neurology, Emergency Medicine, Anesthesia, General Surgery, Orthopedic Surgery, Plastic Surgery, Otolaryngology, Cardiac Surgery and Urban and Rural Family Medicine. There is no national requirement for CCM rotations in Family Medicine but given that many trainees subsequently practice in rural Alberta, a one-month rotation is offered for all trainees in order to develop skills in caring for the critically ill.

We are pleased to report that our clinical rotation continues to be highly desired by undergraduate medical students at the University of Calgary. For

the seventh consecutive year, the number of medical students who have chosen CCM remains very high. This year, 52 (42 local and 12 Out-of-Province) students rotated within our critical care units and 20 pre-clerks and job shadowers participated in various elective forms of ICU exposure. In addition to local students, we continue to attract national trainees wishing to pursue CCM as a medical elective. Based on requests for the upcoming academic year, we anticipate the number of medical students interested in rotating with will continue to be high.

## Opportunities and Challenges Ahead

One significant opportunity and challenge that lies ahead for the DCCM CCM Training Program will be preparing for and navigating the transition to competency-based medical education (CBME). The Royal College of Physicians and Surgeons of Canada is currently implementing CBME requirements for all medical and surgical specialties in Canada. This program called "Competence by Design" (CBD) is the biggest change in postgraduate medical education in Canada in more than three decades! CBD is an outcomes focused physician education model to better support continuous learning and assessment in professional development.

Over the past two years several of our faculty members have been engaged in meetings at the Royal College in Ottawa and served in a leadership capacity in this regard within the University. The product of these workshops has been delineation of required training experiences, development of new training requirements organized around a framework of competencies, as well as the incorporation of new workplace-based assessment methods that will inform the education and professional development of future cohorts of CCM trainees. Critical Care Medicine has soft-launched many of its new educational processes and assessment tools in 2018, well in advance of our anticipated transition to CBD in July 2019. This has provided our clinical faculty hands-on experience with this new paradigm and permitted us to gain some greater familiarity with process issues ahead

of our upcoming official launch time. We remain excited about this transformational educational change and are actively furthering education scholarship as we explore our experience with the lead-up and transition to this new educational paradigm.

***Dr. Jonathan Gaudet, Critical Care Medicine  
Residency Program Director***

## Critical Care Fellows Communication Skills Curriculum

The Critical Care Fellows Communication Skills curriculum was developed from a local needs assessment, and involves 5 formal sessions delivered over a one year period combined with structured feedback during clinical rotations. Each formal session consists of an instructor-led interactive presentation followed by case-based simulated practice with an actor. The topics of the formal sessions include basic principles of communication, family meetings and goals of care conversations, disclosure of unanticipated medical events, addressing conflict, and organ donation.

Trainees are asked to obtain guided feedback during their ICU rotations. Forms were developed to guide multidisciplinary preceptors in observing and providing feedback to trainees on their communication skills in clinical practice. Trainees are also required to obtain feedback from family members of ICU patients on their communication

skills, using the CARE instrument, which has been previously validated in the literature.

Fellows complete an evaluation following each formal session. Several trainees and faculty have also participated in interviews exploring their perceptions of the curriculum and feedback forms and have shared ideas for improving the curriculum and forms. Feedback from the trainees indicate that they appreciate the opportunity to participate in simulation and feedback around difficult conversations.

A description of the curriculum has been published in Academic Medicine (Acad Med 2017;92:501-505).

***Dr. Amanda Roze des Ordons, MD FRCPC MMed***

***Dr. Philippe Couillard, MD FRCPC***

***Dr. Christopher Doig, MD MSc. FRCPC***

## Nursing Education & Development

### Orientation Program

Registered Nurses (RNs) new to critical care are provided a comprehensive six-week orientation program through the Orientation Program for Adult Critical Care Alberta (OPACCA). This Provincial Orientation course offers a system-based introduction to critical care nursing, providing all new hires important foundational knowledge and clinical skills.

RNs with previous critical care experience are supported with tailored orientation programs that cover content relevant to their unique learning needs. Welcoming an average of 4 RN's per month or 60 staff per year, Managers, Clinical Nurse Educators, Nurse Clinician teams, and currently practicing bedside ICU RNs work together to provide mentorship to support new staff.

### Partnerships

- As partners with Mount Royal University and the University of Calgary, student nurses are welcomed each semester for final practicums within our Adult Intensive Care Units.
- Many critical care RNs currently practicing within the DCCM pursue post baccalaureate specialization through the Advanced Critical Care Nursing Program (ACCN) at Mount Royal University.
- Critical care nurses with 3 to 5 years of practice are encouraged to obtain National critical care certification through the Canadian Association of Critical Care Nurses (CACCN). Educators and advanced practice nurses offer a series of lectures to support registered nurses interested in obtaining this advanced certification.
- Critical care RNs within the Calgary Zone are supported by the Canadian Association of Critical Care Nurses (CACCN) Southern Alberta Chapter.

### Continuing Education

Ongoing educational support for RNs within the DCCM is provided in numerous ways each year. Advancement of RN professional practice is supported through courses designed by the Clinical Nurse Educators to address advanced clinical qualifications and topics such as code blue response, continuous renal replacement therapy, advanced hemodynamics, along with other tailored courses that address care of specific patient populations in critical care (examples include advanced cardiac care and care of vascular surgery, neurologically injured, and burn patients).

Implementations of new initiatives or practices within the DCCM are supported through targeted education and committee support. Over the past year this type of education has encompassed topics such as donation post cardiocirculatory death, delirium, early mobilization, advanced CRRT classes, plasma exchange (PLEX) therapy, and end of life care.

In effort to support RNs in the maintenance of the vast amount of information required for practice, every existing Critical Care RN is provided an annual educational and qualification review day. Our zonal Clinical Nurse Educator team also facilitate various levels of inter professional simulation sessions each month and offer professional development conferences. These internally hosted events focus on relevant critical care topics and at times partner with the Canadian Association of Critical Care Nurses (CACCN) Southern Alberta Chapter to host Critical Care RN Journal Clubs

## Department of Critical Care Medicine Research Summary

In 2018 more than 2,800 patients were admitted to the four general system intensive care units (ICU) across the Calgary Zone with an average stay of 7 days. This is where patients with life threatening, complex medical conditions are treated by highly trained multidisciplinary teams which include Registered Nurses, Respiratory Therapists, Pharmacists, Physiotherapists, Occupational Therapists, Speech Language Pathologists, Dieticians, Intensivists, Psychiatrists, and Researchers.

The goal of our Department is to lead and partner in research initiatives to develop and implement new knowledge to provide the best care for critically ill patients. Our Department has much to celebrate and notable research highlights are summarized below.

### Notable Highlights:

#### *Biomedical:*

The Translational Laboratory in Critical Care Medicine, under the direction of Dr. Paul Kubes, continues to foster collaborations between clinicians and basic scientists. The lab is committed to understanding complex immune responses in the context of human clinical disease. The lab continues to develop new and innovative approaches to assess biomarkers associated with critical illness and is optimizing novel, in-house assays to measure markers of inflammation, infection and tissue damage reflected in their on-going contribution to numerous publications in the past year.

The Jenne Lab, led by Dr. Craig Jenne, focuses on infectious disease, using intravital microscopy to better understand how the immune system recognizes and responds to pathogens. This research aims to identify mechanism modulate the immune response, improving the clearance of pathogens while limiting collateral tissue damage.

Of particular interest is a research project examining how infectious disease leads to the activation of intravascular coagulation. This project, in collaboration with Dr. Braedon McDonald, has identified a number of key immune molecules that directly interact with the coagulation cascade, leading to the initiation of clotting, reduced vascular perfusion and tissue damage. Additional studies have begun to link

pathogen-mediated activation of the clotting cascade with tissue damage associated with severe influenza infection. These studies open exciting new therapeutic avenues for the potential treatment of patients with influenza.

#### *Clinical:*

In 2018 more than 100 patients were enrolled across 11 different clinical studies in ICUs across the Calgary zone. The DCCM Clinical Research team continued to prioritize maintaining a transparent approach to financial tracking and emphasized addressing backlogs in both finance and research administration. The most recent Department Research Report can be found in Appendix VIII.

#### *Health Services Research:*

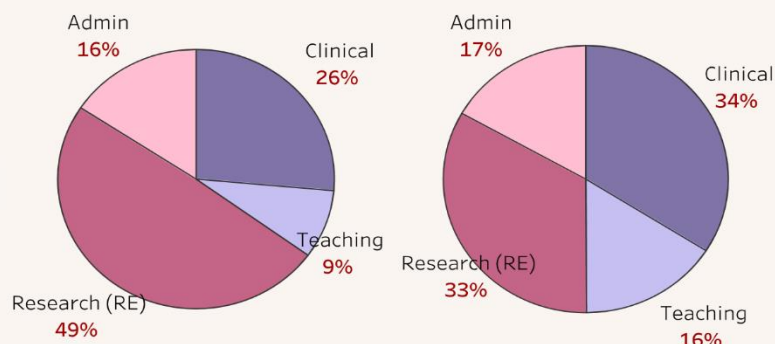
In 2018, members of the DCCM contributed to a total of 88 peer reviewed scholarly publications and 41 peer reviewed abstracts (presented at national and international conferences). Grant support was strong with members receiving funding from Alberta Health Services, Canadian Institutes of Health Research (CIHR), the Canadian Frailty Network (Centres of Excellence of Canada), the Critical Care Strategic Clinical Network, the Lung Association of Alberta, M.S.I. Foundation, the Royal College of Physicians and Surgeons of Canada and the University of Calgary. A complete list of departmental publications and grants can be found in Appendix VII.



# Research

## Annual Report 2017-18 *Critical Care Medicine*

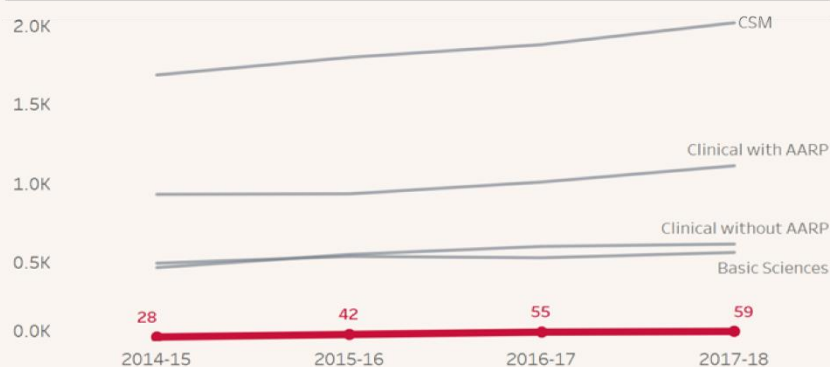
ANNUAL FTEs <sup>2</sup>					<i>Critical Care Medicine</i> <sup>3.1</sup>		<i>Clinical without AARP</i> <sup>3.1</sup>	
	2014-15	2015-16	2016-17	2017-18 <sup>1</sup>				
CSM	512	500	508	518				
Basic Sciences	131	126	129	136				
Clinical w/out AARP	155	153	157	157				
Clinical w. AARP	226	221	222	225				
<b>Critical Care Medicine</b>	<b>6</b>	<b>6</b>	<b>8</b>	<b>7</b>				
ANNUAL RES <sup>3</sup>								
	2014-15	2015-16	2016-17	2017-18				
CSM	200.7	199.6	201.4	209.0				
Basic Sciences	69.4	66.8	67.9	72.9				
Clinical with AARP	80.7	81.5	81.0	83.8				
Clinical w/out AARP	50.6	51.2	52.5	52.3				
<b>Critical Care Medicine</b>	<b>2.6</b>	<b>2.4</b>	<b>3.5</b>	<b>3.5</b>				
TOTAL RESEARCH REVENUE <sup>4</sup>								
	2014-15	2015-16	2016-17	2017-18				
CSM	\$172.7M	\$167.2M	\$164.0M	\$198.3M				
Basic Sciences	\$45.7M	\$43.7M	\$41.6M	\$52.3M				
Clinical w AARP	\$54.4M	\$65.7M	\$62.9M	\$70.1M				
Clinical w/out AARP	\$25.9M	\$24.2M	\$27.6M	\$30.1M				
<b>Critical Care Medicine</b>	<b>\$1.1M</b>	<b>\$1.5M</b>	<b>\$1.9M</b>	<b>\$1.6M</b>				
TOTAL CIHR REVENUE <sup>5</sup>								
	2014-15	2015-16	2016-17	2017-18				
CSM	\$28.4M	\$30.4M	\$33.0M	\$38.7M				
Basic Sciences	\$15.3M	\$14.6M	\$14.6M	\$16.6M				
Clinical w AARP	\$10.5M	\$12.5M	\$13.1M	\$14.9M				
Clinical w/out AARP	\$2.6M	\$3.3M	\$5.2M	\$7.2M				
<b>Critical Care Medicine</b>	<b>\$0.29M</b>	<b>\$0.44M</b>	<b>\$0.78M</b>	<b>\$0.80M</b>				
TOTAL CLINICAL RESEARCH REVENUE <sup>6</sup>								
	2014-15	2015-16	2016-17	2017-18				
CSM	\$14.8M	\$23.2M	\$58.9M	\$68.0M				
Basic Sciences	\$0.0M	\$1.8M	\$6.7M	\$8.8M				
Clinical w AARP	\$12.3M	\$16.1M	\$34.9M	\$44.3M				
Clinical w/out AARP	\$2.4M	\$3.9M	\$16.9M	\$13.7M				
<b>Critical Care Medicine</b>	<b>\$0.36M</b>	<b>\$0.40M</b>	<b>\$1.43M</b>	<b>\$1.03M</b>				
RESEARCH REVENUE PER RE <sup>4.1</sup>								
	2014-15	2015-16	2016-17	2017-18				
CSM	\$0.63M	\$0.67M	\$0.66M	\$0.73M				
Basic Sciences	\$0.66M	\$0.65M	\$0.61M	\$0.72M				
Clinical with AARP	\$0.67M	\$0.81M	\$0.78M	\$0.84M				
Clinical without AARP	\$0.51M	\$0.47M	\$0.53M	\$0.58M				
<b>Critical Care Medicine</b>	<b>\$0.41M</b>	<b>\$0.64M</b>	<b>\$0.54M</b>	<b>\$0.46M</b>				
CIHR REVENUE PER RE <sup>5.1</sup>								
	2014-15	2015-16	2016-17	2017-18				
CSM	\$0.14M	\$0.15M	\$0.16M	\$0.19M				
Basic Sciences	\$0.22M	\$0.22M	\$0.22M	\$0.23M				
Clinical with AARP	\$0.13M	\$0.15M	\$0.16M	\$0.18M				
Clinical without AARP	\$0.05M	\$0.07M	\$0.10M	\$0.14M				
<b>Critical Care Medicine</b>	<b>\$0.11M</b>	<b>\$0.18M</b>	<b>\$0.23M</b>	<b>\$0.23M</b>				
CLINICAL RESEARCH REVENUE PER RE <sup>6.1</sup>								
	2014-15	2015-16	2016-17	2017-18				
CSM	\$0.09M	\$0.11M	\$0.29M	\$0.32M				
Basic Sciences	\$0.00M	\$0.03M	\$0.10M	\$0.12M				
Clinical with AARP	\$0.15M	\$0.20M	\$0.43M	\$0.53M				
Clinical without AARP	\$0.05M	\$0.08M	\$0.32M	\$0.26M				
<b>Critical Care Medicine</b>	<b>\$0.14M</b>	<b>\$0.17M</b>	<b>\$0.41M</b>	<b>\$0.30M</b>				



## 2017-18 BIBLIOMETRICS

## Critical Care Medicine

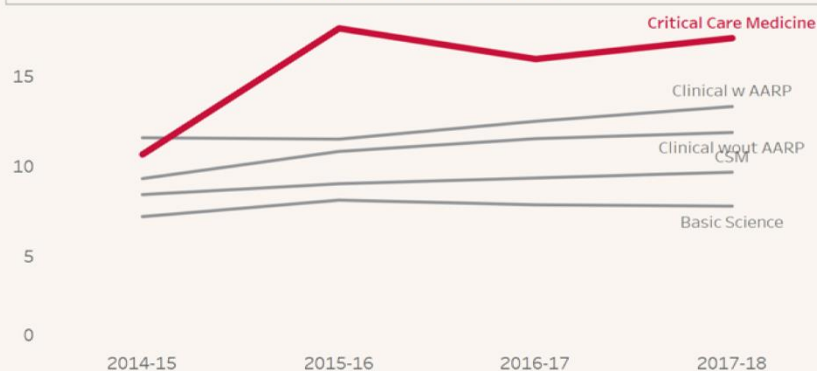
### PUBLICATIONS <sup>7</sup>



### PUBLICATIONS PER FTE <sup>8</sup>

	2014-15	2015-16	2016-17	2017-18
CSM	3.3	3.6	3.7	3.9
Basic Sciences	3.7	4.2	3.8	4.0
Clinical with AARP	3.9	4.1	3.8	4.7
Clinical without AARP	3.0	3.5	3.5	3.8
<b>Critical Care Medicine</b>	<b>4.7</b>	<b>7.0</b>	<b>6.9</b>	<b>8.4</b>

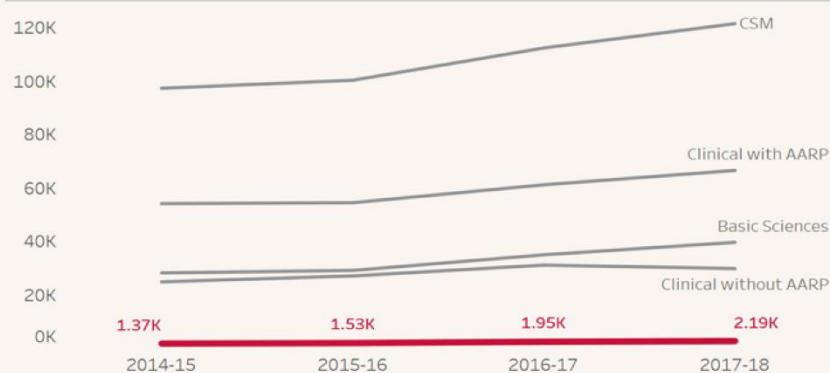
### PUBLICATIONS PER RE <sup>9</sup>



### PUBLICATIONS PER RE <sup>9</sup>

	2014-15	2015-16	2016-17	2017-18
CSM	8.4	9.0	9.3	9.7
Basic Science	7.2	8.1	7.8	7.8
Clinical w AARP	11.6	11.5	12.5	13.3
Clinical wout AARP	9.3	10.8	11.5	11.9
<b>Critical Care Medicine</b>	<b>10.6</b>	<b>17.6</b>	<b>15.9</b>	<b>17.1</b>

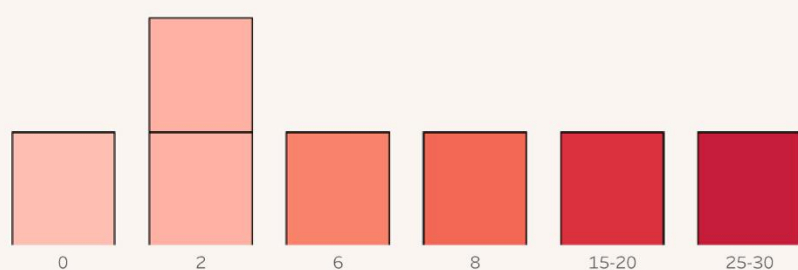
### ANNUAL CITATIONS <sup>10</sup>



### ANNUAL CITATIONS per FTE <sup>11</sup>

	2014-15	2015-16	2016-17	2017-18
CSM	191	201	222	237
Basic Sciences	216	232	272	297
Clinical with AARP	239	246	275	296
Clinical without AARP	161	177	199	192
<b>Critical Care Medicine</b>	<b>229</b>	<b>254</b>	<b>244</b>	<b>313</b>

### # PUBLICATIONS BY 2017/18 FTE FACULTY IN 2017 <sup>12</sup>



### HOT PAPERS <sup>13</sup>

	2014-15	2015-16	2016-17	2017-18
CSM	307	341	386	397
Basic Sciences	96	96	112	120
Clinical without AARP	74	86	109	92
<b>Critical Care Medicine</b>	<b>4</b>	<b>4</b>	<b>12</b>	<b>9</b>



## NOTES and Definitions

- 1 **Year 2017-18**  
Snapshot of Faculty Counts, as of June 30 2017.  
This is the definition used by HR Systems and Reporting and the OIA Fact Books.
- 2 **FTEs**  
Full-time Academic Staff with Ranks of Professor, Associate Professor or Assistant Professor, Instructor, Senior Instructor, as of June 30 of the previous year (e.g. 2018 FTEs are as of June 30 2017)  
  
Department Groups Defined as Follows:  
a) Basic Sciences (Biochemistry & Molecular Biology, Cell Biology & Anatomy, Community Health Sciences, Microbiology Immunology & Infectious Diseases, Physiology & Pharmacology)  
b) Clinical with AARP (Cardiac Sciences, Clinical Neurosciences, Family Medicine, Medicine, Paediatrics)  
c) Clinical with AARP (Anaesthesia, Critical Care Medicine, Emergency Medicine, Medical Genetics, Obstetrics & Gynaecology, Oncology, Pathology & Laboratory Medicine, Psychiatry, Radiology, Surgery)  
  
**Source:**  
Annual Factbook by the UCalgary Office of Institutional Analysis
- 3 **REs**  
Average Research Time Allocation, divided by 100 and multiplied by the number of FTE faculty (see Note 2).  
Note: To account for CSM Academic Staff members with no time allocations reported in the ARO, the previous year's time allocation is used. If the previous year's time allocation is also blank, then the department average is assigned.  
  
**Source:**  
Academic Report Online
- 3.1 **Time Allocation**  
Average Time Allocation (as reported in ARO) for FTE faculty (see Note 2).  
  
Note: To account for CSM Academic Staff members with no time allocations reported in the ARO, the previous year's time allocation is used. If the previous year's time allocation is also blank, then the department average is assigned.  
  
**Source:**  
Academic Report Online
- 4 **Total Research Revenue**  
Annual Research Revenue for Projects assigned to CSM  
- Revenue is assigned to a Department/Comparator Group based on the Project Department  
- CSM total includes Project Departments not part of the 20 CSM Departments (e.g. Dean's Department - Operations)  
\* Of the ~\$34 million dollar increase in CSM Research Revenue from 2016-17 to 2017-18, ~\$21.5 million is grant revenue and ~\$10.5 million is donation related.  
  
**Source:**  
Enterprise Reporting\Research & Trust Accounting datamart
- 4.1 **Research Revenue per RE**  
Annual Research Revenue (See note 4) divided by the number of Research Equivalents in the same year (See note 3)  
\* For the CSM Total, Revenue assigned to Project Departments not part of the 20 CSM Departments is excluded (e.g. Dean's Department - Operations revenue is excluded)
- 5 **CIHR Revenue**  
Research revenue export (see Note 4), where:  
IF Account Description = ("CIHR Grants" OR "CIHR Authorized Transfers")  
OR  
Tri-Council Source = "CIHR" AND Account Description ("CIHR Grants" OR "CIHR Authorized Transfers")
- 5.1 **CIHR Revenue per RE**  
Annual CIHR Research Revenue (See note 5) divided by the number of Research Equivalents in the same year (See note 3)  
\* For the CSM Total, CIHR Revenue assigned to Project Departments not part of the 20 CSM Departments is excluded (e.g. Dean's Department - Operations revenue is excluded)
- 6 **Clinical Research Revenue**  
Research revenue export (see Note 4), where" Purpose of Funds = "Clinical Trials" OR "Clinical Research"  
- In 2016-17, all revenue assigned to projects involving 'Grant Sponsored Clinical Trials' was classified as 'Clinical Research'. In 2015-16, only 47% of revenue assigned to projects involving 'Grant Sponsored Clinical Trials' was classified as 'Clinical Research'. This led to a large increase in 'Clinical Research' revenue in 2016-17 from 2015-16
- 6.1 **Clinical Revenue per RE**  
Annual Clinical Research Revenue (See note 6) divided by the number of Research Equivalents in the same year (See note 3)  
\* For the CSM Total, Revenue assigned to Project Departments not part of the 20 CSM Departments is excluded (e.g. Dean's Department - Operations revenue is excluded)

## NOTES and Definitions Cont'd

- 7 **Publications**  
The number of unique papers published by FTE Faculty in the same publication year. (e.g. 2017-18 refers to the number of unique papers published by 2017/18 FTE faculty in the 2017 publication year)
- Only publications of Document Types "Article", "Review", "Editorial", "Case Report", "Clinical Trial" and "Book" are included;
  - Papers co-authored by more than 1 FTE faculty member will be counted once within the same Group.
- Source:**  
Web of Science; - CV from Authors sent to Office of Faculty Analysis (OFA) in 2014-18
- 8 **Publications per FTE**  
Annual number of Unique Publications (see note 7) divided by the number of FTEs in the same year (see note 2)
- 9 **Annual Publications per RE**  
- Annual number of unique Publications (see note 7) divided by the number of Research Equivalents in the same year (see note 3)
- 10 **Citations**  
The number of times that unique publications by FTE Faculty of a given year have been cited in the same year (e.g. 2017-18 refers to the number of times unique papers published by 2017/18 FTE Faculty were cited in 2017)
- Only publications of Document Types "Article", "Review", "Editorial", "Case Report", "Clinical Trial" and "Book" are included;
  - Papers co-authored by more than 1 FTE faculty member will be counted once within the same Group.
- Source:**  
Web of Science; - CVs from Authors sent to Office of Faculty Analysis (OFA) in 2014-18
- 11 **Citations per FTE**  
Total citations in a year for all unique career publications by FTE faculty (see note 10) divided by the number of FTE Faculty in the same year (see note 3)
- 12 **# of Publications by 2017-18 Faculty in 2017**  
Histogram of the number of papers published by 2017-18 FTE Faculty in 2017
- 13 **Immediate Impact Papers**  
Unique publications cited > 49 times in a 5 year publication date window (e.g. For 2017-18, sum of unique publications published between 2013-17 by 2017/18 FTE Faculty that were cited in 2013-17 greater than 49 times)

## Adoption and De-adoption of Evidence-based Clinical Critical Care Practices

Dr. Niven began his appointment as Assistant Professor in the Departments of Critical Care Medicine and Community Health Sciences in April 2016. Since that time he has developed a research program focused on improving the adoption and de-adoption of high-value and low-value clinical critical care practices, respectively.

In 2018, he published a scoping review examining the reproducibility of clinical research in critical care that identified 14 clinical practices with reproducible evidence of benefit, and 21 practices with reproducible evidence of no benefit (BMC Medicine 2018;16(1):26). He has since completed a systematic review examining whether reproducibility of evidence can be predicted from original publication, and presented that work locally at the 2018 Department of Critical Care Medicine Research Day in Calgary, Alberta, provincially at the 2019 Alberta Society of Intensive Care Physicians 31st Annual General Meeting in

Lake Louise, Alberta, and internationally at the 2018 American Thoracic Society Conference in San Diego, California. In 2018 he was also visiting professor at the Dartmouth Institute for Health Policy and Clinical Practice. He has since received funding from the MSI Foundation and CIHR to translate this list of clinical practices with reproducible evidence into a living, actionable, prioritized knowledge translation agenda for practice change in ICUs in Alberta. In addition to this, Dr. Niven initiated an intervention to reduce Albumin use in ICUs in Alberta, beginning with feasibility testing in Edmonton ICUs.

This work is funded by the CIHR, the MSI foundation, Department of Critical Care Medicine, O'Brien Institute for Public Health, and the Critical Care Strategic Clinical Network.

***Dr. Daniel Niven, Assistant Professor***

## Acute Respiratory Distress Syndrome – 2018 Update

Acute Respiratory Distress Syndrome (ARDS) is an inflammatory syndrome of the lungs that results in impaired oxygenation due to non-cardiogenic pulmonary edema. ARDS is associated with a significant morbidity and mortality, and thus prompt recognition and treatment is crucial. Treatments for ARDS that have been shown to reduce mortality include minimizing pressure and volume during mechanical ventilation to prevent ventilator induced lung injury, as well as muscle relaxants and prone positioning.

Previous work by our project team (funded by a QI grant 2016-18 Calgary Zone CMO/Medical Affairs as well as a 2017 Critical Care Strategic Clinical Network Seed Grant) demonstrated that ARDS is prevalent within the Calgary Zone and associated with significant morbidity and mortality. We estimate that approximately 10% of all Calgary Zone ICU patients meet full ARDS criteria by the Berlin Definition. This is important because patients with ARDS have a two-fold increase in ICU mortality, with patients in the severe ARDS category demonstrating a mortality rate of 56%. Application of evidence based care interventions is quite variable, particularly in the severe ARDS category. If we extrapolate our Calgary area incidence of ARDS to the province of Alberta we

estimate approximately 951 cases of ARDS per year in Alberta, with an average hospital length of stay of 22 days.

We recently conducted an expert-panel modified-Delphi Consensus process to determine the optimal evidence-informed management of ARDS. This included a multidisciplinary group of 30 experts (Physicians, respiratory therapists, and registered nurses) from 5 different ICUs in Calgary. In 2018 we externally validated this consensus pathway of care by surveying relevant frontline stakeholders from across Alberta. We had an enthusiastic response from over 700 clinicians from tertiary, community, and regional ICUs across the province. We are currently gathering feedback on this pathway from families and caregivers. We also have refined the tools within eCritical to track the use of this pathway.

Currently we are preparing to implement and assess the efficacy of this pathway. We are aiming for a late spring early summer 2019 launch of a pilot test of this pathway. The bundled treatment of ARDS is a novel and innovative concept and a potentially “low cost-low resource” intervention that may impact clinical outcomes and reduce inappropriate variability in care.

***Dr. Ken Parhar, QI ARDS Research Project Lead***

***Gwen Knight, Research Assistant***

***Dr. Andrea Soo, Senior Biostatistician DCCM***

***Pete Dhillon, RRT Educator***

***Devika Kashyap, Quality Improvement Lead***

## Delirium in Critically Ill Patients

Dr. Kirsten Fiest's research program focuses on developing and testing a patient and family-centered approach to the prevention, detection, and management of delirium in the critically ill.

From November 2017 to September 2018 we studied the validity and reliability of family-administered tools to identify delirium in critically ill patients admitted to the ICU. We recruited 142 patient and family member dyads to our Family ICU Delirium Detection Study (FIDDS) at the Foothills Medical Centre. Family members of ICU patients completed two delirium identification tools daily (FAM-CAM & "Sour Seven"). These will be compared to a research nurse assessment as the reference standard. We also measured symptoms of depression and anxiety in family members. We hope to improve both patient and family outcomes.

In November and December of 2018 we conducted focus groups with patients and family members who participated in FIDDS, as well as with nurses and physicians. We aimed to assess barriers and

facilitators (using the Theoretical Domains Framework) of employing family delirium detection in the ICU. Analyses of this data are underway.

We began a pilot study for ICU Family Education on Delirium (iFAM-ED) in the FMC ICU. This project will measure family member knowledge on delirium before and after an intervention designed to improve knowledge of ways family can prevent, detect, and manage delirium in critically ill. Knowledge will be measured using a tool adapted to the ICU context by our group: the Caregiver Knowledge of ICU Delirium Questionnaire. We will measure knowledge at baseline, post-intervention, and at 2-weeks follow-up.

Funding for this work comes from the Canadian Institutes of Health Research, M.S.I. Foundation, Department of Critical Care Medicine, O'Brien Institute for Public Health, Cumming School of Medicine Clinical Research Fund, and the Critical Care Strategic Clinical Network.

***Dr. Kirsten Fiest, Assistant Professor***



## Critical Care Medicine Faculty Members

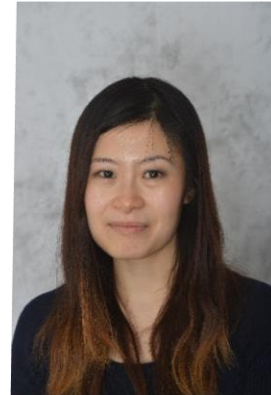


**George Alvarez, Clinical Assistant Professor (MPT)**  
**Clinical Activities:** RGH-MSICU, SHC-MSICU, PLC-MSICU  
**Fellowship and Postgraduate Training:** Critical Care Medicine, Internal Medicine M.Sc. Health Informatics

Dr. George Alvarez has been a member of the DCCM since April 2006. He studied at University Of Manitoba for both his undergraduate and Medical School including his Internal Medicine Specialty. He completed his Critical Care training at the University of Western Ontario before moving to Australia to pursue Informatics training. He is the past chair of the Quality Assurance Committee and a former medical director of the SHC ICU. He is the current chair of the departments' renal replacement committee.

**Selena Au, Clinical Assistant Professor (MPT)**  
**Clinical Activities:** RGH-MSICU, SHC-MSICU, PLC-MSIUC  
**Administrative Responsibilities:** QI- QAC Medical Director  
**Fellowship and Postgraduate Training:** Critical Care Medicine

Dr. Au completed her undergraduate studies in biopsychology and medical school at the University of British Columbia. In 2007, she moved from her hometown of Vancouver for the University of Calgary Internal Medicine residency program followed by fellowship with the Department of Critical Care Medicine. She completed her Masters of Science in Quality and Improvement and Patient Safety with the University of Toronto in 2014. Currently, Dr. Au is appointed as a Clinical Assistant Professor in the Department of Critical Care. As Quality Improvement and Assurance Medical Director, she co-chairs the Quality Assurance Committee to oversee patient safety review and learning and morbidity and mortality rounds. Her academic interests for which she has received grants and awards include health services delivery and patient and family centered care. Dr. Au is an arts and languages enthusiast and enjoys time with her family in Vancouver and Québec.



## Critical Care Medicine Faculty Members



**Luc Berthiaume, Clinical Assistant Professor (MPT)**

**Clinical Activities:** PLC-MSICU, FMC-CVICU

**Administrative Responsibilities:** Mechanical Ventilation Committee Co-Chair, Site Director PLC

**Fellowship and Postgraduate Training:** Critical Care Medicine, Pulmonary Medicine, Internal Medicine, M.Sc Clinical Epidemiology

Dr Berthiaume is the Medical Director of the Peter Lougheed Centre ICU. He graduated at the University of Ottawa in 1999 (MD magna cum laude). He completed Internal Medicine residency training in 2002 at the University of Toronto. He pursued further training in Pulmonary Medicine (2004) and Critical Care Medicine (2005) at the University of Calgary. Dr Berthiaume has additional training in clinical epidemiology. He is heavily involved in undergraduate and postgraduate medical education. Dr Berthiaume is married with 4 children. He enjoys skiing, mountain biking and hiking.

**Paul Boiteau, Clinical Professor (MPT)**

**Clinical Activities:** FMC-MSICU

**Fellowship and Postgraduate Training:** Critical Care Medicine, Pulmonary Medicine, Internal Medicine

Dr. Boiteau is a 1979 medical graduate of Laval University. He completed a residency in Internal Medicine at McGill University in 1983 before moving to the University of Manitoba to complete a fellowship in Pulmonary and Critical Care Medicine in 1986. He was an Assistant Professor of Medicine at the University of Calgary and the Assistant Director of the Foothills Hospital ICU from 1986 to 1993. He moved to Toronto in 1993 to assume the Directorship of the Mount Sinai Hospital Critical Care Unit. He was an Associate Professor of Medicine at the University of Toronto from 1993 to 1998. He relocated to Calgary in 1998 as the Medical Director of the Foothills Medical Centre Multi-System ICU with the rank of Clinical Associate Professor of Medicine. In 2003 Dr. Boiteau became the Head, Department of Critical Care Medicine as well as Professor of Medicine at the University of Calgary. In 2013 he ended his term as Head of the Department and is currently an Intensivist in the Calgary Zone with and interest in a systems approach to Patient Safety, the use of Simulation in creating High Performance Teams and optimization of the management of High and Intermediate High Risk Pulmonary Thromboembolism.



## Critical Care Medicine Faculty Members



**Paul Boucher, Clinical Assistant Professor (MPT)**

**Clinical Activities: FMC-MSICU, FMC-CVICU**

**Fellowship and Postgraduate Training: Critical Care Medicine, Internal Medicine**

Dr. Paul Boucher; Graduate of the University of Ottawa, Bachelor of Biochemistry 1991, Medicine 1995. Completed Internal Medicine Residency in 1988, and specialty in Critical Care in 2000, at the University of Calgary. Echocardiography fellowship, University of Calgary, completed 2002. Clinical interests include cardiovascular intensive care, echocardiography, and Patient and Family Centered Care

**Carla Chrusch, Clinical Associate Professor (MPT)**

**Clinical Activities: RGH-MSICU, PLC-MSICU, SHC-MSICU**

**Administrative Responsibilities: Site Director RGH ICU, RGH Site Education Coordinator**

**Fellowship and Postgraduate Training: Critical Care Medicine, Internal Medicine, MSc Epidemiology**





## Critical Care Medicine Faculty Members



**Philippe Couillard, Clinical Assistant Professor (MPT)**

**Clinical Activities: FMC-MSICU**

**Administrative Responsibilities: FMC-ICU Medical Director, Deputy Site Education Coordinator, Course V Chair- Elect, UME Program Fellowship and Postgraduate Training: Critical Care Medicine, Neurology**

Dr. Philippe Couillard is a member of the Critical Care Department since 2012. He graduated at Laval University in 2005, completed further training in Calgary with specialization in Neurology and Critical Care Medicine. He has additional training in Neurocritical care and Stroke neurology. Dr. Couillard is an Assistant Professor in the Departments of Critical Care Medicine and Clinical Neurosciences in the Faculty of Medicine, University of Calgary. He currently is appointed as Course V chair with the Undergraduate Medical Education at the Cumming School of Medicine. Dr. Couillard is married with 3 children.

## Critical Care Medicine Faculty Members



**Christopher James Doig, Professor (GFT)**

**Clinical Activities:** FMC-MSICU, SHC-MSICU, RGH-MSICU

**Administrative Responsibilities:** Department Head CCM, MEC Chair, ICU Executive Council Co-Chair, Member Leadership Forum, Faculty of Medicine Member, Executive Committee for Institute of Infection, Immunity and Inflammation, AMA Board Member

**Fellowship and Postgraduate Training:** Critical Care Medicine, Internal Medicine, M.Sc, Epidemiology

Dr Christopher Doig was Head of the Department of Critical Care Medicine from November 1, 2013 – October 31, 2018 and past Head of the Department of Community Health Sciences. He graduated at the University of Saskatchewan in 1988 (MD with distinction), completed further training in Vancouver and Calgary with specialization in Internal Medicine and Critical Care Medicine. He has additional training in clinical epidemiology and health care ethics. Dr. Doig is a Professor in the Departments of Critical Care Medicine, Internal Medicine and Community Health Sciences in the Faculty of Medicine, University of Calgary. He was the Medical Director of the Multisystem ICU at the Foothills Medical Centre from 2002 - 2010. He was the President of the Alberta Medical Association 2009 – 2010. Dr. Doig has over 140 peer-reviewed publications including in journals such as Nature Medicine, the New England Journal of Medicine, the Journal of the American Medical Association, the Canadian Medical Association Journal, and international and national critical care subspecialty journals. Dr. Doig is married with 4 children. He is an avid cyclist, swimmer, and soccer player....currently ranked 4th in his family in goal scoring, but hoping to improve.

## Critical Care Medicine Faculty Members



**Michael Dunham, Clinical Assistant Professor (MPT)**

**Clinical Activities:** RGH-MSICU, SHC-MSICU, FMC-MSICU

**Administrative Responsibilities:** Zonal Director for ATLS Courses, Site Lead General Surgery SHC, Director Acute Care Surgery SHC, General Surgery Finance Committee, General Surgery Surgical Executive Committee, General Surgery Recruitment Committee

**Fellowship and Postgraduate Training:** Critical Care Medicine, General Surgery, Trauma Surgery

Dr. Michael Dunham is the Site Lead for General Surgery at the South Campus Hospital. He graduated from the University of Alberta in 1999 (MD) and completed a General Surgery residency at the University of Calgary in 2004 (FRCSC). He pursued further fellowship training at the University of Miami in Critical Care Medicine and Trauma Surgery in 2006. He is Clinical Assistant Professor of Surgery at the University of Calgary and is actively involved in several committees and teaching ATLS and ATOM courses for medical staff. Academic interests involve teaching and training residents Critical Care, Trauma Surgery and Acute Care Surgery and has been recognized as Educator of the year four times by the Departments of Surgery, Emergency Medicine and Critical Care Medicine. Dr. Dunham is married with 4 children and hobbies include World War II history, mountain biking, running and skiing.

**Paul Easton, Associate Professor (GFT)**

**Administrative Responsibilities:** Medical Director; Lethbridge Sleep Laboratory, Advisory Committee for AADL Chair, Program of the Ministry of Seniors and Social Services

**Fellowship and Postgraduate Training:** Pulmonary Medicine, Sleep Medicine, Internal Medicine, Ph.D, Resp Physiology

Dr. Easton is a pulmonary physician with specific expertise in sleep medicine. Dr. Easton is a respiratory muscle physiologist with a focus on respiratory muscle function in chronic respiratory failure.

## Critical Care Medicine Faculty Members



### **Andre Ferland, Clinical Associate Professor (MPT)**

**Clinical Activities:** FMC-MSICU, FMC-CVICU

**Administrative Responsibilities:** Site Director, FMC-CVICU;

**Fellowship and Postgraduate Training:** Critical Care Medicine, Internal Medicine

Dr. Andre Ferland is a Clinical Professor in the Department of Critical Care (DCCM), Medicine, Cardiac Sciences and Internal Medicine within the University of Calgary, Faculty of Medicine. Dr. Ferland graduated from Sherbrooke medical school in 1984, completed thereafter general internal medicine and critical care. It is worth mentioning that he was the first intensivist to graduate from the U of C Critical Care program!

On faculty since 1990, Dr. Ferland held the position of Critical care program director for more than 10 years until taking a 1 year sabbatical in clinical echocardiography. In 2013, he resumed for the second time the role Medical Director of the Cardiovascular Intensive Care Unit at the Foothills Medical Centre(FMC). In 2015 in partnership with Dr. Godinez, Boucher and the radiology group EFW, Dr. Ferland helped developing an outpatient echocardiography lab with the goal of enhancing the echo training of DCCM residents. Dr. Ferland is still an active internist as he still practices and teaches general internal medicine in his outpatient clinic and the FMC.

### **Kirsten Fiest, PhD Assistant Professor (GFT)**

Kirsten is an Assistant Professor of Critical Care Medicine, Community Health Sciences & Psychiatry at the University of Calgary. She is also Director of Research and Innovation in the Department of Critical Care Medicine. Kirsten received her PhD in Epidemiology from the University of Calgary and completed post-doctoral training in neuro and psychiatric epidemiology from the University of Manitoba. Her research program focuses on advancing the science of patient and family-centered critical care research. Her current work examines the role of family in preventing, detecting, and managing delirium in the critically ill. Kirsten also teaches Introduction to Epidemiology in the Department of Community Health Sciences graduate program.



## Critical Care Medicine Faculty Members



**Jonathan Gaudet, Clinical Assistant Professor (MPT)**

**Clinical Activities: PLC-MSICU**

**Administrative Responsibilities: DCCM Education Director, Critical Care Residency Training Program Director, PLC Site Education Coordinator, Medical Advisor Respiratory Therapy**

**Fellowship and Postgraduate Training: Critical Care Medicine, Emergency Medicine**

Dr. Jonathan Gaudet is the Adult Critical Care Medicine Residency Training Program Director and the Medical Advisor for Respiratory Therapy in the AHS Calgary Zone. He graduated from Dalhousie University Medical School in 2005 and completed his Emergency Medicine specialization at the University of Alberta in 2010 before coming to Calgary to pursue his fellowship training in Critical Care Medicine. He has since completed a Masters degree in Medical Education. His academic interests include medical education, procedural skills training and assessment methods. Dr. Gaudet is married with two young children that keep him on his toes.

**Tomás Godínez-Luna, Clinical Assistant Professor**

**Clinical Activities: FMC-MSICU, FMC-CVICU**

**Fellowship and Postgraduate Training: Internal Medicine**

Dr. Tomás Godínez-Luna graduated from The National Autonomous University of Mexico in 1977. Further training in internal medicine, critical care medicine and clinical echocardiography. He has been practicing Critical Care Medicine since 1986.



## Critical Care Medicine Faculty Members



**Terrance Hulme, Clinical Assistant Professor (MPT)**  
**Clinical Activities:** RGH-MSICU, PLC-IUC, SHC-MSICU  
**Fellowship and Postgraduate Training:** Critical Care Medicine, Pulmonary Medicine, Internal Medicine

Dr. Hulme graduated medical school in Ottawa. He completed his internal medicine and critical care training at the University of Western Ontario, in London Ontario. Upon completion of his training, Dr. Hulme moved to Calgary and joined the medical staff of the Rockyview General Hospital, where he presently practices both pulmonary and critical care medicine. His non-clinical interests focus on quality improvement and medical decision making. He is a current member of the department of critical care's delirium initiative.

**Craig N. Jenne, Assistant Professor (GFT)**  
**Administrative Responsibilities:** Canada Research Chair in Imaging Approaches Towards Studying Infection, Snyder Institute for Chronic Diseases  
**Fellowship and Postgraduate Training:** Dept of Microbiology, Immunology and Infectious Diseases, Critical Care Medicine

Dr. Craig Jenne is an Assistant Professor in the Departments of Critical Care Medicine and Microbiology, Immunology and Infectious Diseases. Dr. Jenne completed his PhD at the University of Calgary in 2005 followed by Post-doctoral positions at the University of California, San Francisco and the Australian National University before returning to Calgary in 2009. Dr. Jenne began an independent research program in 2013 using intravital microscopy to study infectious disease such as drug resistant bacterial infections and influenza. Of particular interest is how infection, immunity and inflammation interact with hemostasis leading disseminated coagulation in the critical ill. Dr. Jenne's group is supported by funding from the Canadian Institutes for Health Research, Natural Sciences and Engineering Research Council, the Heart and Stroke Foundation of Canada and the Canadian Cancer Society Research Institute. In addition, Dr. Jenne serves as the Scientific Director of the Snyder Translational Laboratory in Critical Care Medicine. The Snyder Lab works to foster clinical research projects by providing "wet bench" and biochemical support to clinical researchers, analyzing patient samples for biomarkers to develop an understand the underlying mechanisms of critical illness in an effort to improve patient care and outcomes.



## Critical Care Medicine Faculty Members



**John B. Kortbeek, Professor (GFT)**

**Clinical Activity: RGH-MSICU, SHC-MSICU**

**Administrative Responsibilities: ICU Outreach Medical Director, Member Leadership Forum, Faculty of Medicine, International Chair, ATLS, American College of Surgeons.**

**Fellowship and Postgraduate Training: Critical Care Medicine, Trauma Surgery, General Surgery**

Dr. John B. Kortbeek is a graduate of the University of Alberta. He completed an internship at St. Thomas Hospital, Akron Ohio and a General Surgery residency at the University of Calgary. He trained as a Critical Care fellow at the University of Calgary and as a Trauma fellow at Carraway Methodist Medical Centre in Birmingham, Alabama. He has held an appointment at the University of Calgary since 1991 and is currently a Professor in the Departments of Surgery, Anesthesia and Critical Care. Dr. Kortbeek has served as regional Trauma Services Director for Calgary, Director of the Intensive Care unit at the Foothills Medical Centre as well as Foothills Site Chief of Surgery. He served as Head of the Department of Surgery for the University of Calgary and for the Calgary Zone, Alberta Health Services from 2006-2016. He has been an active member of many surgical and trauma organizations. He has previously served as President of the Trauma Association of Canada, Governor of the American College of Surgeons as well as Chair of the Advanced Trauma Life Support subcommittee of the American College of Surgeons' Committee on Trauma. Dr. Kortbeek recently completed his term on the Shock Trauma Air Rescue Society (STARS) Board of Directors.



## Critical Care Medicine Faculty Members



**Andreas Kramer, Clinical Associate Professor (MPT)**

**Clinical Activities: FMC-MSICU**

**Administrative Responsibilities: Medical Director SAOTDP, DCD**

**Working Group Meeting Chair**

**Fellowship and Postgraduate Training: Critical Care Medicine, Neuro Critical Care, Internal Medicine, M.Sc., Public Health**

Dr. Andreas Kramer is a Clinical Associate Professor in the Departments of Critical Care Medicine and Clinical Neurosciences. He graduated from medical school at the University of Manitoba in 1997 and received specialty training in internal medicine and critical care at the University of Calgary in 2002. After working for three years as a community internist and intensivist in Manitoba, he obtained fellowship training in neurocritical care at the University of Virginia 2005-2007. During this time, he also completed a Master of Science degree in Health Evaluation Sciences. Dr. Kramer joined the Department of Critical Care Medicine in Calgary in 2007. He has a particular research and clinical interest in neuro-monitoring and prevention of secondary injury in neurocritical care patients. Dr. Kramer is on the Editorial Boards of the journals Neurocritical Care and Critical Care Medicine. He has over 70 peer-reviewed publications, with over half of these as first or senior author. He is a co-investigator in a number of CIHR-sponsored clinical trials. Dr. Kramer has written multiple textbook chapters on a variety of neurocritical care topics, and was the co-editor of two 2017 neurocritical care editions of the prestigious Handbook in Clinical Neurology. Since 2011, he has been the Medical Director of the Southern Alberta Organ and Tissue Donation agency, and serves on numerous Canadian Blood Services advisory committees. Dr. Kramer is married with four very energetic children between the ages of 8 and 16.



## Critical Care Medicine Faculty Members

**Julie Kromm, Clinical Assistant Professor (MPT)**

**Clinical Activities: FMC-MSICU**

**Fellowship and Postgraduate Training: Neurocritical Care**

Dr. Kromm obtained her MD from the University of Alberta. She then completed residencies in neurology at the University of Alberta, and critical care medicine at the University of Calgary. Thereafter, she completed a fellowship in neurocritical care at Columbia and Cornell Universities. Throughout her training she has also attained certification in various neuro-monitoring modalities including EEG, evoked potentials and transcranial doppler ultrasonography. She is a clinical assistant professor at the University of Calgary in the departments of Critical Care Medicine and Clinical Neurosciences. She practices as an intensivist and neurologist at Foothills Medical Centre. Her research focuses on the logistics of continuous EEG monitoring of critically ill patients. As an educator her main goal is to establish a neurocritical care training program at the University of Calgary in the Department of Community Health Sciences graduate program.



## Critical Care Medicine Faculty Members



### **Paul Kubes, Professor (GFT)**

**Administrative Responsibilities:** Holder of the Calvin, Phoebe & Joan Snyder Chair in Critical Care Research, Director; Institute of Infection, Immunity & Inflammation

**Fellowship and Postgraduate Training:** Ph.D, CIHR Senior Scientist, Dept. of Physiology & Biophysics

Dr. Paul Kubes is a basic scientist with a focus on mechanisms of disease involving acute and chronic inflammation. Dr. Kubes received his PhD from Queen's University, followed by post-doctoral training in Shreveport Louisiana with Dr. Neil Granger. Dr. Kubes joined the faculty at the University of Calgary in 1991 as a member of the Department of Immunology. Since arriving, Paul has focused his research on understanding the complex field of inflammation, and the role of neutrophils particularly involving their interaction with vascular endothelium, the role of neutrophils in acute sepsis, and the use of in-vivo high fidelity dynamic imaging to understand the activation and interaction of white blood cells with other tissues. This year, Dr. Kubes published papers in *Cell* on sterile injury (Impact factor greater than 30) and *Journal of Experimental Medicine*, *Cell Reports* and *Cell Host Microbe* in the area of infections common to the ICU. These journals all have an impact of 10 or higher. Dr. Kubes also has a CIHR Foundation Grant and a CIHR team grant in lung inflammation. Dr. Kubes is the inaugural Snyder Chair in Critical Care Research. Dr. Kubes has led multiple team grants and other initiatives including multiple Canadian Foundation for Innovation grants awarded to the University of Calgary, CIHR training team grants for developing translational research, and was a Principal Investigator for the AHFMR Sepsis Team Grant. Dr. Kubes is also the inaugural and current Scientific Director of the Snyder Institute for Chronic Disease and leads the priority initiative in Infection Inflammation and Chronic Diseases for the VPR. Past graduate students and post-doctoral fellows are now in academic positions globally. He has received numerous awards and accolades including as a past recipient of the Canadian Institutes for Health Research Health Researcher of the Year for 2014. As the Snyder Chair in Critical Care, Dr. Kubes has dedicated his time and talent to developing translational research related to critical care including investing in the next generation of clinician scientists.

## Critical Care Medicine Faculty Members



**Calvin Lam, Clinical Assistant Professor (MPT)**

**Clinical Activities:** FMC-CVICU, FMC-MSICU

**Administrative Responsibilities:** CVICU ECLS Committee co-chair, Medical Informatics Zonal Team, Cardio-Respiratory Therapeutics Program

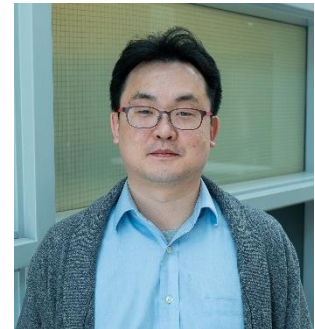
**Fellowship and Postgraduate Training:** Critical Care Medicine, Internal Medicine

Dr. Lam is an attending physician in the department, working in various intensive care units.

**Chel Hee Lee, Adjunct Assistant Professor  
Biostatistician**

**Fellowship and Postgraduate Training:** Ph.D.

Dr. Lee received his PhD in Biostatistics from the University of Saskatchewan in 2014. His undergraduate training was also in Statistics with specialization in Economic and MSc in Statistics. His research is centered on the theory and application of imprecise probabilities and the development of efficient sampling in high dimensions. In his current role as a senior biostatistician, he is working on the improvement of statistical methodologies and algorithms for evidence-based care delivery to critically ill patients.



## Critical Care Medicine Faculty Members



**Jason Lord, Clinical Associate Professor (MPT)**

**Clinical Activities:** PLC-MSICU

**Administrative Responsibilities:** Director of Assessment, PGME. CBD Lead, DCCM

**Fellowship and Postgraduate Training:** Critical Care Medicine, Emergency Medicine, M.Sc (Anatomy), M.Sc (Med Ed)

Dr. Jason Lord completed his undergraduate degree in Biology at the University of Victoria. He then moved to Kingston Ontario to complete a Master's degree in Anatomy and Cell Biology before entering Medical school at Queen's University. He graduated from medicine in 1998 and then completed residency in Emergency Medicine and fellowship in Critical Care at Queen's University in 2004. He also completed a Master's degree in Community Health Sciences at the University of Calgary with a specialization in Medical Education. Currently, Dr. Lord is dual appointed as a Clinical Associate Professor in the Departments of Critical Care Medicine and Emergency Medicine at the University of Calgary. He served as the Critical Care Residency Training Program Director from 2009-2016. He is also the Director of Assessment at the U of C PGME office and the Competence by Design Lead for the DCCM. His academic interests include medical education, simulation based training, procedural skills training and assessment methodology. Personal interests include hiking and camping, fly fishing, back-country skiing and cycling.

## Critical Care Medicine Faculty Members



**Paul McBeth, Clinical Assistant Professor (MPT)**  
**Clinical Activities:** RGH-MSICU, SHC-MSICU, FMC-MSICU  
**Fellowship and Postgraduate Training:** Critical Care Medicine, Surgery

Dr. Paul McBeth joined the Departments of Surgery and Critical Care Medicine at the University of Calgary in 2015. Dr. McBeth is a native of Calgary and started his career as an engineer with post graduate training in surgical robotics and human performance evaluation. He led the design and development of Project neuroArm: an image-guided neurosurgical robot system. During his medical training he continued to develop his research interests in robotics, remote ultrasound and monitoring of intra-abdominal pressures in critically ill patients. Dr. McBeth went on to complete post graduate training in General Surgery at the University of Calgary with sub-specialty training in Critical Care Medicine at the University of British Columbia and Trauma Surgery at the Elvis Presley Memorial Trauma Centre in Memphis. Dr. McBeth currently is an Assistant Professor of Critical Care Medicine and Surgery at the Cumming School of Medicine and Adjunct Professor of Engineering at the Schulich School of Engineering, University of Calgary. He has over 50 peer-reviewed publications and is currently developing a program to support the use of thrombelastography in trauma and the critically ill patients.

## Critical Care Medicine Faculty Members



**Braedon McDonald, Assistant Professor (GFT)**

**Clinical Activities:** RGH-MSICU, SHC-MSICU, FMC-MSICU

**Fellowship and Postgraduate Training:** Critical Care Medicine

Braedon is joining the Cumming School of Medicine as an Assistant Professor in the Department of Critical Care Medicine, and Department of Medicine. Originally from Crossfield, AB, Braedon trained in microbiology and immunology at McGill University in Montreal. He then returned to Alberta where he completed medical school as well as a PhD in immunology at the University of Calgary. Following graduation, Braedon headed west to Vancouver, where he trained in Internal Medicine at the University of British Columbia. He then returned to the University of Calgary where he completed a fellowship in adult Critical Care Medicine, as well as a postdoctoral research fellowship in the lab of Dr. Kathy McCoy at the International Microbiome Centre. Braedon now joins the Snyder Institute of Chronic Diseases and International Microbiome Centre as a clinician-scientist, leading a translational and basic science research program on microbiome-immune interactions in infection and critical illness. Braedon's clinical practice focuses on multisystems critical care, and he is an attending intensivist at FMC, RGH, and SHC. Braedon and his wife, Dr. Mary Dunbar, as well as their daughter, Frances, are thrilled to be part of the DCCM family.

**Daniel Niven, Assistant Professor (GFT)**

**Clinical Activities:** PLC-MSICU

**Fellowship and Postgraduate Training:** Critical Care Medicine, Internal Medicine

Dr. Daniel Niven is an Assistant Professor in the Department of Critical Care Medicine since April 1, 2016. He obtained his MD from the University of Calgary in 2006, and completed additional training in Internal Medicine and Critical Care Medicine in 2011. He subsequently completed a PhD in Health Services Research between 2012 and 2015. His clinical appointment is primarily based at the Peter Lougheed Centre ICU. His research focuses on improving use of evidence-based best practices in critical care through methods in Knowledge Translation. In 2016 he received the CIHR Institute of Health Services and Policy Research (IHSPR) Rising Star award, and in 2017 he was named one of Avenue Magazine's Top 40 under 40 for the City of Calgary.



## Critical Care Medicine Faculty Members



**Richard J Novick, Clinical Professor (MPT)**

**Clinical Activities:** FMC-MSICU, FMC-CVICU

**Fellowship and Postgraduate Training:** Critical Care Medicine, Cardiac Sciences, Surgery

Dr. Richard J. Novick is a consultant cardiac surgeon and intensivist at the Foothills Medical Centre and a Professor in the Departments of Cardiac Sciences, Critical Care and Surgery at the University of Calgary. He completed medical school, as well as residency training in general surgery and cardiothoracic surgery at McGill University, followed by a fellowship in cardiac surgery, critical care and transplantation at Stanford University Medical Center. He subsequently practiced at Western University's Schulich School of Medicines for 24 years, where he served as Professor and Chair of the Division of Cardiac Surgery, as well as Chief of Cardiac Surgery, at the London Health Sciences Centre.

Dr. Novick has engaged in a busy clinical practice of both cardiac surgery and critical care, while maintaining a strong academic commitment, including grant-supported laboratory research and completion of a graduate certificate in Clinical Epidemiology and Biostatistics. Dr. Novick's research interests have focused on the preservation of grafts for transplantation, on the learning curves of innovative cardiac surgical procedures and, more recently, on qualitative educational research. He introduced use of the cumulative sum failure method in the analysis of surgical learning curves and postoperative complication rates in adult cardiac surgery. In addition, he was the project leader of an \$18.2 million grant from the Canada Foundation for Innovation, which established CSTAR (Canadian Surgical Technologies & Advanced Robotics), a national centre for minimally invasive and robotic surgery. Dr. Novick has mentored numerous clinical trainees and has also supervised the laboratory and clinical research work of postgraduate fellows, surgical residents, and medical students; Dr. Novick and two of these trainees have won national research awards. Dr. Novick has served as a member of the Editorial Board of the Annals of Thoracic Surgery, including a decade as Associate Editor, and served a five year term as national Chair of the Cardiac Surgery Examination Board of the Royal College. His bibliography includes over 300 peer-reviewed papers, textbook chapters, abstracts, and invited commentaries.

Dr. Novick is married and has two sons. He has a strong interest in foreign languages and he and his family are avid hikers and skiers.



## Critical Care Medicine Faculty Members



**Ken Parhar, Clinical Assistant Professor (MPT)**

**Clinical Activities:** FMC-MSICU, FMC-CVICU

**Administrative Responsibilities:** Chair, ECLS Committee; Lead, QI ARDS Research Project

**Fellowship and Postgraduate Training:** Critical Care Medicine, Internal Medicine, Cardio Thoracic Fellowship

Dr. Ken Parhar has been a member of the Department of Critical Care Medicine since 2013. Ken was born and raised on Vancouver Island. He went to the University of British Columbia to complete his Bachelor of Science in Microbiology and Immunology (Honors), as well as a Master of Science in Experimental Medicine. After completing his Medical degree at Queen's University, he moved west to Calgary for Internal Medicine residency. Ken has completed fellowship training in General Internal Medicine, as well as Critical Care in Calgary, which included training in echocardiography. Ken has also completed an advanced fellowship in Cardio-Thoracic Critical Care at Papworth Hospital in Cambridge, England, with a focus on mechanical circulatory support. His clinical interests include hypoxemic respiratory failure, ARDS and extracorporeal life support (ECLS). Ken currently leads the ECLS program, as well as a combined QI/research project on ARDS management in Calgary. Ken and his family enjoy travelling in their spare time, and have travelled all over the world including Asia, South America, and Africa (all the way to the top of Mount Kilimanjaro). Being from BC originally, Ken is a very dedicated Vancouver Canucks fan.



## Critical Care Medicine Faculty Members



**Juan Posadas, Clinical Assistant Professor (MPT)**

**Clinical Activities:** PLC-MSICU, RGH-MSICU, SHC-MSICU

**Administrative Responsibilities:** SHC ICU Medical Director

**Fellowship and Postgraduate Training:** Critical Care Medicine, Internal Medicine

Dr. Posadas was born in Mexico City, entered Medical School at UNAM (National Autonomous University of Mexico) in Mexico City in 1990. Obtained his Medical Degree in 1997 and then completed the Residency in Internal Medicine and a Fellowship in Critical Care Medicine at UNAM/National Institute of Nutrition and Medical Science in 2003. He worked as staff Intensivist at a medical/surgical ICU at National Institute of Nutrition and Medical Science before moving to Calgary in 2007. Entered the International Fellowship in Critical Care Medicine at the Department of Critical Care Medicine at the University of Calgary and completed a Master's Degree in Critical Care in 2014. Currently Dr. Posadas is appointed as a Clinical Assistant Professor in the Department of Critical Care Medicine at the University of Calgary and as Medical Director of the South Health Campus ICU since 2016. His academic interests involve nutrition in the critically ill patient, sepsis and delirium. Juan's personal interests include long distance running, soccer, history and mystery books and FIFA2017™.

### **Tom Rosenal, Associate Professor Emeritus**

Dr. Tom Rosenal is an Associate Professor Emeritus in the Department of Critical Care Medicine. He is a critical care physician who currently works at the intersection of several fields: health humanities, clinical informatics, education and change management. Tom believes that his professional worldview arises from his experiences with critically ill patients and their families and from the opportunity to share those encounters with colleagues across many disciplines.



## Critical Care Medicine Faculty Members



**Amanda Roze des Ordon, Clinical Assistant Professor (MPT)**  
**Department of Critical Care Medicine, Department of Anesthesiology**  
**Clinical Activities:** RGH-MSICU, SHC-MSICU, FMC-MSICU  
**Administrative Responsibilities:** DCCM CME Coordinator, RGH Site  
Education Coordinator Clinical Educator Office of Faculty  
Development, Program Director Palliative Medicine Subspecialty  
Program  
**Fellowship and Postgraduate Training:** Critical Care Medicine,  
Anesthesiology, Palliative Care, Masters of Medical Education

Dr. Amanda Roze des Ordon is a Clinical Assistant Professor in the Department of Critical Care Medicine and Division of Palliative Medicine. She completed her Doctor of Medicine degree at the University of Alberta in 2006 and completed additional training in Anesthesiology (University of Alberta), Critical Care Medicine (University of Ottawa), and Palliative Medicine (University of Calgary). She has also completed a Master's Degree in Medical Education through the University of Dundee. Her research interests include serious illness conversations and patient and family support in the acute care setting. Outside of work, she enjoys hiking and spending time with family and friends.

## Critical Care Medicine Faculty Members



### James Dean Sandham, Professor Emeritus

Dr. Dean Sandham is one of the pioneers of critical care in Canada. A farm boy from southern Alberta, Dr. Sandham attended medical school at the University of Alberta. After a short time at the Montreal General as an intern, Dr. Sandham returned to Alberta as a family physician in Red Deer. He then completed internal medicine and pulmonary medicine fellowships at the University of Calgary. Dr. Sandham was responsible for starting the multidisciplinary ICU at the Calgary General Hospital. In 1986, he moved as the medical director of the Foothills Hospital ICU. Dr. Sandham was foundational in the development of critical care medicine at the University of Calgary starting the critical care residency training program, and establishing first a free standing division of Critical Care Medicine, followed by Critical Care Medicine becoming a free-standing clinical and then academic department; Dr. Sandham was the inaugural head of both the division and the department. Dr. Sandham was influential in the funding for the Snyder Chair in Critical Care Research. Dr. Sandham had an important national influence in critical care including helping to start the Canadian Critical Care Society, The Canadian Critical Care Trials Group, and the Canadian Intensive Care Foundation. Dr. Sandham served as the Dean of the University Of Manitoba Faculty Of Medicine before retiring, and returning home to Alberta. Dr. Sandham's legacy of excellence in clinical care coupled with the importance of research and patient safety continues as a philosophy within the department. The Dean Sandham Clinical Teaching Award is named in his honour, in part recognizes his influence on the training of high quality clinicians, and is awarded annually to a clinical teacher within the department (as selected by trainees). Dr. Sandham continues to reside in Alberta, and is an avid flier, outdoorsman, and music maker with his unique bedpan banjo.

# Critical Care Medicine Faculty Members



**Andrea Soo, Adjunct Assistant Professor  
Senior Biostatistician  
Fellowship and Postgraduate Training: Ph.D.**

Andrea completed a Doctor of Philosophy in 2015 at the University of Calgary with specialization in Biostatistics in the Department of Community Health Sciences. She additionally has a BSc in Statistics and Actuarial Science and MSc in Statistics. During the past 10 years, she has been very active as a statistician in multiple areas of research including outcomes and adverse events of adults and children with kidney disease and of adults in assisted living facilities. In her current role, she provides statistical and methodological expertise for research and quality improvement projects in the Department of Critical Care Medicine. She is primarily involved in a project on optimizing ARDS management with Dr. Ken Parhar, multiple projects within Dr. Tom Stelfox's research group and several other department members. Andrea is an avid fan of the Boston Bruins, enjoys sewing, knitting, and crocheting.

**H. Tom Stelfox, Professor (GFT)  
Clinical Activities: FMC-MSICU  
Administrative Responsibilities: Head, Department of Critical Care Medicine, University of Calgary & Alberta Health Services, Calgary Zone  
Fellowship and Postgraduate Training: Critical Care Medicine, Internal Medicine, Ph.D., Health Policy - Statistics & Evaluative Sciences**

Dr. Tom Stelfox is Professor and Head of Critical Care Medicine at the University of Calgary and Alberta Health Services. He received his M.D. from the University of Alberta, Internal Medicine Residency at the University of Toronto, Ph.D. in Health Care Policy at Harvard University and Critical Care Fellowship at the Massachusetts General Hospital. He focuses on applying health services research methods to evaluate and improve the quality of health care delivery to critically ill patients. His activities include developing quality indicators; developing strategies to improve continuity of patient care across the care continuum; and improving the translation of scientific evidence into clinical practice.



## Critical Care Medicine Faculty Members



**Sid Viner, Clinical Associate Professor (MPT)**

**Clinical Activities:** PLC-MSICU, FMC-MSICU

**Administrative Responsibilities:** Zone Medical Director, Calgary Zone

**Fellowship and Postgraduate Training:** Critical Care Medicine, Pulmonary Medicine, Internal Medicine

Dr. Sid Viner is a native Calgarian and specialist in Respiratory and Critical Care Medicine who has practiced in Calgary since 1990. He is a Clinical Associate Professor at the University of Calgary in the Department of Critical Care and Division of Respiratory Medicine. He received his MD degree from the University of Alberta in 1983. After completing a rotating internship at the Holy Cross Hospital in Calgary, he completed post-graduate training in Internal Medicine, Respiriology and Critical Care at the University of California, Los Angeles, University of Toronto and University of Pittsburgh. While maintaining an inpatient clinical practice, Dr Viner is also actively involved in teaching within the Faculty of Medicine. He is a senior medical administrator and leader who currently holds the position of Medical Director, Calgary Zone, Alberta Health Services. Dr. Viner is patient-focused with a particular interest in quality and engagement. Dr. Viner is married with 3 children.

**Jason Waechter, Clinical Assistant Professor (MPT)**

**Clinical Activities:** FMC- MSICU, FMC-CVICU

**Administrative Responsibilities:** FMC, Site Education Coordinator Co-Chair, DCCM Website Committee

**Fellowship and Postgraduate Training:** Critical Care Medicine, Anesthesia

Dr. Jason Waechter is an intensivist and cardiac anesthesiologist. He has an interest in medical education and is founder of [teachingmedicine.com](http://teachingmedicine.com) which is a medical education website used at many medical schools in Canada and the US. He was the cardiovascular course director for 4 years at UBC and currently is very involved with curriculum design and teaching at the University of Calgary. His research interest is competency within medical education.



## Critical Care Medicine Faculty Members



**Frank Warshawski, Clinical Assistant Professor**

**Clinical Activities:** RGH-MSICU, FMC-CVICU, SHC-MSICU

**Administrative Responsibilities:** Member, Staff Work Life Program

**Fellowship and Postgraduate Training:** Critical Care Medicine, Pulmonary Medicine, Internal Medicine

Dr. Frank Warshawski is a consultant of Critical Care Medicine since September 1984 and joined the Calgary department in July 1990. He graduated from the University of Alberta in 1976 (MD cum laude). He then completed a year of family practice in Vancouver BC, followed by further training at the University of Western Ontario in London ON, and Harvard University in Boston, Massachusetts, with specialization in Internal Medicine, Respiratory Medicine and Critical Care Medicine. Dr. Warshawski is a Clinical Assistant Professor in the Departments of Critical Care Medicine, Internal Medicine and Respiratory Medicine in the Faculty of Medicine at the University of Calgary. He was the Medical Co-Director of ICU at the Calgary District Hospital Group 1990-1998, then Director of the RGH ICU from 1998-2004. Dr. Warshawski is married with 4 children. He is an avid cyclist, swimmer & skier.

## Critical Care Medicine Faculty Members



**Jessica Wang, Clinical Assistant Professor (MPT)**

**Clinical Activities:** RGH-MSICU, FMC-CVICU, SHC-MSICU

**Administrative Responsibilities:** RGH ICU Medical Director

**Fellowship and Postgraduate Training:** Critical Care Medicine, Internal Medicine

Dr Wang is an Intensivist and Clinical Assistant Professor with the Department of Critical Care Medicine in Calgary. She was appointed Medical Director of the Rockyview General Hospital ICU in 2018. She completed her Critical Care Medicine fellowship at the University of Calgary in 2015 following her residency in Internal Medicine at the University of Saskatchewan. She completed a further 2 years of training in Melbourne, Australia, where she obtained experience in extracorporeal life support, subspecialty critical care (heart and lung transplants, burns, and trauma), in addition to completing an ICU Echocardiography Fellowship from 2017-18. Jessica was awarded the Diploma of Diagnostic Ultrasound (Critical Care) from the Australasian Society for Ultrasound in Medicine and has passed the American Board Examination of Special Competence in Adult Echocardiography. In addition to her interests in cardiovascular intensive care and critical care ultrasound, she is also passionate about medical education. She has taught throughout her career and received the University of Saskatchewan Medical Class of 1939 Resident Teacher Award in Medicine in 2013. Originally from Saskatoon, she grew up in Hong Kong, and Australia is now the third country she has lived in.



## Critical Care Medicine Faculty Members



**Brent Winston, Associate Professor (GFT)**

**Clinical Activities: FMC-MSICU**

**Departments of Critical Care Medicine, Medicine, and Biochemistry and Molecular Biology. Member: Immunology Research Group and Airway Inflammation Research Group, Snyder Institute for Chronic Diseases, Cumming School Of Medicine, University of Calgary, Calgary, AB, Canada**

**Administrative Responsibilities: Coordinator for Post Graduate DCCM Graduate Education Committee and is the DCCM Representative to the Faculty Association. Member of the DCCM Research Committee and the DCCM Residency Education Committee. Fellowship and Postgraduate Training: Critical Care Medicine, Pulmonary Medicine, Internal Medicine and Postgraduate Fellowship in molecular biology research.**

**Research Focus:**

- We are primarily interested in using metabolomics to study human diseases in Critical Care. We continue to study metabolomics in sepsis, lung injury (ARDS) and head injury (traumatic brain injury, TBI).
- Clinical/Translational studies on sepsis. We have participated in a number of sepsis clinical studies. To this end, I have created a Critical Care Tissue bank (CCEPTR) to conduct translational research on clinically important problems in the ICU and have also created a wet lab within the ICU to manage patient samples.

My laboratory is particularly interested in conducting translational research on clinically relevant Critical Care and Pulmonary disease processes.

## Critical Care Medicine Faculty Members



### **Dean Yergens, PhD Adjunct Assistant Professor**

Dr. Dean Yergens is an Adjunct Assistant Professor in the Department of Critical Care. He has a BSc in Computer Science and a PhD in Community Health Sciences with a specialization in Health Services Research. Dr. Yergens has been very active in the area of Medical Informatics having previously developed and deployed Calgary's first ICU Clinical Information System in 1995. His current area of research is in the application of artificial intelligence towards the automation of data analysis and software for improving literature reviews. He has a strong interest in Global Health having worked in several countries over the past 15 years.

### **Bryan Yipp, Assistant Professor (GFT)**

**Clinical Activities:** RGH-MSICU, SHC-MSICU

**Fellowship and Postgraduate Training:** Critical Care Medicine, Internal Medicine

Dr. Bryan Yipp is a physician-scientist and assistant professor in the department of critical care medicine at The University of Calgary. His research interests include imaging host-pathogen responses and the in vivo immune system. Bryan joined the Leaders in Medicine program at The University of Calgary and completed a combined graduate immunology and medical degree (2000-2005). He pursued Internal Medicine at The University of British Columbia in Vancouver (2005-2008) followed by Critical Care Medicine in Calgary (2008-2010). Following his clinical training, Bryan was accepted into a physician-scientist training program at The Rockefeller University, New York, where he studied under Dr. Ralph Steinman (Nobel Laureate 2011). Currently, Dr. Yipp is investigating acute immune responses in the lung using advanced resonant scanning confocal and multiphoton intravital microscopy. He has received a Canada Foundation for Innovation award and holds a Canada Research Chair (tier II) in pulmonary immunology, inflammation and host defense. His laboratory is supported by operating funds from the CIHR.



## Critical Care Medicine Faculty Members



**Nubia Zepeda, Research Program Manager**

Nubia is the Research Program Manager for the Calgary Critical Care Research Network. She received her Master's degree from the University of Alberta, and has previous experience working as a Project Manager with the Surgery Strategic Clinical Network and the Canadian VIGOUR Centre. As the Program Manager of the network, Nubia works across a variety of projects with Drs. Fiest, Niven, Parsons Leigh and Stelfox.

**Dan Zuege, Clinical Professor (MPT)**

**Clinical Activities: PLC-MSICU**

**Administrative Responsibilities: Senior Medical Director Critical Care Strategic Clinical Network; Provincial Medical Director eCritical Alberta; Medical Informatics Lead – Critical Care – Calgary Zone; Co-chair Connect Care Critical Care Area Council; Co-chair University of Calgary Medical Group Executive Council**

**Fellowship and Postgraduate Training: Critical Care Medicine, Pulmonary Medicine, Internal Medicine, M.Sc. Respiratory Physiology**

Dr. Dan Zuege graduated from the University of Alberta (MD with distinction) with further training in Edmonton and Calgary obtaining specialty certification in internal, respiratory and critical care medicine and a Master's of Science in respiratory physiology. Dr. Zuege is a clinical professor in the Departments of Medicine and Critical Care Medicine in the Cumming School of Medicine, University of Calgary. He has held a number of medical leadership positions including the Medical Director for the Peter Lougheed Centre ICU from 2001 to 2012, the Medical Director for the Southern Alberta Organ and Tissue Donation Program from 2003 to 2010, the Medical Director for the eCritical Alberta Provincial Critical Care Clinical Information System Program from 2011 to the present. He has just assumed the role of Senior Medical Director of the Critical Care Strategic Clinical Network. He is the co-chair of the University of Calgary Medical Group Executive Council. His research interests include the epidemiology and prevention of infections in critical care and the use of medical informatics to support population health in the critically ill. He is married and tries to keep up with his five year old in the mountains, skating rinks and ski hills.



# Critical Care Medicine Leadership Group

## **Caroline Hatcher, Executive Director, FMC**

Caroline is the Executive Director of Critical Care, Cardiac Sciences and Clinical Neurosciences at FMC and has been involved in Calgary zone leadership in various positions for over 25 years. She is a Registered Nurse and has a Bachelor of Science in Nursing from the University of Alberta and a Master of Health Studies, Leadership. Caroline's professional interests include Quality Improvement and Leadership development. Her patient-driven focus on quality and engagement in healthcare have also led her to volunteer abroad, teaching Leadership and QI in Africa through the Department of Global Maternal Child Health, University of Calgary.

Caroline is married and has two young adult children. In her spare time, she enjoys the great outdoors, travelling and cycling.



## **Kelly Coutts, ICU Manager, FMC**

Kelly is the Manager of the Foothills Medical Centre Intensive Care Unit. Her clinical background is in Respiratory Therapy and she is a graduate of Thompson Rivers University in British Columbia. Kelly has held leadership positions in Vancouver and Calgary over the last 20 plus years. She joined AHS in 2006 as a Clinical Educator at the Peter Lougheed Centre and has held the position of Manager for Respiratory Services at both Rockyview General Hospital and Foothills Medical Centre. Kelly's professional interests include Healthy Work Environments and Leadership Development. She is married and has 2 teenaged children. Outside of work she enjoys travelling, camping and watching her boys play hockey.

# Critical Care Medicine Leadership Group

## **Pam Holberton, Executive Director, SHC**

Pam is the Executive Director of Critical Care, Cardiac Sciences, Emergency, Medicine and Respiratory Services at South Health Campus and has been involved in Critical Care in the Calgary zone for many years.

She graduated from the Royal Alexandra School of Nursing with a diploma, has a Baccalaureate Degree from the University of Alberta and a Master of Nursing Degree from the University of Calgary.

Pam's passion is Patient and Family Centered Care. She has a 27 year old daughter, also a nurse, who lives in Australia.



## **Rachel Taylor, ICU Manager, SHC**

Rachel Taylor is the Manager of the SHC ICU/CCU. She has a BScN from the University of Brandon, MB. Rachel has been in a leadership role for the past 18 years within AHS. She has presented at national and international conferences regarding care of Cardiology Patients and Patient and Family Centered Initiatives within critical care.

# Critical Care Medicine Leadership Group

## **Teresa Thurber, Executive Director, RGH**

Teresa is the Executive Director Critical Care, Emergency, Respiratory, Women's Health and NICU @ RGH.

Nursing Graduate of Lethbridge and Athabasca University, CNA Certification in 2003 (Critical Care). She is currently working towards completion of MBA (June 2019). Over 31 years of Nursing experience includes L&D, Medicine & Seniors Health, Critical Care (ICU & CCU). The past 15 years have been spent in progressive operational leadership roles in AHS.

Married with 3 adult children, the youngest will be my Nursing successor.



## **Melissa Redlich, ICU Manager, RGH**

Melissa Redlich is the Manager for the Rockyview General Hospital's Intensive Care and Coronary Care Units, as well as the Manager for Respiratory Services. She is a graduate from the University of Calgary Nursing Program. She has over 30 years of experience in Critical Care nursing including experience in clinical nursing, critical care education, and operational management.

Melissa is the co-chair for the provincial Alberta Health Services - Critical Care Strategic Clinical Network's Delirium Project, an inter-professional team, which has been spearheading the development of a provincial critical care delirium assessment and management program.

Melissa was born and raised in Calgary. She is married and has 2 daughters, both who are following in their mother's nursing footsteps.



# Critical Care Medicine Leadership Group

## **Jana Ambrogiano, Executive Director, PLC**

Jana is the Executive Director of Critical Care, Cardiac Sciences, Medicine, NICU, Pediatrics and Respiratory Services at the Peter Lougheed Centre.

Jana is a Registered Nurse by trade and early in her Nursing career developed a keen interest in leadership. As a result she has rounded out her education to date with several Leadership certificates; a Project Management certificate and a Masters in Management degree.

Jana has held a diverse set of leadership roles in both acute care and community in the Calgary Zone over the past 16 years.



## **Patty Infusino, ICU Manager, PLC**

Patty Infusino is the manager of the intensive care unit since Sept 2015. Patty graduated from the Foothills school of nursing and then received her degree in nursing (with distinction) from the University of Athabasca. She has completed the Adult Critical Care program and was certified nationally. Prior to the managing ICU, she was the unit manager in ICU and prior the unit manager of hematology and medical teaching. Most of her career has been spent in the critical care department.



## Critical Care Medicine Leadership Group

### **Kevin Orton, CVICU Manager**

Kevin Orton is the manager of PCU 91, CVICU, OR perfusion and the Mechanical Circulatory Support Program. Graduating with a diploma in respiratory therapy in 2001 from Fanshawe College and BA PE (hons) from University of Western Ontario in 1994. A Registered Respiratory Therapist with Alberta Health Services for the past 18 years.

Kevin previously held positions as Unit Manager and Manager with the Department of Respiratory Services at the Foothills Medical Centre and Rockyview General Hospital respectively.

Kevin is married with 3 young children all of whom are actively engaged in music, sports and community.



## Critical Care Medicine Leadership Group

**Scott H. Banks MBA, CITP, CPHR**

**Calgary Zone Manager Critical Care Medicine, Emergency Medicine,  
& Obstetrics & Gynaecology**

**Co-Chair of Emergency Medicine Physician Manpower**

Scott is the Calgary Zone Department Manager for Critical Care Medicine, Emergency Medicine and Obstetrics & Gynaecology. Scott assumed the Critical Care portfolio in Sept 2017, Obstetrics & Gynaecology in July 2018 and has continued to serve as the Zone Manager in Emergency Medicine since 2008.

Scott completed his Master of Business Administration degree (MBA) at the University of Calgary in 1993 specializing in Human Resources and International Management, and his Bachelor of Arts Honors degree in 1989 from the University of Regina. Scott is a 22 year Chartered Professional in Human Resources (CPHR) in Alberta, and holds a Certified International Trade Professional Designation (CITP) in Canada. Previously Scott served as the Vice President of Operations & Human Resources at The Brenda Strafford Foundation, and as Senior Vice President & Chief Operating Officer at a for profit healthcare college in Oahu, Hawaii. He has also served as an International Development Consultant with the Canadian International Development Agency in Guyana, Manager of the Mount Royal University Small Business Training Centre, and as a Market Intelligence Research Officer at the Canadian High Commission in Trinidad. In addition, he served as the Manager of Business Training & Commercial Accounts with the Business Development Bank of Canada.

Scott has lived and/or worked in Hawaii, Canada, Trinidad, Guyana, Haiti, and Dominica. Scott is married and has very active 5 and 8 year old boys. He enjoys spending quality time with his family, his French bulldog, jogging, travelling, and volunteering with World Vision.



# Critical Care Medicine Leadership Group

## **Pam Hruska, Clinical Nurse Specialist**

Pam Hruska is the Clinical Nurse Specialist for the Department of Critical Care Medicine in Calgary, Alberta. She graduated from the University Of Calgary Faculty Of Nursing in 2003 and completed both the ACCN and Canadian Nursing Association Critical Care Certification programs. Pam completed her Masters of Science in Medical Education in 2015 during which she developed research interests in cognitive based education, reasoning, and decision-making.

Pam is married, has a tiny dog named Golaith, travels whenever possible, and loves to ski in untouched backcountry powder.



## **Devika Kashyap, Quality Improvement Lead**

Devika Kashyap is the Quality Improvement (QI) Lead for the Department of Critical Care Medicine (DCCM) in the Calgary Zone. Devika has a Bachelor's Degree in Communication Studies from the University of Calgary, a Green Belt certification in Lean Six Sigma and is certified as a Prosci Change Management practitioner.

## Critical Care Medicine Graduate Fellows



**Dr. Angela Babuk** was born in Russia and after many years on the move settled in BC, where she completed her undergraduate education at SFU in biopsychology and molecular biology.

She obtained her MD and four years of Internal Medicine training at UBC and is currently completing her Critical Care Medicine fellowship at the University of Calgary and Echocardiography training at UBC.

She is passionate about global health, community development and providing sustainable health care solutions to under-served populations.

**Dr. Colin Casault** is a Canadian Neurologist and Critical Care fellow at the University of Calgary. Born and raised in Edmonton, Alberta, he grew up with a passion for neurophysiology which he pursued into his future career. He went on to receive his Medical Doctorate, Neurology and Critical Care Medicine training from the University of Calgary. Throughout his education, he was recognized for academic excellence, education and leadership receiving the University of Alberta Dean's Silver Medal in Science, University of Calgary distinguished service award in Education and the Canadian Medical Association's Young Leaders Award.

Dr. Casault naturally gravitated towards leadership roles as both a medical student and resident eventually becoming the President of the Calgary Medical Students' Association, as well as a Board Member of the Provincial Association of Residents of Alberta (PARA), and chaired the Alberta Medical Association student affairs committee amongst many other roles. As a resident, he furthered his interest in medical education by contributing to the training of undergraduate medical students, residents and international medical graduates in Clinical Neurosciences.

Currently, Dr. Casault is finishing a two-year fellowship in Critical Care Medicine and has been accepted to a Neurocritical Care Fellowship at Massachusetts General Hospital in Boston, MA.



## Critical Care Medicine Graduate Fellows



**Dr. Adam Parry** completed his Bachelor of Health Sciences (BHSc) degree followed by medical school at McMaster University. Subsequently, he completed residency training in Internal Medicine at the University of Saskatchewan.

Dr. Parry is currently completing a two-year fellowship in Critical Care Medicine at the University of Calgary.

He enjoys running, soccer, reading everything that will inform and challenge and solving complex problems.

**Dr. Sean Spence** was born and raised in Calgary, Alberta, before leaving to complete an undergraduate degree in Life Sciences at Queen's University.

He then returned to Calgary for medical school, before moving to Toronto for three years of Internal Medicine training.

He is very happy to be back in Calgary as a first year Critical Care Fellow. When not preparing for his Royal College exams, Sean enjoys travelling, snowboarding, and spending time in Fernie



## Critical Care Medicine Graduate Fellows



**Dr. Natalia Jaworska** completed her undergraduate degree, medical school training and Internal Medicine residency at the University of Calgary. She completed her General Internal Medicine fellowship training at the University of Saskatchewan before returning to Calgary where she is currently completing a fellowship in Critical Care as well as a graduate degree in Pharmacology.

Her personal interests include rock climbing, backcountry snowboarding and hiking

**Dr. Josh Ng-Kamstra** completed his undergraduate training at McMaster University before attending medical school at McGill University. He completed a General Surgery residency at the University of Toronto. During residency, he developed a research interest in the intersection between surgical systems and global health equity. He published on the geospatial distribution of surgical resources in India before departing to Boston to complete a Master of Public Health degree and a postdoctoral fellowship at Harvard as a Paul Farmer Global Surgery Research Fellow. After returning to Toronto to complete residency, he joined the DCCM as a fellow in 2018.



## Critical Care Medicine Graduate Fellows



**Dr. Jeff Shaw** is completing his Critical Care training after finishing two three-year residency training programs in Internal Medicine and Cardiology. He has an undergraduate degree in Philosophy and Psychology as well as a MSc. in Molecular Neurosciences from the University of Western Ontario.

Jeff has two kids and a wife in the MD/PhD program at the University of Calgary. For fun the family likes to hit the slopes on the weekends.

### **Dr. Kevin Solverson**

Dr. Kevin Solverson completed his medical training in Internal Medicine and Respiriology at the University of Calgary and is currently finishing his first year of training as a Critical Care Medicine Fellow. Dr. Solverson also complete a Master of Science degree within the Department of Critical Care medicine at the University of Calgary. His research interests include pulmonary vascular disease and rehabilitation from critical illness.





## Critical Care Medicine Graduate Students

**Ian Blanchard** has worked in Emergency Medical Services (EMS) systems in Canada and the United Kingdom for over twenty years.

He is the Research Lead for the Alberta Health Services (AHS) EMS system, the provincial co-chair of the AHS EMS Research Committee, and a past and first paramedic co-chair of the Canadian Emergency Medical Services Research Network - Réseau Canadien de Recherche en Soins Préhospitaliers (CERN-RCRSP). He is also an Adjunct Assistant Professor with the Department of Community Health Sciences, in the Cumming School of Medicine at the University of Calgary.

Most recently he has become a PhD student with the Department of Critical Care, in the Cumming School of Medicine, under the supervision of Dr. Christopher Doig and Dr. Eddy Lang.

He was recently awarded the Izaak Walton Killam Doctoral Scholarship.



**Chloe de Grood** started (Fall 2017) her first year in a Masters program of Community Health Sciences at the University of Calgary under the supervision of Drs. Stelfox and Parsons Leigh.

Chloe's thesis project will focus on the role of patients, families and the public in identifying low-value clinical care practices for de-adoption.

## Critical Care Medicine Graduate Students

**Simon Olivier Guienguere** is currently pursuing his PhD in Community Health Sciences at the University of Calgary. His research interest area is in the ICU bed occupancy under the supervision of Drs. Christopher Doig and Tyler Williamson.

He graduated from Kennesaw State University (GA) with a Master of Science in Applied Statistics and a Master in Economics from University of Ouagadougou.

Coming from the business world (The Coca-Cola Company and IBM partners), he is actively learning from the healthcare industry.

Simon enjoys playing soccer, guitar, and checker (draught) during his spare time



**Fernando Mejia** is a fourth year medical resident in Public Health and Preventive Medicine, and also a Masters Candidate in Medical Education, both at the University of Calgary. His thesis research project is related to mapping the transition to 'Competence By Design' in his specialty.

## Critical Care Medicine Graduate Students

**Dr. Sayed M. Metwaly** is a PhD candidate in Medical Sciences at the University of Calgary. He is a hematologist with a diplomate membership of the Royal Colleges of Physicians of the United Kingdom (MRCPUK). He received his M.D. with distinction & honours and a MSc degree in pathology from Ain Shams University. Dr. Metwaly has strong computer and statistical prowess: he is a Microsoft certified advanced C++ programmer, a Linux shell script programmer and an R programmer with interests in data visualization, machine learning algorithms and multivariate statistical modelling. His PhD project focuses on using metabolomics technologies, machine learning algorithms and multivariate statistical modelling to explore the unmet areas of acute respiratory distress syndrome (ARDS) care.



**Victoria Owen** is a critical care nurse and a Masters student in the Department of Community Health Sciences in the Health Services Research specialization at the University of Calgary. She is under the supervision of Dr. Daniel Niven and Dr. Kirsten Fiest. She graduated with a BSc in Nursing from the University of British Columbia Okanagan, and went on to complete a certificate in Critical Care Nursing from Mount Royal University. Her current thesis work focuses on adherence to evidence-based guidelines for delirium in Albertan intensive care units.

## Critical Care Medicine Graduate Students

**Emma Sypes** is a Masters student in the Department of Community Health Sciences specializing in Health Services Research at the University of Calgary. She is supervised by Drs. Tom Stelfox and Dan Niven. Emma received her Bachelor of Science Honours degree from the University of Guelph in 2017, majoring in Bio-Medical Science. Her current thesis work focuses on the role of the public in reducing low-value care.



## Critical Care Medicine Post-Graduate Fellows

**Nik Bobrovitz** joined the department in July 2018 as post-doctoral fellow. He is working with Dr. Tom Stelfox and Dr. Dan Niven on a large scoping review of research reproducibility. Nik completed his PhD as a Clarendon Scholar at the University of Oxford. He obtained his MSc in Health Services Research and Bachelor of Health Science Honours degree (BHSc) at the University of Calgary. He will be starting medical school at the University of Toronto in August 2019



**Khara Sauro** is a postdoctoral fellow in the Department of Critical Care Medicine and the recipient of a several awards (CIHR, W21C-CRIO, and Cumming School of Medicine/O'Brien Institute of Public Health) for her postdoctoral work. She is currently examining the implementation of best practices in the ICU and safety of care.

Khara graduated from the University of Calgary with a PhD in Community Health Science (health services research). She has over 33 publications; presented her work over 40 times at provincial, national and international conferences; has sat on provincial and international committees; and is a coauthor on a World Health Organization clinical practice guideline.

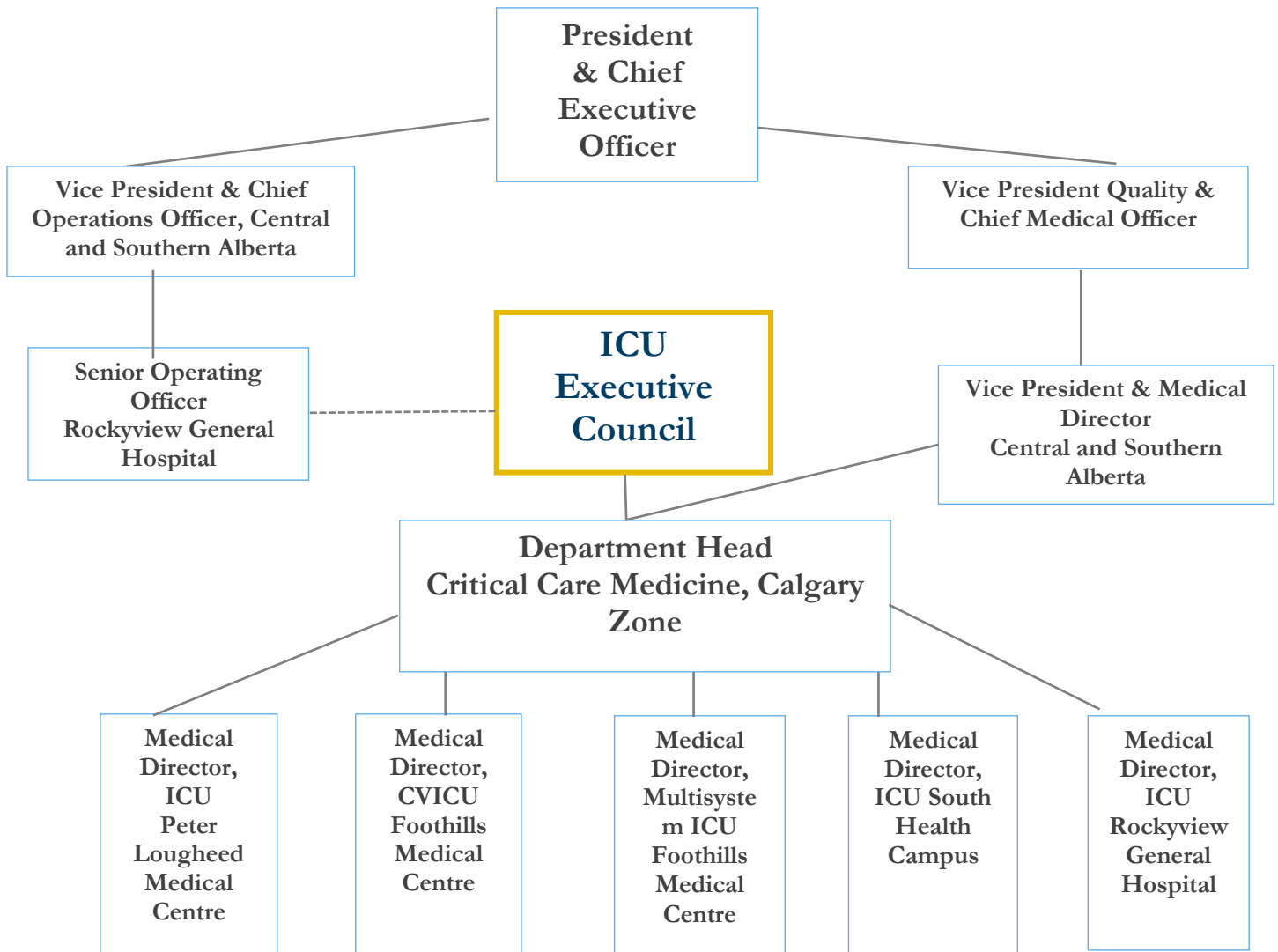
Khara has a particular interest in the application of knowledge translation and quality improvement methodologies for improving the quality & safety of healthcare, and the application of administrative data to evaluate and improve healthcare quality. As a health services researcher, Khara uses diverse methodologies in order to ask and appropriately answer clinically relevant research questions.

# Appendices

## I. Department Structure and Organization

### Governance

The Departmental functions are principally located at the four acute care sites, with the Peter Lougheed Medical Centre, Rockyview General Hospital and South Health Campus Hospital providing general intensive care services while the Foothills Medical Centre, in addition, provides tertiary services for Trauma and Neurosciences patients. Cardiovascular Surgery intensive care services are provided at the Foothills Medical Centre in a distinct ICU under the supervision of Intensivists from the Department of Critical Care Medicine.



## Appendices

The Calgary Zone reporting relationships and governance of DCCM are provided in the schema outlined above. The DCCM Head is a member of the Zonal Medical Advisory Committee. All DCCM members share responsibility for the vision, goals and advancement of all facets of the Department: excellence in clinical service, administrative leadership, and scholarly initiatives in education and research that are aligned with the University's vision to be one of the top five Universities in Canada. The DCCM Head has frequent council with the members of the Department, Medical Executive Committee and also with the Zonal ICU Executive Council for operational issues. Participation by medical and non-medical ICU practitioners in our Departmental Research Seminar, our site based Zonal Morbidity and Mortality working group review processes with direct links to our Departmental Quality Assurance Committee and finally social programs foster our strong Zonal and inter-disciplinary cooperation.

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### Departmental Committees

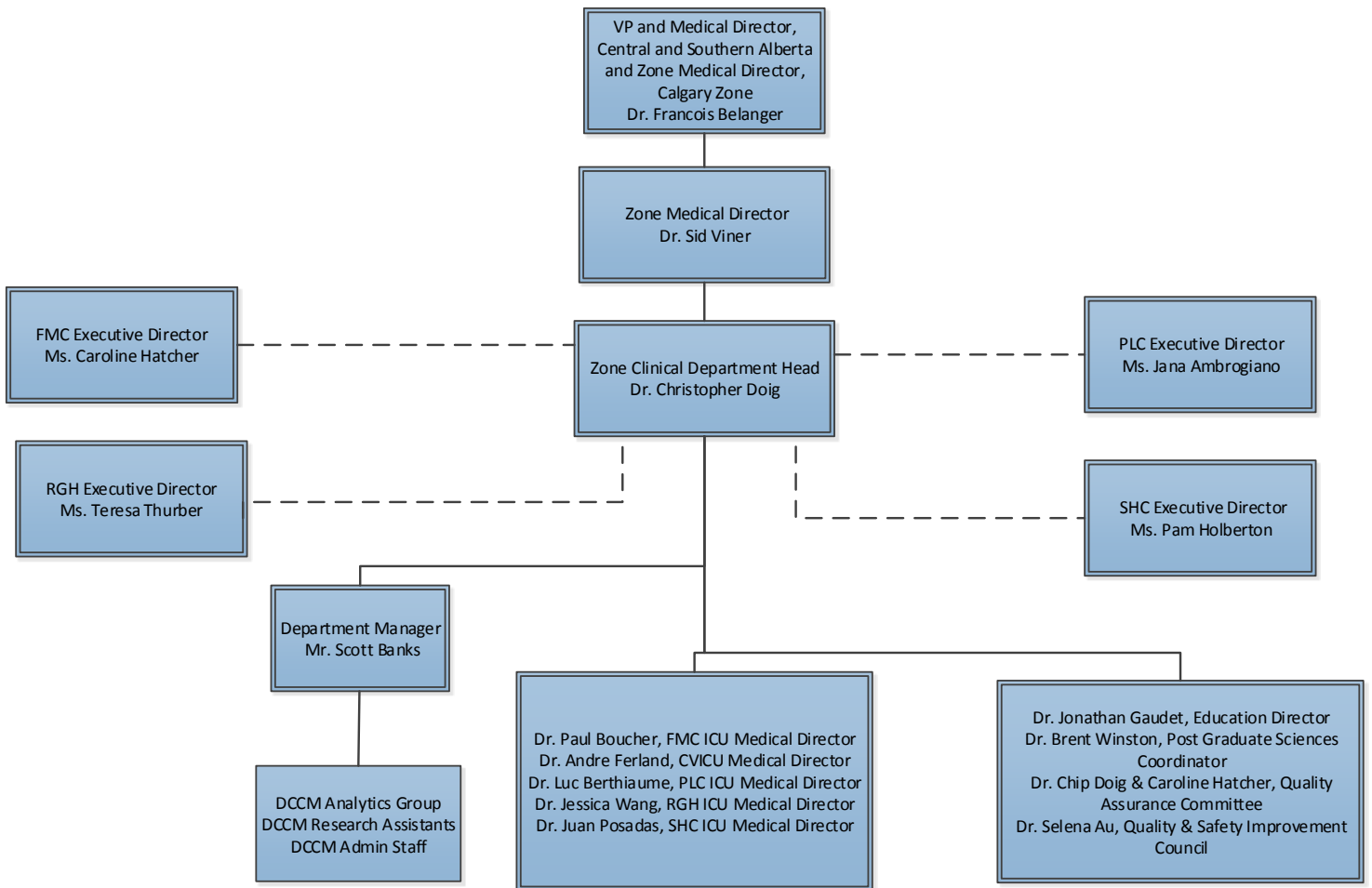
The following Departmental Councils and Committees meets on a regular basis based on the Terms of Reference for each group. Councils more often have a zone mandate and a broader inter-professional representation than committees.

- ICU Executive Council
- Quality Assurance Committee
- Zonal Resuscitation Council
- ICU Medical Executive Committee
- Zonal ICU Outreach Steering Committee
- Zonal Code Blue Committee Meeting
- DCCM Faculty Business Meeting
- Mortality Working Group
- DCCM Clinical Research Meeting



# Appendices

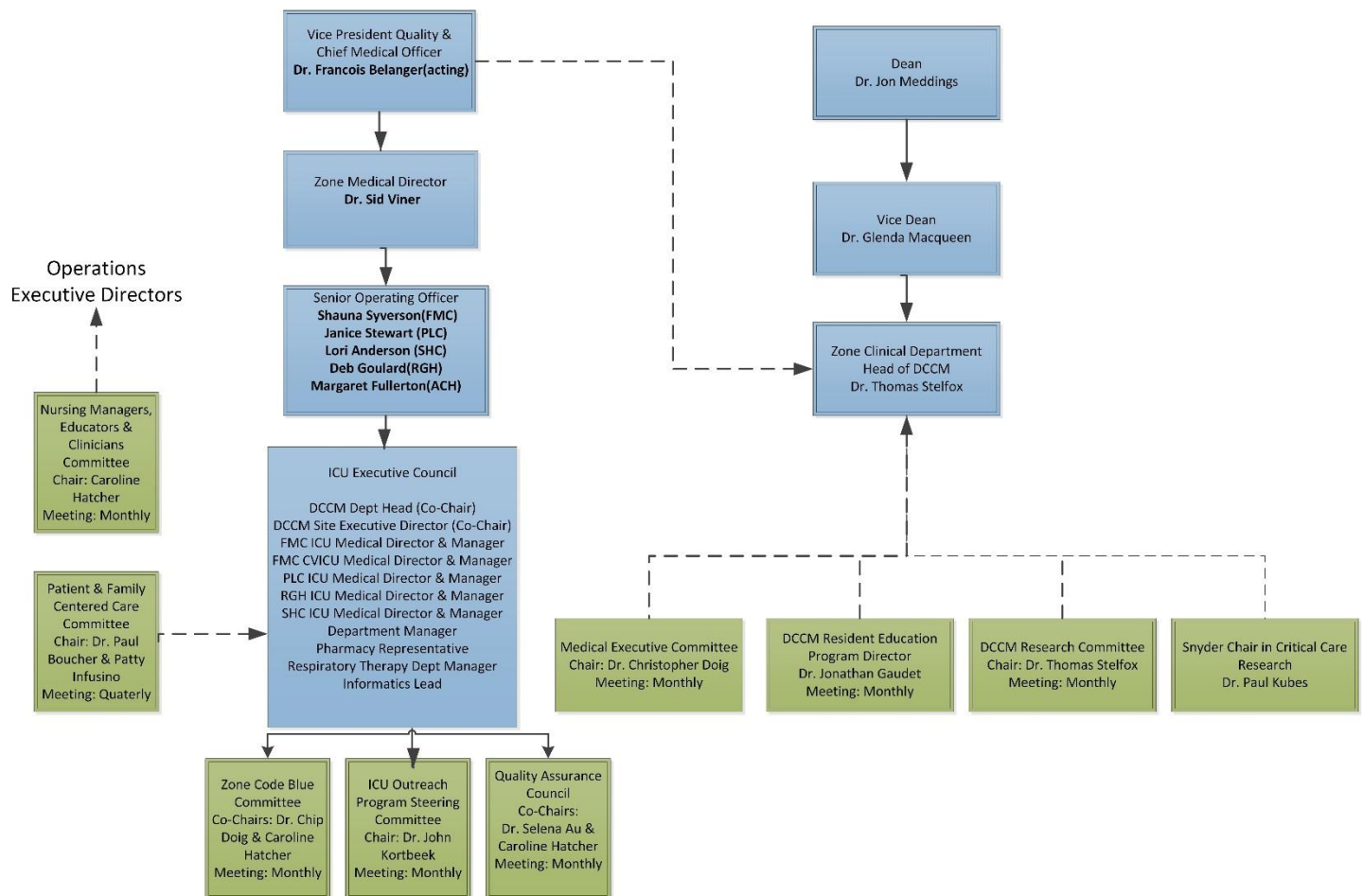
## II. Medical Leadership & Administration



# Appendices

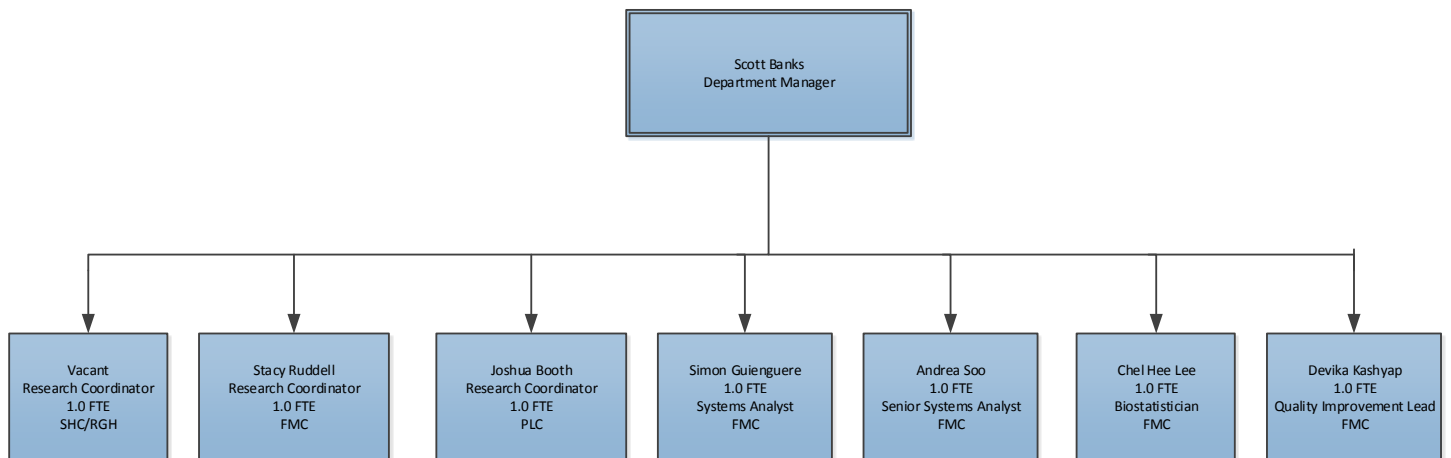
## AHS Calgary Zone Acute Care

## University of Calgary Faculty of Medicine

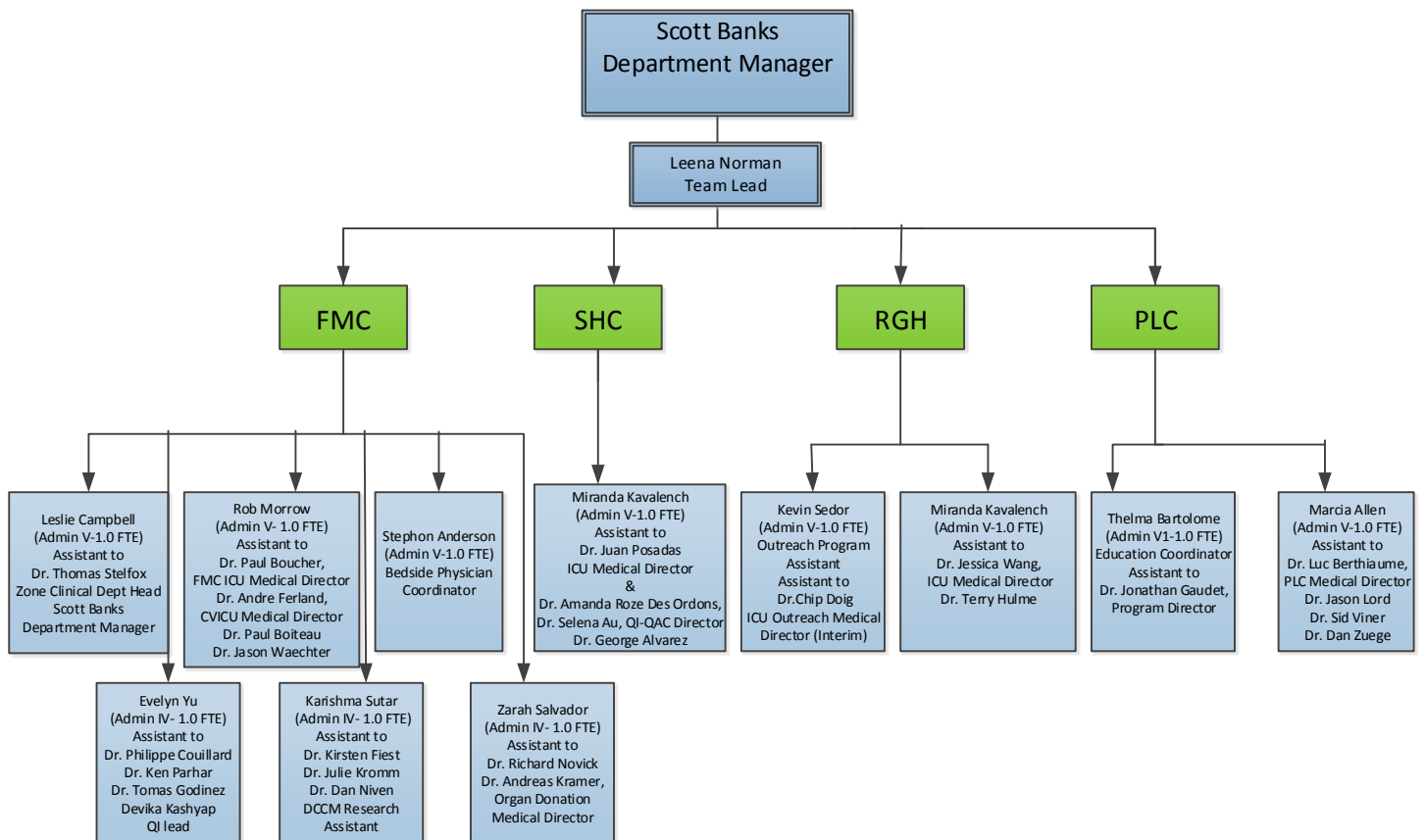


# Appendices

## III. Department of Critical Care Medicine Support Staff



# Appendices



## IV. Clinical Activity & Organization

The Calgary Zone serves a population in Calgary of approximately 1,267,000 and a regional referral of an additional 300,000 patients from south and central Alberta, southeastern British Columbia and occasionally southwestern Saskatchewan.

Adult critical care is provided in five ICU's; the multi-system ICU's (MSICU) are located at each of the Calgary hospitals and one cardiovascular ICU (CVICU) for the management of post-operative heart patients is located at the FMC, and is medically administered and staffed by our Department. The FMC provides regional trauma and tertiary neurologic services within a state of the art 28 bed ICU. It is divided into 3 distinct pods to meet the needs of the critically ill neurologic and trauma patients, the general medical and surgical patient's as well high dependency type patients. The PLC provides regional vascular surgery services and also has an 18 bed MSICU while the RGH provides regional urology services and has a 10 bed MSICU. The SHC, our newest facility currently serving the southern portion of the city has a 10 bed MSCICU. The RGH ICU has a slightly older and classic medical-surgical distribution of patients. The FMC-CVICU has 14 funded beds. The provision of coronary or medical cardiac intensive care is under the purview of the Department of Cardiac Sciences.

Approximately 3.5% of all ICU patients are referred from outside of Calgary. The adult MSICU's in cooperation with Referral, Access, Advice, Placement, Information & Destination (RAAPID) call center and the Shock Trauma Air Rescue Society (STARS) air ambulance system manage referrals so as to maximize bed utilization while respecting the necessity to offer regional services, such as vascular surgery, at only one site. Currently, any out-of-town physician with a critically ill patient can contact the Department of Critical Care Medicine through RAAPID. The RAAPID dispatcher engages in a conversation with the most appropriate site Intensivist according to patient needs and regional ICU capacity.

This process is facilitated by a flow map which is a joint initiative of the Department and RAAPID (see DCCM website). The key to the success of this process is for all participants and stakeholders to demonstrate the necessary flexibility as our Zonal and Provincial landscape changes.

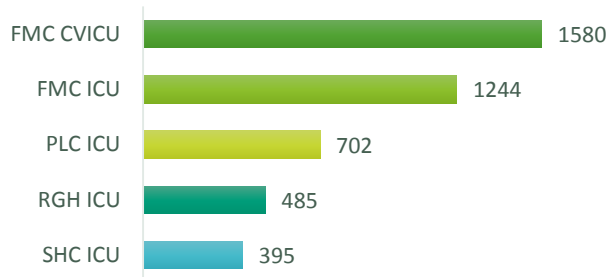
A conference call with the ICU attending, the referring physician, the STARS 'flight' doctor, and any other specialist can be immediately arranged by this service. Within the city, the adult ICU's have adopted a policy of '1 ICU across 4 hospitals' and frequently the Department coordinates inter-institutional transfers of critically-ill patients. These patients may be transferred directly between ICU's or from an Emergency Department to an ICU. These two mechanisms of referral and transfer have helped ensure that all ICU's provide tertiary care referral service, maximize bed utilization across the zone, and continue the spirit of zonal cohesiveness and cooperation.

Over the years, our Zonal "Out of Region Referrals" policy has been changed to reflect our bed capacity issues and subsequently to reflect the creation of one healthcare system under Alberta Health Services (AHS). We are committed to the repatriation of non-Calgary zone patients to their home jurisdictions (Healthcare Zones) once the need for tertiary care services no longer exists. The cancellation of elective surgeries and the transfer of patients to alternate Health Zone ICU's as Departmental bed capacity management strategies only proceeds once all site over capacity measures have been exhausted within the city of Calgary (see DCCM website). Discussions continue to ensure however, that the needs of our usual referring Alberta Health Zones as well as neighboring Eastern BC Health Systems are met through the endorsement of timely policy revisions by the Departmental ICU Executive Council in collaboration with our Zonal Senior Leadership group.

# Appendices

**There were 4,406 admissions in 2018 in the Departmental ICU's.**

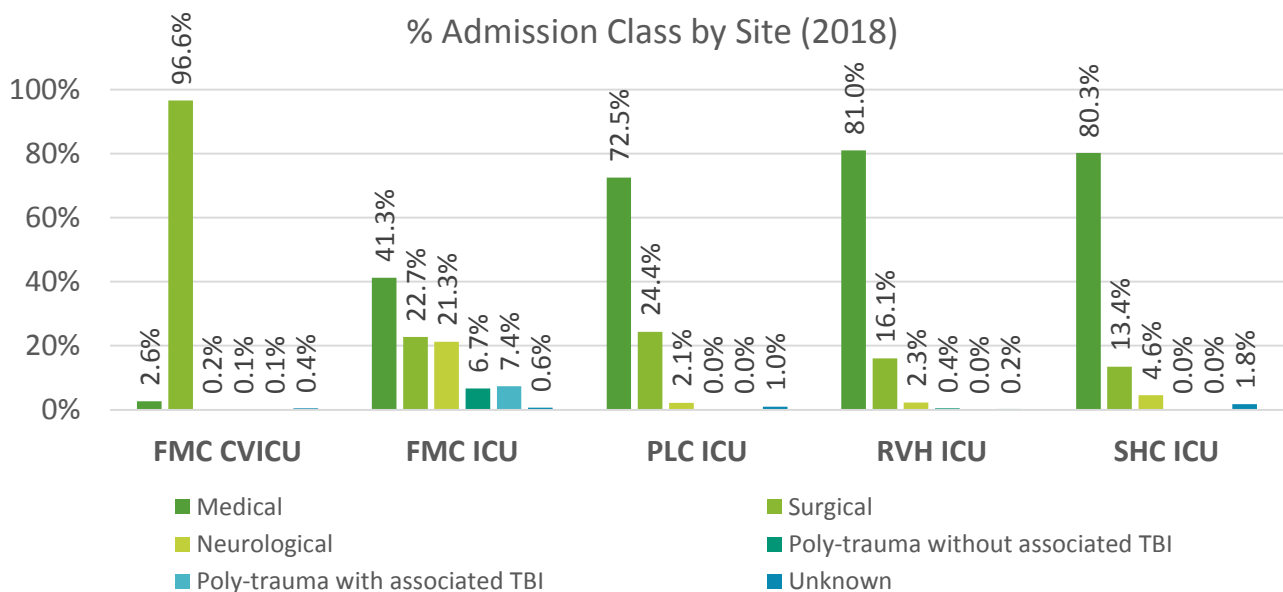
**Number of Admissions by Site (2018)**



All ICU's perform standard critical care monitoring and physiologic support. All units are equipped with similar equipment. All adult ICU's have state of the art bedside ultrasound equipment to secure vascular access and perform limited diagnostic thoracic (cardiac, chest) and abdominal scans 24 hours a day. All ICUs can provide continuous renal replacement therapy (CRRT) with accountability for this service falling under the department of critical Care Medicine. A Zonal CPG with clear policies and procedures guides the provision of this service. Intermittent hemodialysis is provided at both the PLC and FMC with the assistance of the Nephrology service.

Patients experiencing catastrophic lung failure, in the absence of multi-system organ failure, may be referred to our Zonal Extra-Corporeal Lung Assist Program, a collaborative effort between Departmental Intensivists working in the FMC CVICU, cardiovascular surgeons and perfusionists from the Department of Cardiac Sciences at the FMC. Intracranial pressure monitoring is performed at the FMC-MSICU; the standard is percutaneous ventricular drains placed by Neurosurgery, and managed by Critical Care. Jugular venous oxygen saturation monitoring, interventional hypothermia and continuous EEG recording are also commonly used. In the past few years, the FMC ICU has been using cerebral microdialysis in association with the placement of intra-parenchymal Codman microsensor ICP transducers and brain tissue Po2 probes as part of a program in neurocritical care led by our 2 neurocritical care intensivists. The decision to concentrate the provision of neurologic critical care services into one pod at the FMC (C Pod) will allow the development of advanced competencies for both nursing and medical staff while enabling the Critical Care Residency Training Program to move forward with establishing a Neurocritical Care Fellowship program for physician trainees following the completion of 2 years of general critical care medicine training.

**% Admission Class by Site (2018)**



## Appendices

In the summer of 2006, the ICU Outreach Team (Code 66) was born from the realization that our healthcare system needed to recognize critical illness early and to respond to patients wherever they are in the hospital. The goal of having such a Team was to facilitate timely admission of patients to ICU when required, allow direct access of all health care personnel to the expertise of a critical care team to assist in the care of their patients, share critical care skills and expertise through educational partnerships, promote continuity of care by providing follow-up to patients transferred out of ICU and ultimately to improve communication and relationships among health care teams within our acute care sites. The novelty of this concept resides with the fact that the Team can be activated by any health care provider guided by predetermined triggers (e.g., Respiratory rate  $< 8 > 30$  / min, Change in O<sub>2</sub> saturation to  $< 90\%$  when O<sub>2</sub>  $> 5L/min$ , Pulse rate  $< 40 > 140$  / min, Systolic BP  $< 90$  mmHg or acute decrease in systolic BP, etc.). The system was first implemented in the summer of 2006 at the FMC followed by a fall implementation at the PLC and a summer of 2007 implementation at the RGH.

The vision of the eCritical Alberta Project (formerly the Critical Care Clinical Information System (CCCIS) Project), is to deliver the most comprehensive, multimodal and integrated data repository of patient-specific critical care clinical information in the nation, which will present real-time information in an intuitive fashion for optimal and timely patient-specific decision making, while also enabling the creation of timely unit, zonal and provincial reports for administrative, quality improvement, education and research purposes. Ultimately, the Project will deliver a single system – eCritical Alberta – with a single access point for critical care where all charting, documentation, decision support and interfaces to other dependent systems will occur. To accomplish this, eCritical Alberta requires two key components – a bedside clinical information system (MetaVision) and a data warehouse (TRACER). eCritical is now present throughout Alberta's adult, and neonatal ICU's. It is currently expanding to all coronary care units.

The Department of Critical Care Medicine continues to be involved in the initiatives to develop a national critical care data set. A breakthrough in reaching a consensus on ICU data elements necessary for the creation of an initial "Report Card" occurred in February 2005 at the Rocky Mountain Critical Care Conference held in Vernon, British Columbia. Representatives from the following organizations subsequently partnered in submitting a grant to the Canadian Patient Safety Institute in July 2006 on the value of a Critical Care Report Card in driving institutional quality improvement and patient safety initiatives: Vancouver Coastal Health Region, Calgary Health Region, Winnipeg's Regional Health Authority, London Health Sciences Centers, the Ottawa Hospital, Sunnybrook Health Sciences Centre and the Sir Mortimer B. Davis Jewish General Hospital in Montreal. The grant application was successful and critical care leaders from across the country have been working earnestly on the project since early 2007 with an objective to agree upon indicators and their definitions and standardized methodologies for the collection/reporting of key data elements in critical care as well as encouraging participants to share their administrative and clinical data for the benefit of their respective organizations and ultimately patients across the country.

Our department developed, housed and maintained a prototype web-based Canadian Critical Care Score-card application which was used by 24 ICUs in 7 Canadian cities to submit data for 23 quality indicators for benchmarking by peer groups. The application generated on-line benchmark and individual reports using statistical control charts which assisted the leadership of individual Intensive Care Units (ICUs) for purposes of quality improvement and administration. After the success of the prototype applicator a new grant was requested for further development.

Continuous development and enhancements on our departmental web site made this site an important communication tool. Among the many useful features of our internet website we can mention; a unit bed capacity monitor, online quizzes and



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surveys, physician's call schedule, policies and procedures, documentation and access to multiple reports and online applications, just to name a few. Apart from the secured intranet website, we have a fairly comprehensive site available for our families and an external site available to the public.

## V. Workforce Planning

### Summary of Recruitment

#### *Academic Department Members in Critical Care Medicine in 2018:*

Dr. Tom Stelfox assumed the role of Department Head.

Dr. Jessica Wang assumed the role of RGH Site Medical Director.

#### *Vacant Positions filled:*

Neuro-Intensivist: Dr. Julie Kromm

Cardiovascular Intensivist: Dr. Jessica Wang

Microbiome/Clinical Scientist: Dr. Braedon McDonald

#### *Physician Promotions in 2018:*

Dr. Andre Ferland- Clinical Professor

#### *Ongoing recruitment for the following positions:*

Clinician-Scientist (GFT)

Deputy Department Head, Clinical Operations

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## VI. Department Research Report – 2018

### Departmental Research Report - Quarter 3

#### Current DCCM Clinical Studies

Active Clinical Studies			Department Member Participation (n=)	
Industry Trial	Non-Industry Trial	Local Initiated Trial	PI	Co-I
1	6	2	10	9

#### On-going Enrolment – Calgary Zone

Study Name	# Active Enrolment Sites	Patient Enrolment		Start Date
		Most Recent Quarter	Total	
BALANCE	2	1	17	Jan-16
STARRT-AKI FMC	1	0	17	Dec-16
STARRT-AKI PLC	1	3	17	Dec-16
RE-ENERGIZE	1	1	8	May-16
CAN TBI	1	4	19	Jun-17
INDEX	1	5	17	Feb-18
SAHARA	1	0	5	May-18
HEMOTION	1	1	1	Nov-18
HALO	1	0	0	Nov-18
ARTI	4	10	10	Dec-18

#### Patient Enrolment (YTD)

2018	Foothills Medical Centre (n=610)		Rockyview General Hospital (n=235)		Peter Lougheed Centre (n=341)		South Health Campus (n=182)		Calgary Region (n=1,368)	
	Total	N° per 100	Total	N° per 100	Total	N° per 100	Total	N° per 100	Total	N° per 100
Screened	631	51	11	2	84	12	31	8	757	27
Missed*	2	3	1	13	0	0	0	0	3	3
Enrolled	75	6	7	1	15	2	6	2	103	4
Admitted	1,244		485		700		394		2,823	

\*potentially eligible patients not considered for participation

#### Research Finances

Period: 2018/19	Total Cost	Total Revenue	Variance
Quarter 1 (April - June)	\$ 85,786.75	\$ 147,752.80	\$ 61,966.05
Quarter 2 (July - September)	\$ 67,264.42	\$ 64,233.76	\$ (3,030.66)
Quarter 3 (October - December)	\$ 33,954.45	\$ 16,417.00	\$ (17,537.45)
Quarter 4 (January - March)			
YTD	\$ 187,005.62	\$ 228,403.56	\$ 41,397.94
Period: 2017/18	\$ 379,979.43	\$ 278,712.28	\$ (101,267.15)
Period: 2016/17	\$ 334,950.00	\$ 177,249.37	\$ (157,700.63)

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## VII. Grants, Publications & Abstracts

### Department of Critical Care Medicine Research Grants

<u>Granting Agency</u>	<u>Title of Project</u>	<u>Period of Support</u>	<u>Funds Received</u>
Janssen Research & Development, LLC(Janssen Research & Development is a pharmaceutical company of Johnson & Johnson) Site Investigator: <b>Dr. Chip Doig</b>	A Study to Explore the Distribution of Influenza, RSV and hMPV in Adults Hospitalized with Acute Respiratory Tract Infection (Sub Investigator)	2018-2021	Fullstudy:300 patients (\$430 per patient) Sub Study: 36 patients (\$1,619 per patient)
Physician Services Incorporated Foundation <b>Dr. Richard Novick</b>	Building the collective competence of an interprofessional team: how do members of a clinical team seek help when they need it?	2018 - 2020	\$139,500
SGS Emergent Biosolutions Canada Inc. Site Investigator: <b>Dr. Brent Winston</b>	A randomized, double blind, placebo controlled dose ranging study evaluating the safety, pharmacokinetics and clinical benefit of FLU-IGIV in hospitalized patients with serious Influenza A infection	2018- Present	Not mentioned
Canadian Institutes of Health Research (CIHR) <b>Dr. Dan Zuege</b> , Principal Investigator	Bacteremia antibiotic length actually needed for clinical effectiveness: Randomized Controlled Trial (BALANCE study) Site: Peter Lougheed Centre (Site co-investigator)	2018- Present	\$1,105,849
Canadian Institutes of Health Research (CIHR) <b>Dr. Dan Niven</b> , Principal Investigator	Creating a Living Knowledge Translation Agenda to Improve the Delivery of Evidence-based Care in Adult Critical Care Medicine	2018 - 2021	\$393,974
Canadian Institutes of Health Research (CIHR) Co-Investigator: <b>Dr. Tom Stelfox</b>	A Pragmatic Cluster, Randomized, Crossover, Registry-Embedded Clinical Trial of Proton Pump Inhibitors vs. Histamine-2 Receptor Blockers for Stress Ulcer Prophylaxis Therapy in the Intensive Care Unit (PEPTIC Study)	2018 - 2020	\$317,475.00
MSI Foundation <b>Dr. Ken Parhar</b> , Principal Investigator	Testing a Knowledge Translation Strategy to Improve Outcomes in Critically Ill Patients with Respiratory Failure: Minimizing Variation in Care through the Implementation of an Evidence Based Care Bundle	2018 - 2020	\$139,000.00

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Roche Site Investigator: <b>Dr. Dan Zuege</b>	A Phase III multicenter randomized double-blind active-controlled study to assess the efficacy and safety of baloxavir marboxil in combination with a neuraminidase inhibitor versus a neuraminidase inhibitor alone in hospitalized patients with severe influenza	2018 - Present	
O'Brien Institute for Public Health <b>Dr. Dan Niven</b> , Principal Investigator	Prioritization of Evidence-based Best Practices for Adoption/De-adoption in Adult Critical Care Medicine.	2018 - 2019	\$10,000
Canadian Foundation for Health Care Innovation (CFHI) <b>Dr. Tom Stelfox</b> , Principal Investigator	Bridge to Home Spread Collaborative	2018 - 2019	\$39,647
Canadian Frailty Network <b>Dr. Kirsten Fiest</b> , Principal Investigator	Family Identification of Delirium in Critically Ill Patients Living with Frailty	2018 - 2019	\$100,000
Canadian Institutes of Health Research (CIHR) <b>Dr. Kirsten Fiest</b> , Principal Investigator	Family-administered delirium detection in the critically ill	2018 - 2021	\$428,400
University of Calgary Taylor Institute Teaching and Learning Grant. <b>Dr. Amanda Roze des Ordon</b>	Peer observation of clinical teaching: exploring experiences and impact.	2018 - 2019	\$19,100
Canadian Institutes of Health Research (CIHR) <b>Dr. Amanda Roze des Ordon</b>	Development, implementation and evaluation of an innovative integrated supportive care pathway by primary care across Alberta.	2018 – (not mentioned)	\$100,000.
Office of Health and Medical Education Scholarship Grant. <b>Dr. Amanda Roze des Ordon</b>	What paths have they taken? Assessing the broader impact of a program to enhance faculty skills in teaching and educational scholarship.	2018 – (not mentioned)	\$7,300.
Canadian Institutes of Health Research (CIHR) <b>Dr. Bryan Yipp</b> , Principal Investigator	Lung Sensory Nerves Detect Pathogens and Alter Pneumonia Outcomes via the Regulation of Neutrophils.	2018-2023	\$914,176
Alberta Health Services <b>Dr. Tom Stelfox</b> , Principal Investigator	Improving ICU-to-Ward Transfers of Care: Evaluation of an ICU Transfer Summary Tool (Co-PI: K. Sauro*)	2018-2019	\$26,509.39

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## Department of Critical Care Medicine Research Publications

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# Appendices

## Department of Critical Care Medicine Research Abstracts

### January 2018

1. Blanchard, IE\*; Ahmad, A; Tang, KL; Ronksley, PE; Lorenzetti, D; Lazarenko, G; Lang, ES; Doig, CJ; and Stelfox, HT. The Effectiveness of Prehospital Hypertonic Saline for Hypotensive Trauma Patients: A Systematic Review and Meta-Analysis. Oral presentation at the National Association of EMS Physicians conference in San Diego in January 2018.
2. Mohammad Mehdi Banoei, Ryan Groves, Ian Lewis, Jamie Hutchison, Douglas Fraser, Hans Vogel, Beata Mickiewicz and Brent W. Winston for the Canadian Critical Care Translational Biology Group. Metabolomics in TBI: examining pediatrics severe traumatic brain injury (sTBI) and a controlled cortical impact (CCI) mouse model: An Update. Presented at the CCCTBG meeting in Lake Louise, Jan 2018.
3. Metwaly, S., Donnelly, S., Banoei, M., Mourad, A., Vogel, H., Winston, B.W. & the Canadian Critical Care Translational Biology Group (CCCTBG). Using Metabolomics to Study ARDS. Presented at the CCCTBG meeting in Lake Louise, Jan 2018.
4. Mohammad Mehdi Banoei, Beata Mickiewicz, Hans J Vogel, Ian Lewis, Brent W. Winston. Metabolomics study on pediatrics severe traumatic brain injury (sTBI). Presented to the Alberta Society of Critical Care Physician annual meeting and the Critical Care Strategic Clinical Network research conference and the Canadian Critical Care Translational Biology Meeting, Lake Louise, 2018.
5. Metwaly, S., Donnelly, S., Banoei, M., Mourad, A., Vogel, H., Winston, B.W. and the Canadian Critical Care Translational Biology Group (CCCTBG). Using Metabolomics to Study ARDS. Presented to the ASICP, SCN and the CCCTBG at Lake Louise Conference 2018.
6. Metwaly, S., Donnelly, S., Banoei, M., Mourad, A., Vogel, H., Winston, B.W. and the Canadian Critical Care Translational Biology Group (CCCTBG). Using Metabolomics to

Study ARDS. Accepted for presentation to the Canadian Respiratory Congress, 2018.

7. Barnes TRM, Niven DJ, Soo A, Ferland A, Stelfox HT, Doig CJ, Parhar K. Epidemiology of Myocardial Dysfunction Among Patients with Acute Respiratory Distress Syndrome. Oral presentation (presented by lead author) at Alberta Society of Intensive Care Physicians 30th Annual General Meeting 2018; Lake Louise, Alberta.

### February 2018

8. Lord, J, Ellaway R, Palacios Mackay M, Waechter J, Berthiaume L, Roze des Ordons A, Novick R & Gaudet J. Critical Care Medicine Physician Perceptions Regarding Transition to Competence Based Medical Education: Are we Ready? OHMES Symposium, Calgary, AB. 2018
9. Babuk, A, Ellaway R, Palacios Mackay M, Waechter J, Berthiaume L, Roze des Ordons A, Novick R, Gaudet J & Lord J. 'Mind the Gap': Does Understanding Competence Based Medical Education Impact Perceptions Related to Implementation? OHMES Symposium, Calgary, AB. 2018
10. Lord J, Palacios Mackay M, Zuege D, Roze des Ordons A, Lockyer J. Using generalizability theory to assess the dependability of scores from four assessment tools for central line insertion. Presented at OHMES conference, Calgary, Feb 2018.
11. Lord J, Palacios Mackay M, Zuege D, Roze des Ordons A, Lockyer J. Establishing validity evidence: assessing the dependability of scores from four assessment tools for competence in central line insertion. Presented at OHMES conference, Calgary, Feb 2018.

### March 2018

12. Sauro KM, Niven DJ, Soo A, Couillard P, Kramer A, Kromm J, Zygun D, Bagshaw SM, Stelfox HT. Venous thromboembolism

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prophylaxis among neurocritical care patients: What is current practice? International Symposium on Intensive Care and Emergency Medicine 2018; Brussels, Belgium: abstract A115.

13. Sauro KM\*, Soo A, Stelfox HT. Adverse events among those admitted to the ICU: A retrospective cohort study using administrative data. International Symposium on Intensive Care and Emergency Medicine 2018; Brussels, Belgium: abstract A148.
14. Fiest KM; Krewulak K; Davidson J; Ely EW; Stelfox HT. - Feasibility of employing family-administered delirium detection tools in the intensive care unit (ICU). 38th International Symposium on Intensive Care and Emergency Medicine (ISICEM), Brussels, Belgium, March 2018.

### May 2018

15. Vis D, Soo A, Zuege D. Ventilator Associated Complications: Development and validation of an automated detection algorithm and application in a population-based cohort of adult critical care patients in Alberta. Presented at the American Thoracic Society conference, San Diego, May 2018.
16. Montgomery C, Bagshaw S, Stelfox HT, Rolfson D, Zuege D, Zygun D, Hudson D, Openorth D. Frailty in Critical Illness from an Alberta Perspective. Presented at Critical Care Medicine Research Day, University of Alberta, May 2018.
17. 38. Hall A, Stelfox HT, Wang X, Chen G, Zuege D, Dodeck P, Garland A, Scales D, Berthiaume L, Zygun D, Bagshaw S. After hours discharge from the intensive care unit increases all-cause hospital mortality: A retrospective cohort study. Presented at Critical Care Medicine Research Day, University of Alberta, May 2018.
18. Niven DJ, McCormick TJ, Barnes TRM, Fiest KM, Straus SE, Hemmelgarn BH, Jeffs LP, Stelfox HT. Understanding the Reproducibility of Randomized Controlled Trials in Critical

Care: A Systematic Review. Oral Presentation (presented by lead author) at Department of Critical Care Medicine (University of Calgary) Research Day 2018; Calgary, Alberta.

19. Mann B, Solverson K, Bagshaw SM, Straus SE, James MT, Niven DJ. Initial Renal Replacement Therapy Modality and Recovery of Renal Function in Acute Kidney Injury: A Systematic Review & Network Meta-analysis. Oral Presentation (presented by lead author) at Department of Critical Care Medicine (University of Calgary) Research Day 2018; Calgary, Alberta
20. Mann B, Solverson K, Bagshaw SM, Straus SE, James MT, Niven DJ. Initial Renal Replacement Therapy Modality and Recovery of Renal Function in Acute Kidney Injury: A Systematic Review & Network Meta-analysis. Oral Presentation (presented by lead author) at Department of Critical Care Medicine (University of Calgary) Research Day 2018; Calgary, Alberta
21. Niven DJ, McCormick TJ, Barnes TRM, Fiest KM, Straus SE, Hemmelgarn BH, Jeffs LP, Stelfox HT. Understanding the Reproducibility of Randomized Controlled Trials in Critical Care: A Systematic Review. Poster presentation (presented by lead author) at American Thoracic Society Congress 2018; San Diego, California. Am J Resp Crit Care Med 2018;197:A6063
22. Mohammad Mehdi Banoei, Ryan Groves, Ian Lewis, Jamie Hutchison, Douglas Fraser, Hans Vogel, Beata Mickiewicz and Brent W. Winston and the Canadian Critical Care Translational Biology Group. Metabolomics in TBI: examining pediatrics severe traumatic brain injury (sTBI) and a controlled cortical impact (CCI) mouse model. Submitted to the DCCM Research Day for presentation.
23. Metwaly, S., Donnelly, S., Banoei, M., Mourad, A., Vogel, H., Winston, B.W. & the Canadian Critical Care Translational Biology Group (CCCTBG). Using Metabolomics to

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- Study ARDS. Accepted for presentation to the DCCM Research Day for presentation.
24. Mohammad Banoei, DVM, MSc; Lauralyn A. McIntyre, MD, FRCPC, MHSc; Duncan J. Stewart, MD, FRCPC; Shirley H. J. Mei, PhD; David Courtman, PhD; Irene Watpool, RN, BScN; John Granton, MD, FRCPC; John Marshall, MD, FRCSC, FACS; Claudia dos Santos, MD, MSc, FRCPC; Keith R. Walley, MD; Kenny Schlosser, PhD; Dean A. Fergusson, PhD; and Brent W. Winston, MD, FRCPC, For the Canadian Critical Care Trials Group and the Canadian Critical Care Translational Biology Group. Metabolomics Analysis of MSC Therapy in A Phase I Clinical Trial for Septic Shock. Accepted for poster discussion presentation to the ATS Annual Meeting 2018.
25. Isabella Lupe, Mehdi Mohammad Banoei, Lin Ai, Eshter Diaz, Leslie Rodriguez, Brent Winston, Mehdi Mirsaeidi. Metabolomics differentiates veterans from civilians with pulmonary sarcoidosis. Submitted to the ATS Annual Meeting 2018 for presentation.
26. Chongxu Zhang, Mehdi Mohammad Banoei, Reza Dowlatabadi Bazaz, Eshter Diaz, Leslie Rodriguez, Eliana Mendes, Brent Winston, Michael Campos, Mehdi Mirsaeidi. Veterans with pulmonary sarcoidosis have different Metallomic profile compared to civilians with pulmonary sarcoidosis. Submitted to the ATS Annual Meeting 2018 for presentation.
- June 2018*
27. Mohammad Mehdi Banoei, Ryan Groves, Ian Lewis, Jamie Hutchison, Douglas Fraser, Hans Vogel, Beata Mickiewicz and Brent W. Winston, for the Canadian Critical Care Translational Biology Group and the CTRC. Metabolomics in TBI: examining pediatrics severe traumatic brain injury (sTBI) and a controlled cortical impact (CCI) mouse model. Presented at the CCCTBG and CTRC meetings Quebec City, June 2018.
28. Mohammad M. Banoei; Lauralyn A. McIntyre; Duncan J. Stewart; Shirley H. J. Mei; David Courtman; Irene Watpool; John Granton; John Marshall; Claudia dos Santos; Keith R. Walley; Kenny Schlosser; Dean A. Fergusson; and Brent W. Winston, For the Canadian Critical Care Trials Group and the Canadian Critical Care Translational Biology Group. Metabolomics Analysis of MSC Therapy in A Phase I Clinical Trial for Septic Shock. Presented at the CCCTBG meeting Quebec City, June 2018.
29. Metwaly, S., Vogel, H., Winston, B.W. & the Canadian Critical Care Translational Biology Group (CCCTBG). Identification of ARDS Fingerprints Using Multiple Metabolomics Technologies. Presented at the CCCTBG meeting Quebec City, June 2018.
30. Sauro KM, Niven DJ, Soo A, Couillard P, Kramer A, Kromm J, Zygun D, Bagshaw SM, Stelfox HT. When current care is not best care: Is it time to move beyond guidelines? Oral Presentation (presented by lead author) at Knowledge Translation Canada Scientific Meeting 2018 (June 7-8); Vancouver, Canada.
31. Stelfox HT, Brundin-Mathers R, Soo A, Sauro KM, Niven DJ, Parsons-Leigh J, Fiest KM, Doig CJ, Straus SE, Cook DJ, Bagshaw SM. A controlled before and after trial of a knowledge translation intervention to improve guideline concordant venous thromboembolism prophylaxis in critically ill patients. Oral presentation (presented by lead author) at Knowledge Translation Canada Scientific Meeting 2018 (June 7-8); Vancouver, Canada.
32. Fiest KM, Krewulak K, Davidson J, Ely EW, Stelfox HT. Feasibility of employing family-administered delirium detection tools in the intensive care unit (ICU). 8th Annual Meeting, American Delirium Society. San Francisco, CA, USA. June 2018.

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33. Rosgen B, Krewulak KK, Stelfox HT, Ely E, Davidson J, Fiest KM. Is Delirium Associated with Major Depressive Disorder and Generalized Anxiety Disorder Symptomology in Caregivers of the Critically Ill? [Poster], 8th Annual Meeting, American Delirium Society. San Francisco, CA, USA. June 2018.
34. Krewulak K, Stelfox HT, Parsons Leigh J, Ely WE, Fiest KM. Burden of Delirium Subtypes in Critically Ill A Systematic Review and Meta-analysis. 8th Annual Meeting, American Delirium Society. San Francisco, CA, USA. June 2018.

### *August 2018*

35. Jamie Hutchison, Elisa Wilson, William Panenka, Noah Silverberg, Cheryl L. Wellington, Brent Winston, Michael Esser, Anne-Marie Guerguerian, Katia Sinopoli, Robin Green, Angela Colantonio, Jacques Lacorix, David Clarke. A National Biobank and Database for Patients with Traumatic Brain Injury (CanTBI). Accepted for presentation at Neurotrauma 2018, August, Toronto, ON.
36. Esmail R, Hanson H, Holroyd-Leduc J, Niven DJ, Clement F. Knowledge translation and health technology reassessment: identifying synergy. BMC Health Serv Res. 2018 Aug 30;18(1):674. doi: 10.1186/s12913-018-3494-y.
37. Gaudet J, Ellaway R, Palacios MacKay M, Bridge S, Finlayson G, SLigl W, Guimond JG & Lord J. Canadian Critical Care Medicine Physician Perceptions Regarding Transition to Competence by Design: Are we Ready? World Summit on Competency-Based Medical Education, Basel, Sui. 2018
38. Lord J, Ellaway R, Palacios MacKay M, Bridge S, Finlayson G, SLigl W, Guimond JG & Gaudet J. 'Mind the Gap': Does Understanding Competence by Design Impact Perceptions Related to Implementation. 2nd World Summit on Competency-Based Medical Education, Basel, Sui. 2018

### *October 2018*

39. Gaudet J, Ellaway R, Palacios MacKay M, Bridge S, Finlayson G, SLigl W, Guimond JG & Lord J. Canadian Critical Care Medicine Physician Perceptions Regarding Transition to Competence by Design: Mind the Gap! ICRE, Halifax, NS. 2018

### *December 2018*

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