

2023
ANNUAL REPORT
DEPARTMENT OF CRITICAL CARE MEDICINE



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Message from Department Head



I'm very proud to present, on behalf of my departmental colleagues, the 2023 Annual Report for the Department of Critical Care Medicine (DCCM).

Herein we report on important work and accomplishments, in addition to challenges, during the 2023 calendar year. As a clinical and academic department, we integrate clinical programs, education and research to deliver exceptional patient and family centred-care to critically ill patients in the Calgary Zone and associated referral areas. Our greatest asset is our people, who have an opportunity to work in world class facilities, with state-of-the-art equipment, side by side with other outstanding health care professionals who are dedicated to the service of others.

This report will outline some of our collective accomplishments including:

- The breadth of expertise in our ICU medical staff
- Our clinical programs
- Our educational activity
- Some of our outstanding research

Some notable events from 2023 include:

- Continued expansion of the Critical Care Nurse Practitioner program to all ICUs in Calgary
- Preparation for a AMHSP for critical care, with the hope for expanded academic opportunity and recruitment
- Leading several province-wide clinical quality improvement programs positively impacting patient care and achieving significant health system cost avoidance
- Flourishing Clinical Scholar and Neurocritical Care Fellowship programs, with four active trainees during 2023 among all programs
- Achieving significant success in biomedical and clinical critical care research with impactful publications in Nature Medicine and contributions to the establishment of national clinical practice guidelines.

Our department and its members continue to lead critical care through our commitment to clinical care, education and research delivering exceptional patient-and-family-centred care and continually advancing both the art and science of critical care.

Respectfully,

A handwritten signature in black ink, appearing to read 'Dan Zuege', written over a light blue horizontal line.

Dan Zuege MD, MSc, FRCPC
Professor and Head – Department of Critical Care Medicine
Alberta Health Services – Calgary Zone
Cumming School of Medicine, University of Calgary

Mission and Vision



Alberta Health Services

Vision:

Healthy Albertans. Healthy Communities. Together.

Mission:

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

Values:

Alberta Health Services' (AHS) core values – compassion, accountability, respect, excellence and safety – guide our actions and behaviors to achieve excellent patient- and family-centred healthcare for all Albertans.

AHS Core 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.

Cumming School of Medicine University of Calgary

Reimagining Health for All, Ahead of Tomorrow

Our Vision Statement:

We are a compassionate, curious and creative team of educators, learners, scientists, clinicians and professional staff.

We are dedicated to generating diverse knowledge that cultivates local impact and carries global relevance.

We drive positive change in health equity and social accountability through discovery, inclusive excellence and continuous learning.

Our Values:

Anti-racism, anti-oppression, collaboration, compassion, creativity, diversity, excellence, inclusivity, innovation, integrity



Message from the Dean

We are pleased to present the 2023 Cumming School of Medicine (CSM) strategic plan. This plan is the result of a year-long engagement process facilitated by J5 Design and led by CSM vice-dean Dr. Bev Adams, MD, on behalf of the school's senior leadership team. The plan was assembled based on the feedback and iterative input from our working and advisory groups, more than 100 consultative meetings and school wide surveys. We are incredibly grateful to all those who participated.

The previous CSM strategic plan (2015-2022) was built on the foundation of precision medicine and our three pillars of people, platforms and partnerships. These principles remain embedded in the 2023 plan.

The CSM has been an important catalyst for the University of Calgary (UofC) being recognized as a top five research intensive university. This is the base upon which the plan builds. The strong discovery and transdisciplinary academic work of our seven research institutes underpins what we do.

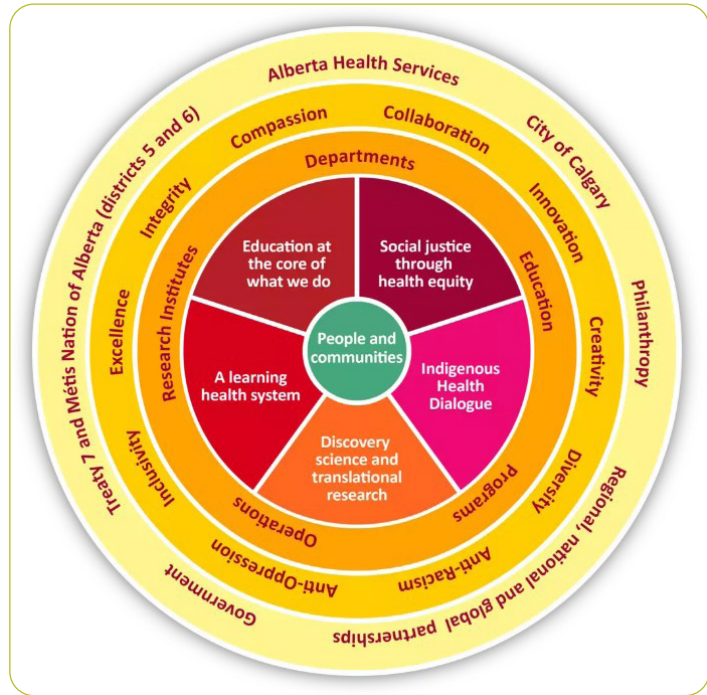
Universities and faculties of medicine have contributed to the structural inequities that have existed in our society for far too long. As articulated in our responsibility statement ([view here](#)), we must make strong commitments to eliminate these barriers -- creating an environment where all people are included, valued and feel a strong sense of belonging.

The core of the plan revolves around six strategic priorities. These should not be thought of as silos. The people and work in these areas will be overlapping and transdisciplinary. Cross-cutting themes will pull these all together. The priorities span the important work our members are doing in discovery science and translational medicine, educational innovation, transformation in the learning health system, health equity and Indigenous health.

Our long-term goal (2040) is to lead — to be the medical school of choice for new learners, faculty and staff. We will provide the best opportunities for all locally and will have expanded global reach. If we attract and retain the best people, then amazing things will happen. An audacious goal needs to start at some point. This is that time. We are deeply committed to Reimagining Health for All: Ahead of Tomorrow. We invite you to join us on our journey.

Todd Anderson
 Dean, Cumming School of Medicine
 On behalf of the Dean's Executive Committee

For the full Message from the Dean and more information about the *Strategic Plan 2023: Reimagining Health for All, Ahead of Tomorrow* click on this link: <https://cumming.ucalgary.ca/stratplan2023>



University of Calgary Strategic Plan Priorities

Department of Critical Care Medicine

VISION

Exceptional patient-and-family-centred critical care.



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

Collaboration — Multidisciplinary teamwork is evident in our clinical care, education and research.

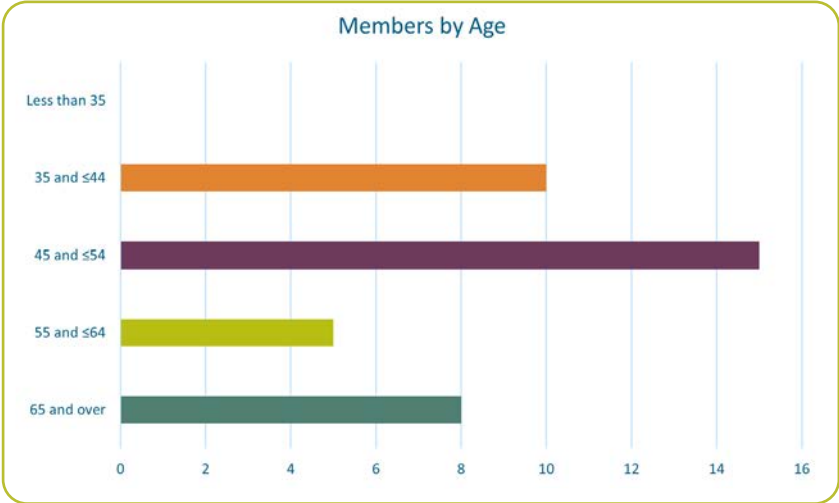
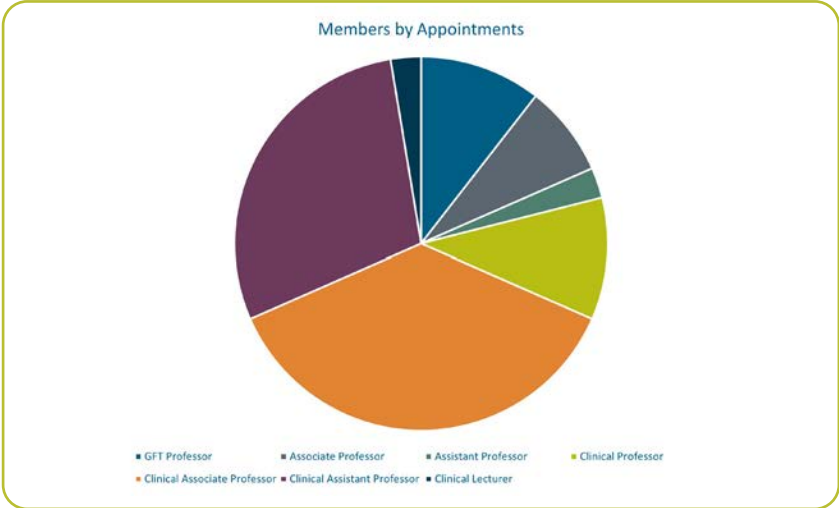
Accountability — Clear expectations and regular feedback.

Respect — DCCM is regarded by members to be a great place to work. We model professionalism.

Excellence — Nationally recognized for clinical care, education and research.

Safety — We report near misses and adverse events and focus on system improvement.

Department Membership

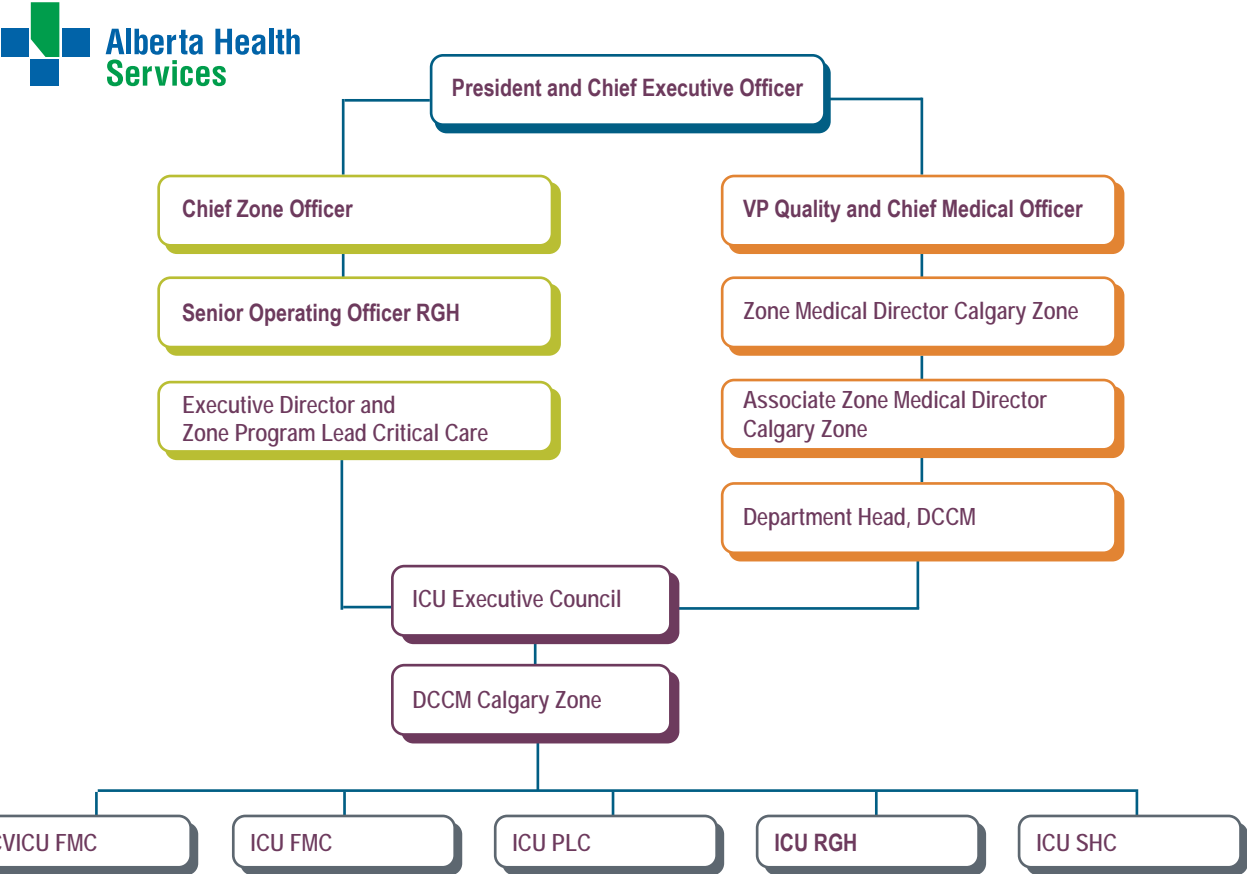


Department Organization, Teams and Strategic Planning

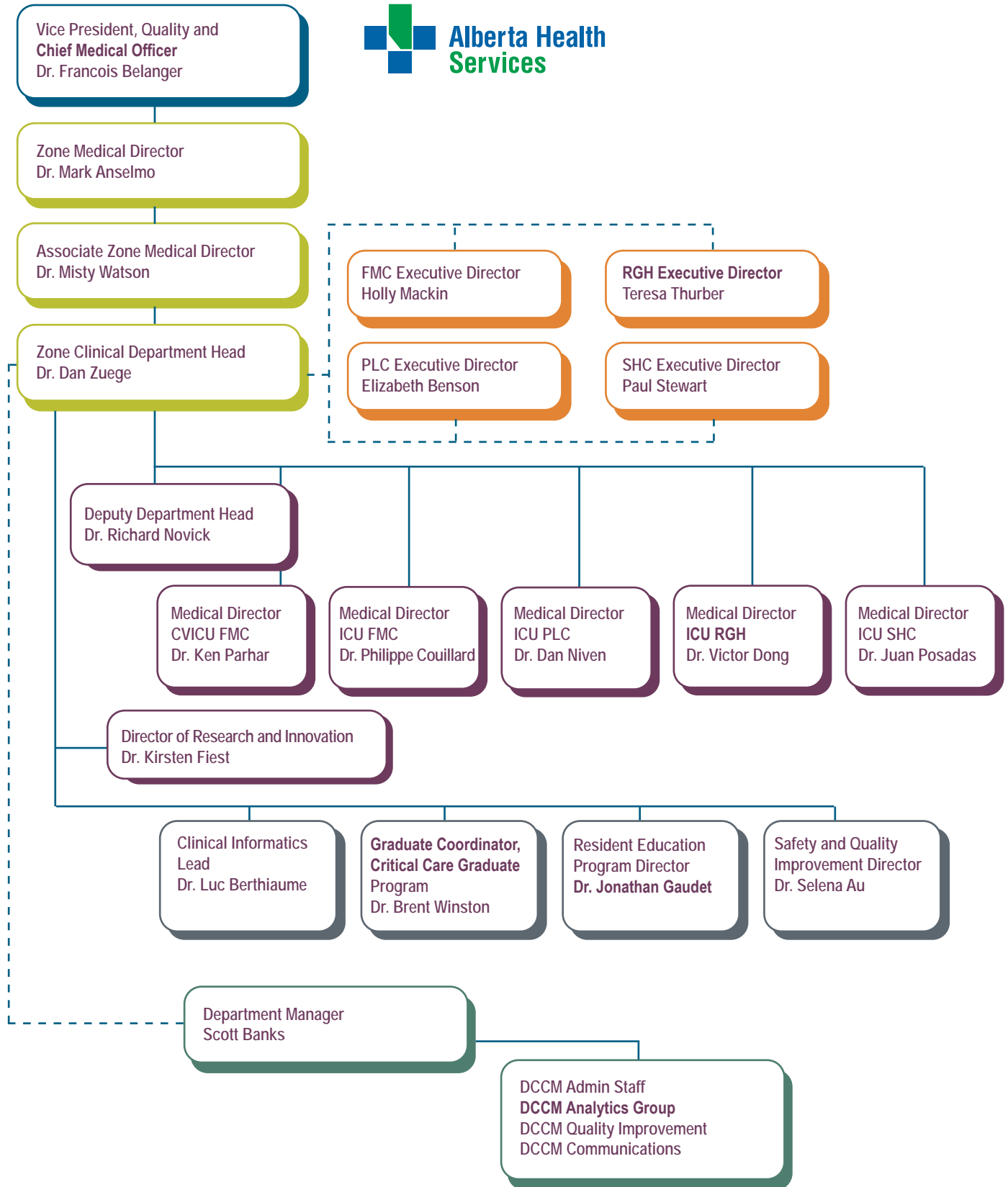
Departmental clinical functions are carried out at the four acute care sites. The Peter Lougheed Medical Centre (PLC), Rockyview General Hospital (RGH) and South Health Campus (SHC) provide general intensive care services while the Foothills Medical Centre (FMC), in addition, provides trauma and neurocritical care services. Cardiovascular Surgery Intensive Care Services are provided at the Foothills Medical Centre in a distinct ICU (CVICU) under the supervision of intensivists from the Department of Critical Care Medicine.

AHS Governance

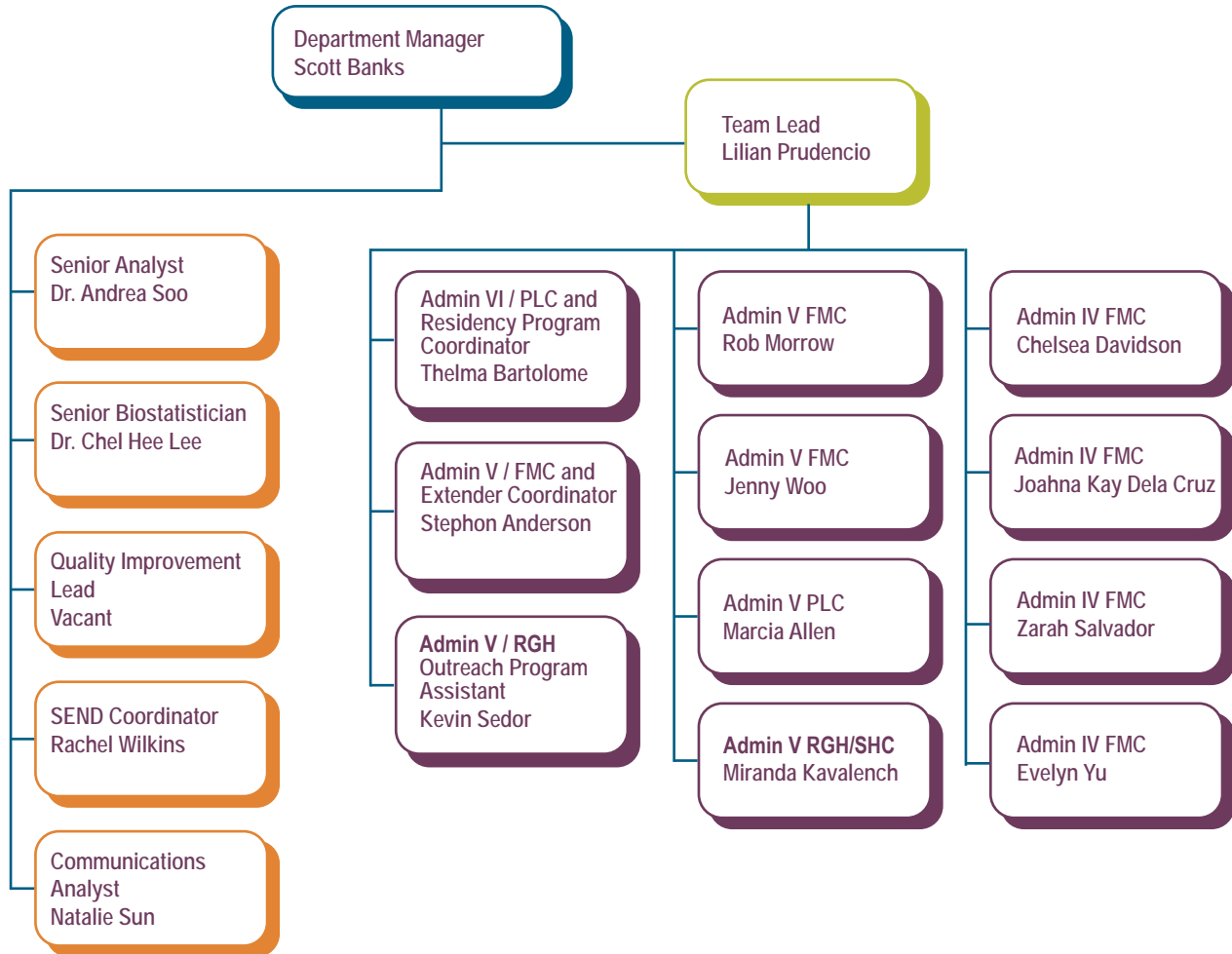
The reporting relationships and governance of DCCM within the Calgary Zone of AHS are outlined below. The DCCM Head is a member of the Zonal Medical Advisory Committee. All DCCM members share responsibility for the vision, goals and advancement of all facets of the Department: exceptional patient-and-family centered critical care. We lead critical care through our commitment to clinical care, education and research. The Medical Executive Committee, Zonal ICU Executive Council, and unit-based committees meet on a regular basis. Participation by medical and non-medical ICU practitioners in our weekly Grand Rounds, our annual Research Day, our site based and Zonal Morbidity and Mortality Working Groups, with direct links to our Departmental Quality Assurance Committee, and finally social programs foster Zonal and inter-disciplinary cooperation.



AHS Medical Leadership and Administration



Administration and Support Staff



Critical Care Medicine Admin Team FMC

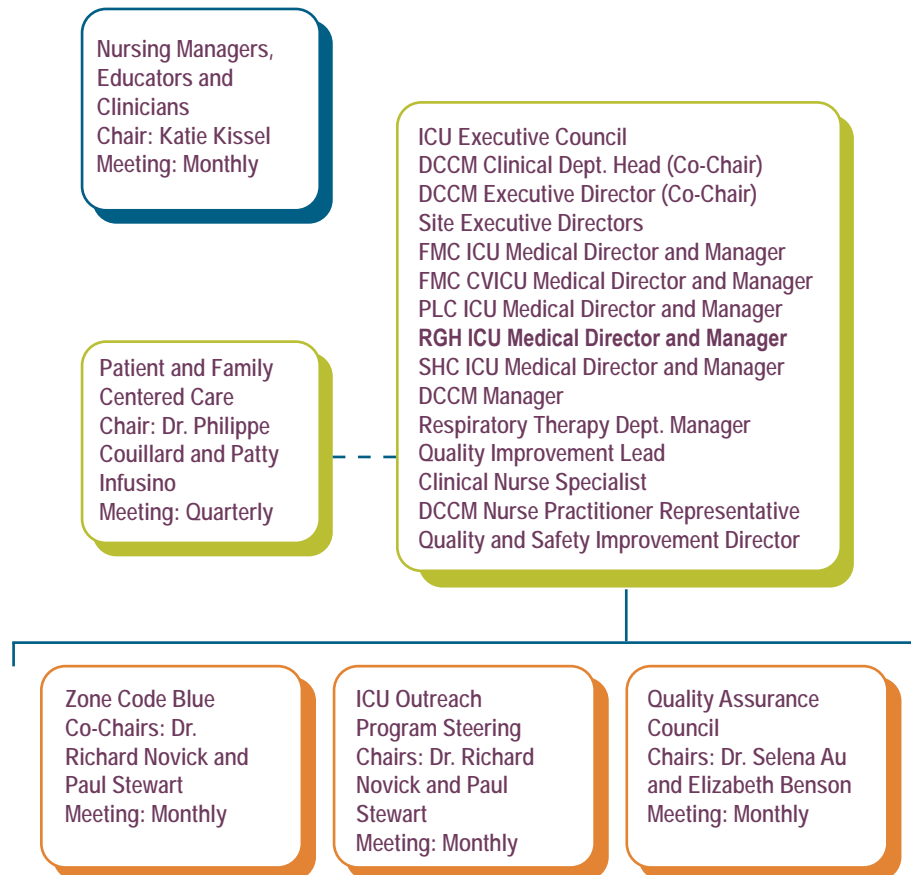
Councils and Committees

The following Departmental Councils and Committees meet on a regular basis based on the Terms of Reference for each group.

- ICU Executive Council
- ICU Medical Executive Committee
- DCCM Clinical Research Committee
- Quality Assurance Committee
- Mortality Working Group
- DCCM Equity, Diversity, and Inclusion Committee
- Zonal ICU Outreach Steering Committee
- Zonal Code Blue Committee
- Zonal ICU Nurse Practitioner Committee

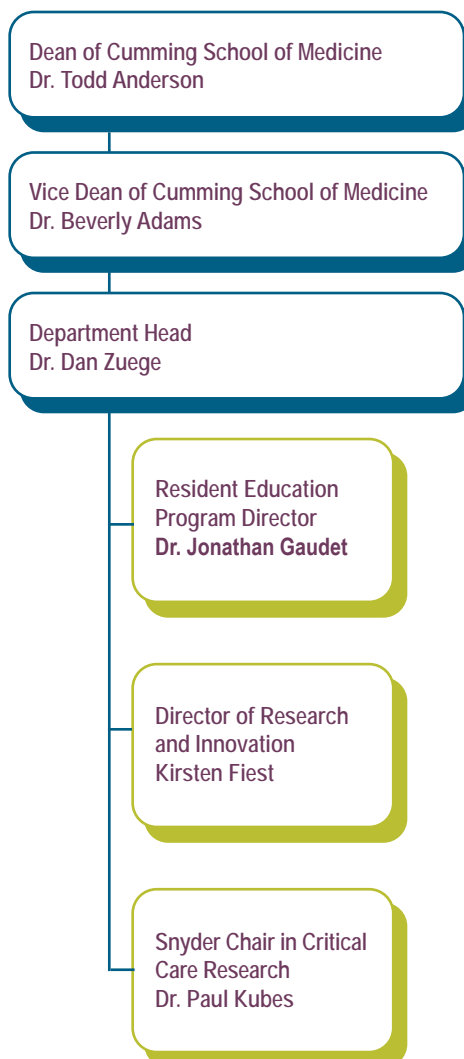


DCCM Clinical Operations

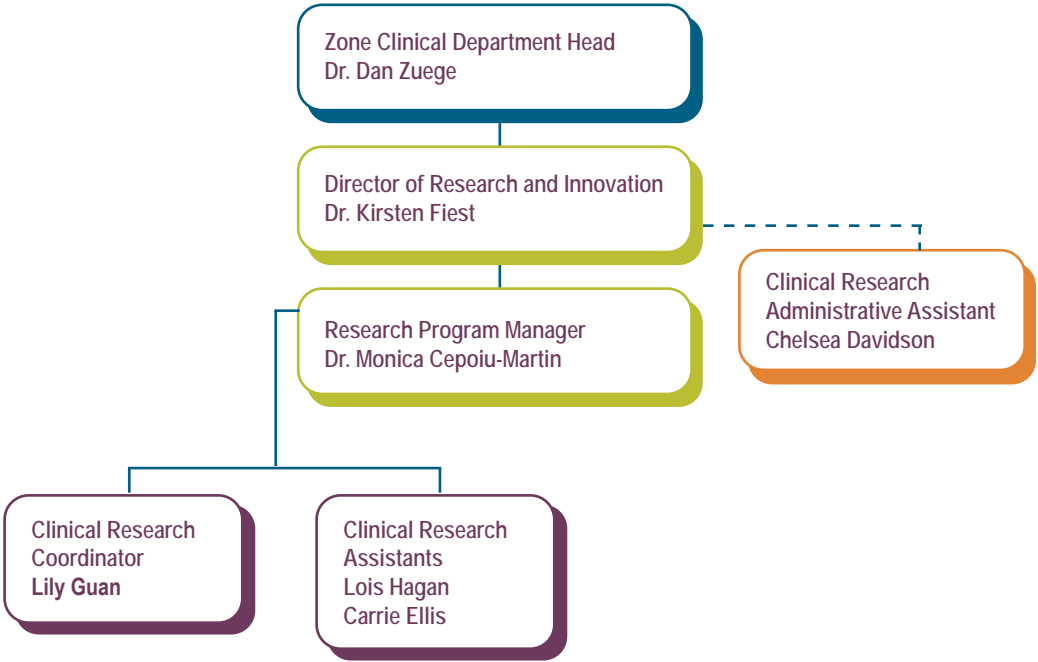


CSM Governance

The reporting relationships and governance of DCCM within the University of Calgary, Cumming School of Medicine, is outlined below. All DCCM members share responsibility for the vision, goals and advancement of all facets of the Department: exceptional patient-and-family centered critical care, education and research.



Clinical Research University of Calgary



Research Staff and Trainees

Doig Team

Graduate Student
Dr. Stefan Edginton
Amanda Leong

Fiest Team

Senior Research Associate
Dr. Karla Krewulak

Postdoctoral Researcher
Dr. Alya Heirali
Dr. Faizan Khan

Research Associate
Violetta-Evelyn Reznikov

Research Assistant
Benny Rana

PhD Graduate Students

Janelle Boram Lee
Laurie Lee

MSc Graduate Students

Abby Thomas
Gwen Knight
Thérèse Poulin

Patient Partners

Marie-Maxime Bergeron
Nadine Foster
Scotty Kupsch
Shelly Longmore
Kristine Russell
Bonnie Sept
Deidre Walsh
Denise Werner

McDonald Team

Lab Manager
Katrina Yu

Eye's High
Postdoctoral Fellow
Dr. Niki Cho

PhD Students
Jared Schlechte
Ayesha Weersinghe
Kathryn Strayer
Amanda Zucoloto

MD/MSc Student
Diana Changirwa

MSc student
Breenna Dobson

Clinical Scholar Project
Michael Chiu
Ann Zalucky

Niven Team

Senior Research Associate
Areej Hezam

KT Specialist
Karen Shariff

Graduate Students
Samson Law PhD
Amanda Leong
Dr. Rachel Jeong MPH
Thérèse Poulin

Parhar Team

Graduate Student
Dr. Stefan Edginton
Gwen Knight

Research Associate
Gwen Knight

Research Assistant
Kiera Stein

Parsons Leigh Team

Postdoctoral Fellow
Dr. Stephana Julia Moss

Research Associates
Rebecca Brundin-Mather
Emily FitzGerald

Research Assistants
Michal Cherak
Alexandra Dodds
Laura Leppan
Sara Mizen
Cynthia Sriskandarajah
Maia Stelfox

Stelfox Team

Postdoctoral Researcher
Dr. Faizan Khan
Dr. Anmol Shahid

Research Associate
Juliane Kennett
Rameiya Paramalingam

Research Assistant
Dr. Niklas Bobrovitz

Winston Team

Research Associate
Dr. Mohammad Mehdi Banoei

Graduate Student
Eric Pimentel

Yipp Team

Post Doctoral Fellow
Dr. Idaira Guerrero

Visiting Professor
Dr. Masato Watanabe

Graduate Students
Luke Brown
Carlos Hiroki
Nicole Sarden

Research Associate
Dr. YueFei Lou

Research Manager
Angela Nguyen, MSc

DCCM Strategic Plan

Focus Area: Clinical Care

Goal

Exceptional patient care that uses practices to optimize patient health outcomes

Objectives

Develop a framework for quality management

Activities

1. Identify the needs of patients and the critical care team to optimize patient care and co-develop metrics to measure performance
2. Develop a strategy to align clinical guidelines, pathways and performance metrics with current and future clinical information systems

Focus Area: Leadership

Goal

Develop a Just Culture

Objective One

Provide leadership and support for a Just Culture

Activities

1. Leadership communication to all members that patient and staff safety is a departmental priority
2. Discuss the quality of care at every ICU executive meeting and at unit meetings

Objective Two

Align all quality assurance activities with Just Culture principles

Activities

1. Educate all members on the principles of Just Culture and their application to the department
2. Task the Quality Assurance Committee to champion Just Culture principles that include patient and team perspectives

Focus Area: Education

Goal One

Successful transition of critical care medicine residency program (Competence by Design)

Objective

Successful implementation of CBD transition plan

Activities

1. Train all physicians on the fundamental of CBD and support them during the transition
2. Evaluate the effectiveness of the CBD program

Focus Area: Education

Goal Two

Professional development to support DCCM member's pursuit of excellence

Objective

Continuous growth and development of members

Activities

1. Solicit feedback to inform professional development opportunities
2. Establish expectations for participation in professional development activities
3. Foster a culture of growth
4. Incorporate education activities in the accountabilities of all physician and CSM faculty

Focus Area: Research

Goal One

Increase interdisciplinary research infrastructure

Objective

Maximize the impact of departmental investment in research

Activities

1. Complete implementations of existing DCCM Clinical Research Strategic Plan
2. Develop and implement a framework for prioritizing investments in research that leverages exciting departmental strengths
3. Establish a research fund development strategy
4. Support inter-professional research collaborations across departmental sites

Goal Two

Increase member capacity for research

Objective

Capacitate members to engage in research

Activities

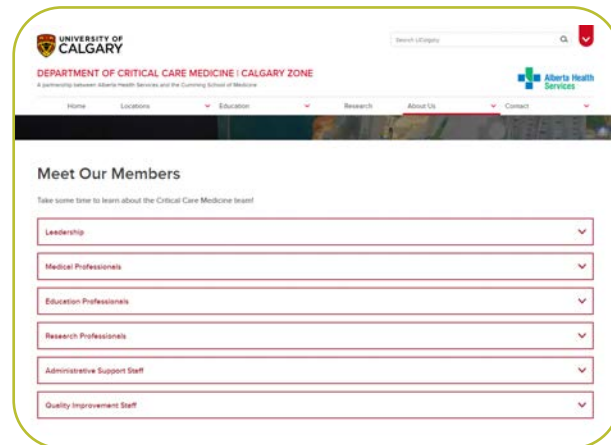
1. Incorporate research activities into the accountabilities of all physicians and CSM faculty
2. Encourage the development of interdisciplinary research teams with synergistic interests and expertise
3. Develop an interdisciplinary research training strategy

Members of the Department

Member profiles have been moved to the DCCM UCalgary website. This allows us to provide the most up-to-date list of department members. There are six categories that members are categorized into:

- Leadership
- Medical Professionals
- Education
- Research
- Student / Trainee
- Support Staff

<https://cumming.ucalgary.ca/departments/critical-care/about-us/teams>



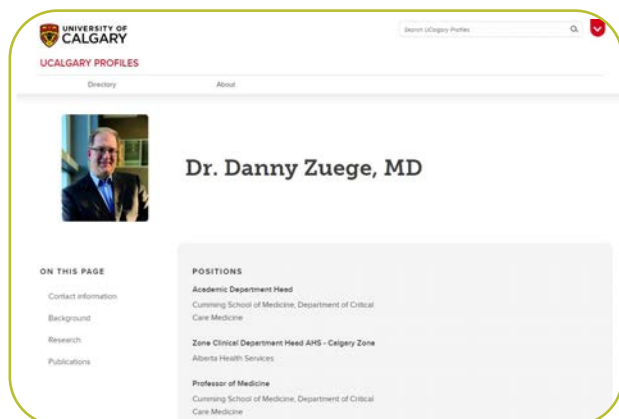
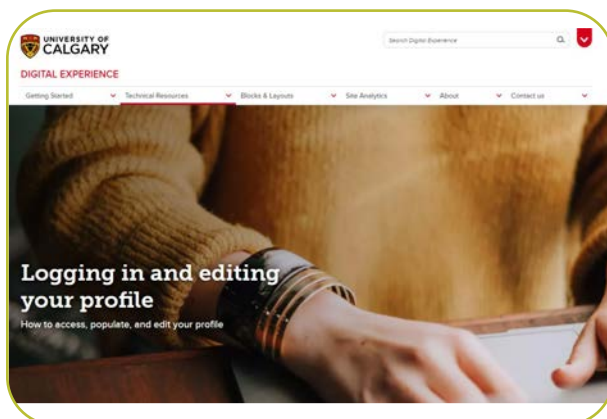
We have updated each individual with a UCalgary profile. UCalgary Profiles are new components of the UCalgary Web System that are designed to help promote and connect our scholars and staff online.

Through this system, we can better showcase clinical, research and educational academic performance:

- Positions and Appointments
- Contact Information
- Background
- Research
- Teaching
- Projects
- Awards
- Publications

UCalgary Profiles allow members to log in and edit their profile.

Go to profiles.ucalgary.ca/user and use your CAS (UofC) credentials to log in.



Workforce Planning

Summary of Recruitment

- Dr. Michael Chiu – DCCM Intensivist with CVICU and cardiac focus

University of Calgary Academic Promotions

- Dr. Paul Easton – Promoted to Full Professor
- Dr. Julie Kromm – Promoted to Clinical Associate Professor
- Dr. Natalia Jaworska – Promoted Clinical Assistant Professor

Transition

- Dr. Tom Stelfox – assumed the role of Deputy Dean of the Faculty of Medicine and Dentistry at the University of Alberta
- Dr. Kirsten Fiest – assumed the role of Scientific Director for the O'Brien Institute for Public Health, Cumming School of Medicine
- Elizabeth Benson – assumed the role of Zonal Program Lead for Critical Care – Calgary Zone and Executive Director for Critical Care, Cardiac Sciences, Respiratory Services, and Allied Health – Peter Lougheed Centre
- Dr. Andreas Kramer – assumed the inaugural role of Medical Director for the Alberta Organ and Tissue Donation Program, Alberta Health Services

Awards and Distinctions

Name	Awards and Distinctions
Selena Au	<ul style="list-style-type: none"> PGME Excellence in Clinical Teaching Award, Cumming School of Medicine, University of Calgary
Luc Berthiaume	<ul style="list-style-type: none"> PGME Excellence in Clinical Teaching Award, Cumming School of Medicine, University of Calgary
Paul Boiteau	<ul style="list-style-type: none"> PGME Excellence in Clinical Teaching Award, Cumming School of Medicine, University of Calgary
Paul Boucher	<ul style="list-style-type: none"> PGME Excellence in Clinical Teaching Award, Cumming School of Medicine, University of Calgary
Diana Changirwa	<ul style="list-style-type: none"> 2023 – Alberta Graduate Excellence Scholarship – Doctoral (\$15,000) 2023 – Achievers in Medical Sciences (AIMS) Award (\$30,000) PhD Student
Michael Chiu	<ul style="list-style-type: none"> PGME Excellence in Clinical Teaching Award, Cumming School of Medicine, University of Calgary
Niki Cho	<ul style="list-style-type: none"> Postdoctoral Fellow 2023 – Eye’s High Postdoctoral Fellowship (total \$50,000/year)
Phillippe Couillard	<ul style="list-style-type: none"> Gold Star Award In Recognition of Outstanding Teaching in Internal Medicine At the Cumming School of Medicine. Awarded by the Echidnas Class of 2023 PGME Excellence in Clinical Teaching Award, Cumming School of Medicine, University of Calgary Dr. David Stather Award for Clinical Core
Chip Doig	<ul style="list-style-type: none"> PGME Excellence in Clinical Teaching Award, Cumming School of Medicine, University of Calgary
Breenna Dobson	<ul style="list-style-type: none"> Dec 2023 – Successfully defended MSc 2023 – Thesis of distinction award 2023 Best trainee presentation award – Dept of Critical Care Research Day MSc Student
Victor Dong	<ul style="list-style-type: none"> PGME Excellence in Clinical Teaching Award, Cumming School of Medicine, University of Calgary
Michael Dunham	<ul style="list-style-type: none"> PGME Excellence in Clinical Teaching Award, Cumming School of Medicine, University of Calgary
Stefan Edginton	<ul style="list-style-type: none"> CIHR Canada Graduate Scholarship Helios UCMG Post Fellowship Training Award
Andre Ferland	<ul style="list-style-type: none"> PGME Excellence in Clinical Teaching Award, Cumming School of Medicine, University of Calgary
Kirsten Fiest	<ul style="list-style-type: none"> Named to the College of New Scholars, Artists and Scientists of the Royal Society of Canada Glenda MacQueen Emerging Leader Award
Jonathan Gaudet	<ul style="list-style-type: none"> PGME Excellence in Clinical Teaching Award, Cumming School of Medicine, University of Calgary

Name	Awards and Distinctions
Tomas Godinez	<ul style="list-style-type: none"> PGME Excellence in Clinical Teaching Award, Cumming School of Medicine, University of Calgary
Natalia Jaworska	<ul style="list-style-type: none"> Bronze Teaching Award, Undergraduate Medical Education, University of Calgary PGME Excellence in Clinical Teaching Award, Cumming School of Medicine, University of Calgary
Craig Jenne	<ul style="list-style-type: none"> Cumming School of Medicine's Social Accountability Distinguished Achievement Award
Rachel Jeong	<ul style="list-style-type: none"> Helios UCMG Post Fellowship Training Award
Faizan Khan	<ul style="list-style-type: none"> Co-Developing a Transitions in Care Bundle for Critically Ill Patients and Their Family Caregivers. Banting Postdoctoral Fellowship OSSD Conference Travel Award – Organization for the Study of Sex Differences, Society for Women's Health Research Best Oral Presentation at 2023 Gairdner Symposium. University of Calgary and O'Brien Institute for Public Health
Andreas Kramer	<ul style="list-style-type: none"> PGME Excellence in Clinical Teaching Award, Cumming School of Medicine, University of Calgary
Julie Kromm	<ul style="list-style-type: none"> Gold Star Award (UME Neuroscience teaching) Off Service Preceptor Award. University of Calgary, Dept of Emergency Medicine PGME Excellence in Clinical Teaching Award, Cumming School of Medicine, University of Calgary
Paul Kubes	<ul style="list-style-type: none"> Distinguished Achievement Awards Canadian Academy of Health Sciences, Fellowship. Recognition reserved for Canada's most accomplished health scientist. Honorary Degree, Feinstein Institute, Elmezzzi Graduate School of Molecular Medicine Order of the University of Calgary
Sampson Law	<ul style="list-style-type: none"> Distinguished Doctoral Recruitment Scholarship
Chel Hee Lee	<ul style="list-style-type: none"> Awarded on December 2023, \$450,000, Co-Applicant, Strategic Operating Grants, Arthritis Society – Determining neurochemical contributions to pain in knee osteoarthritis Chip Doig - Cumming School of Medicine Inaugural PGME Clinical Teaching Award Best Research Poster at the Annual Directors of Clinical Skills Education Meeting, Association of the American Medical Colleges, November 2023 Chair, Case Study Competition, Statistical Society of Canada Paper of the Year, First Place. Canadian Association of Physical Medicine and Rehabilitation, April 2023 Transdisciplinary Scholarship Connector Grant, University of Calgary – Graduate Student Experience Survey Development
Jason Lord	<ul style="list-style-type: none"> PGME Excellence in Clinical Teaching Award, Cumming School of Medicine, University of Calgary
Braedon McDonald	<ul style="list-style-type: none"> Killam Emerging Research Leader Award (CIHR), University of Calgary
Dan Niven	<ul style="list-style-type: none"> Clinician of the Year Award for 2022-2023 Academic Year. Department of Critical Care Medicine. Cumming School of Medicine, University of Calgary PGME Excellence in Clinical Teaching Award, Cumming School of Medicine, University of Calgary

Name	Awards and Distinctions
Richard Novick	<ul style="list-style-type: none"> PGME Excellence in Clinical Teaching Award, Cumming School of Medicine, University of Calgary
Ken Parhar	<ul style="list-style-type: none"> PGME Excellence in Clinical Teaching Award, Cumming School of Medicine, University of Calgary
Juan Posadas	<ul style="list-style-type: none"> PGME Excellence in Clinical Teaching Award, Cumming School of Medicine, University of Calgary
Thérèse Poulin	<ul style="list-style-type: none"> Canadian Institutes for Health Research Graduate Scholarship Masters Award MDCH first author Publication Award
Amanda Lee Roze des Ordon	<ul style="list-style-type: none"> Canada Graduate Scholarship Doctoral Award, Social Sciences and Humanities Research Council (SSHRC; May/23) PGME Excellence in Clinical Teaching Award, Cumming School of Medicine, University of Calgary
Jared Schlechte	<ul style="list-style-type: none"> 2023 – CIHR Doctoral Canada Graduate Studentship (\$35,000/year x3 years) 2023 – CSM PhD Program Entrance Award (\$2500) 2023 – Alberta Graduate Excellence Scholarship – Indigenous (\$11,000) PhD Student
Anmol Shahid	<ul style="list-style-type: none"> O'Brien Institute Postdoctoral Fellowship (\$12,500/year – 1 year) The Cumming School of Medicine Postdoctoral Fellowship (\$12,500/year – 1 year) CIHR Health System Impact Postdoctoral Fellowship (\$77,500/year – 2 years) Postdoctoral Scholar
Kevin Solverson	<ul style="list-style-type: none"> “Above and Beyond Award”, recipient 2023, Division of Respiriology, Department of Medicine
Tom Stelfox	<ul style="list-style-type: none"> PGME Excellence in Clinical Teaching Award, Cumming School of Medicine, University of Calgary
Sid Viner	<ul style="list-style-type: none"> PGME Excellence in Clinical Teaching Award, Cumming School of Medicine, University of Calgary
Jason Waechter	<ul style="list-style-type: none"> PGME Excellence in Clinical Teaching Award, Cumming School of Medicine, University of Calgary
Jessica Wang	<ul style="list-style-type: none"> PGME Excellence in Clinical Teaching Award, Cumming School of Medicine, University of Calgary
Brent Winston	<ul style="list-style-type: none"> Covid Period Outstanding Achievement Award, Cumming School of Medicine
Amanda Zucoloto	<ul style="list-style-type: none"> April 2023 – Successfully defended PhD 2023 – PhD thesis of distinction award, Faculty of Graduate Studies, UCalgary PhD Student
Danny Zuege	<ul style="list-style-type: none"> PGME Excellence in Clinical Teaching Award, Cumming School of Medicine, University of Calgary

Communications

Our Audience

DCCM'S primary audience is our staff and physicians. Out of the four communication channels, three are directly targeted and can be only accessed through AHS login. A key distinction within the DCCM Communications is that our audience is often our content creators. This synergy between audience and communications presents a unique entity for DCCM. As a result, one of our key strategies is to maintain an effective and transparent communication channel.

Our secondary audience is our community. Because DCCM is a joint clinical and academic department, our public platform exists on the University of Calgary (UofC) Cumming School of Medicine (CME) website. The Critical Care Medicine platform is a part of the CME portfolio. On this site, the information available encompasses our team, education and research.

Current Communications Channels and Materials

AHS InSite Website (Internal)

Our AHS InSite website is our main point of contact for our staff and team. We host both clinical and educational resources. Within this site, each page has an owner and they are responsible for submitting documents and keeping their content up to date.

UofC Website (External)

The DCCM platform on the UofC website is DCCM's public platform. On this site, we include a description of our department, the scope of our work and our team members. This year we updated all team member portfolios to the new dynamic and upgraded UofC platform. This gives members access to edit their portfolios whenever they choose and more options to the information that they wish to share. In addition, we have resources related to our academic program for prospecting talent and professional opportunities.

Newsletters

The DCCM Newsletter is published quarterly. Our newsletter celebrates our talented staff, patient success stories, department research and other news.

Grand Rounds Within our Insite Website

DCCM has a designated page for the education program Grand Rounds which includes video presentations.

Summary

Our communications goal is to maintain an effective and transparent channel for DCCM improving as technology advances. We will ensure our communication channels, materials are up-to-date to allow efficient decisions to be made by our members.

Natalie Sun, Communications Analyst



Reviewing last year's annual report

Site Updates

DCCM is a joint clinical and academic department, Alberta Health Services – Calgary Zone and Cumming School of Medicine (CSM), University of Calgary. It is comprised of members spanning multiple disciplines dedicated to improving the care and health of critically ill patients and their families. We lead critical care through our commitment to clinical care, education and research. A team of 36 intensivists, one physiatrist, and one epidemiologist work alongside a multidisciplinary team of Registered Nurses, Respiratory Therapists, Pharmacists, Physiotherapists, Occupational Therapists, Speech Language Pathologists, Dieticians, Social Workers, Spiritual Care Specialists, Unit Clerks, Health Care Aides, Volunteers, Research Coordinators, QI Staff, Research Analysts and Administrative professionals between five adult intensive care units located in four hospitals across the Calgary Zone. We have a large complement of medical students, residents, fellows and clinical scholars

Foothills Medical Centre ICU

The General System ICU at Foothills Medical Centre (FMC) provides intensive care, code blue and outreach services to over 1100 inpatients and supports many key programs for the zone; Neurosurgery, Stroke, Hepatobiliary surgery, Head and neck cancer reconstructive surgery, Burn care, Thoracic surgery, Trauma and the Alberta Blood and Bone marrow transplant programs, to name a few.

The 33-bed unit saw 1525 admissions in 2023 with an average occupancy of 88%.

Neuro ICU, trauma, medical and surgical patients shared the multi-pod footprint depending on patient needs.

The ICU Outreach Team, with a ramp up RN and RRT model, continues to support the site. The team responded to 800 Code 66 calls and 1000 follow up visits this past year, providing support to inpatient unit teams, often during times of high capacity and acuity.

Planning for the opening of the Arthur J.E. Child Comprehensive Cancer Centre was a focus in 2023 where the Critical Care team will provide Code 66 and Code Blue support. An ICU nurse and Respiratory therapist will be present in the building 24/7 and Code Blue support will also come from the FMC Main Campus. In anticipation of the October 2024 opening, simulation, orientation activities are planned through the spring and summer of 2024.

FMC ICU embraces patients and families as partners in care and we encourage their presence at the bedside and involvement in care. When in-person attendance is not possible, virtual patient visits, family attendance during daily multidisciplinary rounds and family conferences with the ICU team continue to be offered. Music Therapy and Pet Therapy continue to support the holistic approach to patient wellness on our unit. Our rehabilitation team is proactive to help patients recover and transition out of ICU.

Quality Improvement, Education and Research are essential components of the ICU. FMC ICU has been working collaboratively with the Critical Care Strategic Clinical Network on multiple improvement projects including Venting Wisely, Dialyzing Wisely as well developing an Alberta approach to preventing Central Line Blood Stream Infections.

FMC ICU hosts many learners throughout the year including undergraduate nursing, Advanced Critical Care Nursing, Respiratory Therapy and Allied Health students along with Medical trainees and Fellows. Our specialty services offer unique and valuable learning experiences.

Kelly Coutts, FMC Patient Care Manager
Dr. Philippe Couillard, FMC ICU Medical Director



ICU FMC

Foothills Medical Centre CVICU

Overview

The Cardiovascular Intensive Care Unit (CVICU) strives for excellence in post-cardiac surgical care. Achieving this level of care requires remarkable dedication, teamwork, and collaboration among all departments and multidisciplinary teams involved in the patients' journey. The unit has 22 beds spread across two units (U94 and U104), with 16 of these beds currently funded.

Situated at the Foothills Medical Centre, the CVICU serves Southern Alberta and managed over 1500 post-cardiac surgery admissions in 2023. Specializing in post-operative open-heart surgery, the unit primarily handles cases such as coronary artery bypass graft (CABG) and valve repair or replacement. Additionally, the CVICU provides care for advanced surgeries including complex thoracic aortic surgery, minimally invasive valve surgery, Extracorporeal Life Support (ECLS) for temporary heart and lung support (VV/VA ECMO), and Ventricular Assist Devices (VAD) for more durable heart support.

Patient Care

The CVICU's dynamic multidisciplinary team, particularly the nursing cohort, has been actively engaged. We've warmly welcomed numerous new nurses over the past year. Beyond tending to post-cardiac surgical patients, our team continues to play a pivotal role in caring for those requiring mechanical circulatory support and ECLS. Their dedication and hard work in providing exceptional care in various capacities over the past year are commendable.

Our diverse CVICU team comprises Registered Nurses, Registered Respiratory Therapists, Cardiac surgeons, Cardiac anesthetists, Cardiovascular Intensivists, physiotherapists, clinical pharmacists, and other allied health care providers. With an impressive array of advanced certifications in critical care, including IABP, CRRT, VAD devices, Pulmonary Artery catheters, advanced pacing, and Lumbar drains, among others, our CVICU stands at the forefront of specialized care.

We're excited to welcome Ms. Joana Everson, a highly experienced nurse practitioner, to our team. Her addition marks the beginning of a pilot test for this role, aiming to improve transitions for complex patients and enhance continuity of care for our chronically ill patients.

In acknowledging transitions, we bid farewell to Ms. Kari France, who has admirably served in the CVICU for 18 years, including over 15 years as unit manager. We express our heartfelt gratitude for Kari's dedication and hard work; she will be sincerely missed. As one chapter ends, another begins, and we

eagerly welcome Ms. Kirsten Docherty to the role of Unit Manager, embracing the opportunities that lie ahead.

Quality Improvement And Research

Our dynamic multidisciplinary CVICU team continues work on Quality Improvement and research projects including:

- Improving the quality of care for minimally invasive cardiac surgery patients through the development and implementation of a care pathway to optimize recovery.
- Ongoing recruitment for the HPI goal directed therapy study which is using an algorithm-based method to help manage resuscitation postoperatively.
- Ongoing recruitment for the SMART-BP study which is examining the use of wireless non-invasive real time blood pressure monitoring and comparing it to invasive blood pressure monitoring.
- Ongoing participation in the Venting Wisely initiative which is a pan-provincial initiative to optimize the care provided to patients who are mechanically ventilated with hypoxemic respiratory failure and ARDS using a multidisciplinary evidence informed care pathway.
- Creation of a high-resolution (5D-ICU) quality improvement database for patients who are postoperative Cardiac Surgery to try and eliminate unnecessary variability in care.
- Participation in the INDEX national ECLS database partnering with the University of Toronto

Education

Our CVICU prioritizes a robust and clinically engaged approach to nurse education. To enrich our training initiatives, we're pleased to welcome Lindsay Keong as a nurse educator, working alongside our senior educator, Chris Coltman. Advanced certifications for CVICU nurses necessitate both initial certification and annual recertification. Additionally, all new ICU nurses participate in the Department of Critical Care mentorship program, tailored specifically for the CVICU to foster an environment conducive to independent skill development.

We're continuously enhancing our educational offerings within the CVICU. We've increased the number of residents and fellows who rotate through on a monthly basis. Moreover, we utilize simulation exercises, including chest reopening simulations, to bolster residents' preparedness for specialized acute cardiac life support scenarios. In 2023, we proudly welcomed our second advanced CVICU fellow, Dr. Stefan Edginton, through our Clinical Scholar program in collaboration with the Department of Critical Care Medicine. Another training position will be available in July 2024, aligning with our mission to cultivate future Cardiovascular Intensive Care physicians.

Monique Babin, FMC CVICU Patient Care Manager
Dr. Ken Parhar, FMC CVICU Medical Director



CVICU FMC

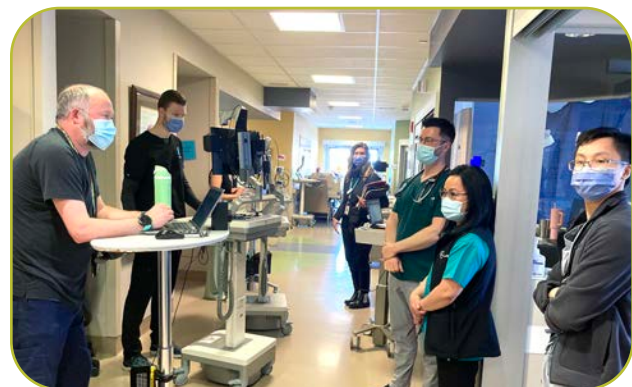
Peter Lougheed Centre ICU

In 2023, PLC ICU has been kept busy both through increases in unit capacity and numbers of admissions as well as support of exciting quality improvement initiatives. In 2023, PLC ICU has experienced an average 91% occupancy rate (20 of 22 funded beds). The PLC ICU has cared for more than 840 patients throughout the year. Of these patients, nearly 650 were ventilated (approximately 77%). As a hospital, the PLC has had significant capacity challenges. The ICU has supported this through the outreach program, with more than 300 calls activated. PLC continues to actively recruit RNs to staff the four additional beds that were added in 2022. To help with recruitment, in 2023 the ICU established a new graduate RN program. The initial program was implemented with limited support and resources. Through feedback from front line staff and additional support across the Calgary Zone, a second group of new graduate RNs were welcomed to the ICU. The new graduates had extended buddy shifts and are now all practicing independently. We are currently considering another new graduate group to support ongoing recruitment within the ICU.

With an occupancy rate of 91%, both A and B care teams have been busy within the unit. With the addition of our two ICU nurse practitioners last year and higher patient numbers, the B team no longer primarily cares for the less acute patients as was often the case pre-pandemic. To help support the B team, PLC ICU added a second lead RN to attend the B team rounds on a regular basis. This RN works in collaboration with the B physician to ensure that rounds are organized, and that staff feel supported through the B team.

In addition to expansion of support within the B team, PLC ICU is leading or participating in several exciting quality improvement initiatives. Lead by our ICU nurse practitioners, we are working on revitalizing the wake up and breath initiative that was started several years ago, where goals include earlier identification of patients appropriate for extubation, and timelier extubation among those patients deemed appropriate. PLC ICU is also a participating site in the Critical Care SCNs' Dialyzing Wisely and Don't Misuse My Blood Provincial Quality Improvement initiatives. As a participating site in the multi-center REVISE clinical trial, with recruitment complete, we await the results of the trial to further understand how we should approach the long-held practice of stress ulcer prophylaxis.

In addition to these research initiatives, other local committees have resumed regular meetings that were otherwise on hold during the pandemic. This includes our local Quality Improvement group and the Patient and Family Centered Care committee. And of course, not lost within the increased patient volume and important quality improvement and committee work is the ongoing provision and focus on patient and family centered care that remains a pillar in the PLC ICU.



ICU PLC

Patty Infusino, PLC Patient Care Manager
Dr. Dan Niven, PLC ICU Medical Director

Rockyview General Hospital ICU

Construction on our new state of the art Intensive Care Unit remains on track. We anticipate completion of the build in the fall of 2024 with an anticipated move in date in early in 2025. This new build incorporates leading edge technology with innovative patient and family centered care designs. We are especially excited to offer our patient's families a larger and more accommodating family room environment to support their wellbeing while staying close to their loved ones in the ICU. Our new ICU space will offer care areas that provide supportive spaces for patient care, patient care equipment, family care, as well as a safe and healthy work environment for our inter-professional team. We are grateful for this long-awaited opportunity to update our critical care space to better support patients, their families, and the dedicated healthcare providers that care for them.

We continue to grow and support the Nurse Practitioner role in our ICU setting. These advanced nursing practice providers work alongside our Intensivists and medical trainees in a hybrid team model unique to the ICUs in the city. We were very excited to welcome a new Nurse Practitioner to our team this past year. She brings a wealth of experience in the role, and we are excited to partner with her to continue to grow the NP practice in our ICU.

The Rockyview ICU continues to participate and support the advancement of education for a wide variety of learners. We continue to support medical trainees in our ICU. These trainees encompass Critical Care Fellows, Medical Residents, and Clinical Clerks. We also participate in the preceptorship for Allied Health disciplines, Respiratory Therapy, Physiotherapy, Pharmacy, Nutrition, Nursing and Unit Clerks. Our inter-professional rounds provide a robust and diverse learning environment that fosters excellence in patient's care.

Our ICU actively engages in quality improvement initiatives and research activities. These activities range from site-based initiatives to zonal and provincial initiatives. Through our Arterial Line insertion and Intubation by Respiratory Therapist projects, we continue to optimize inter-professional collaborative practices. Patient safety is enhanced with the completion of our OR to ICU Handover project and our continued work on structured patient care rounding practices. We continue to be high performers in the following provincial quality care initiatives: Venting Wisely, Delirium Mitigation and Management, Using Albumin Wisely, and Dialyzing Wisely projects. Our site-based quality committee continues to enhance patient and family centered care through their work on developing resources for families, as well as our "Breaking Free" initiative. This initiative supports cognitive stimulation and mobilization for our ICU patients. Our Outreach Team is initiating QI work that will not only review Outreach calls and patient outcomes but will look at optimizing ward education around Rapid Response. We continue to be a site for recruitment for a number of clinical trials run by the department including the newly initiated LIBERATE study.



ICU RGH

Melissa Redlich, RGH Patient Care Manager
Dr. Victor Dong, RGH ICU Medical Director

South Health Campus ICU

The SHC ICU remains 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.

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

Unit Accomplishments

- Roll out of Connect Care in May 2023
- Performance summary conversations resumed in September 2023 and will be ongoing monthly
- Creation and Implementation of the PerCI Pathway (Persistent Critical Illness Pathway) in July, 2023. The pathway creates specific care plans for those patients in the ICU who have prolonged ICU stays.
- Successful implementation of Critical Care SCN initiatives: Venting Wisely and Don't Misuse my Blood
- Consolidation of A and B physician model to best support patient coverage and physician rest

Future Goals

- Resume the OR to ICU Handover working group to navigate deficiencies.
- Resume unit specific quality improvement council when staff are permitted to attend meetings and be compensated for attendance.
- Two new rooms are being built, this will allow all patients to have their own rooms instead of being doubled with other critically ill patients and will make the SHC ICU in alignment with other Calgary ICU layouts.
- Roll out of the Dialyzing Wisely Critical Care SCN provincial quality improvement project.

Rachel Taylor, SHC Manager
Dr. Juan Posadas, SHC ICU Medical Director



ICU SHC

Clinical Programs

Critical Care Rehab

The Critical Care Rehabilitation service provides rehabilitation assessment and triage resources for ICU patients. Our goal is to improve the speed and quality of recovery for patients during and after their critical illness.

Clinical

Inpatient

Throughout 2023, Dr. Grant has started rounding within the ICU weekly in the FMC ICU B – pod. The goal of this initiative is to increase rehabilitation medicine's presence within the ICU to provide within-unit presence, to establish closer working relationships with critical care allied health, and to bridge patients between inpatient and outpatient follow-up as appropriate.

Ongoing longer-term initiatives to add rehabilitation resources earlier to the patient recovery trajectory are ongoing. For example, the initiative to add music therapy resources to critical care has been expanded to PLC and SHC in 2023, where previously, this had only been piloted at FMC.

Outpatient — Calgary ICU Recovery Clinic

The ICU Recovery Clinic is an outpatient rehabilitation triage and assessment clinic focusing on former ICU patients who have risk factors that suggest they may be slower to recover in the community. One month after leaving the hospital, referred patients are invited to be assessed in the clinic to ensure that the appropriate resources and strategies are being used to improve their recovery.

The clinic focuses on education and exercise prescription as a foundation and refers to community resources as appropriate.

The ICU Recovery Clinic is available to ICU care providers as an outpatient rehabilitation resource.

Research

In 2023, the clinic has continued to support research initiatives. We support various grant applications as co-investigators or collaborators but didn't run any funded studies independently in 2023. Dr. Grant participates in national committees where this is helpful (e.g., Sepsis Canada Rehabilitation and Recovery Working Group).

Education

Dr. Grant contributes to fellow education intermittently at the direction of Dr. Gaudet.

Rehabilitation medicine contributes to sub-specialty fellowship education (e.g. neurocritical care focusing on post-NCC management and outcomes, cardiovascular critical care with a focus on ECLS outcomes) as directed by Drs. Kromm and Wang.

Dr. Chris Grant, Physical Medicine and Rehabilitation

Critical Care Strategic Clinical Network

The Department of Critical Care Medicine is a vital part of the Critical Care SCN (CCSCN). Several members of our department provided leadership or vital participation within the CCSCN in 2023 (Dan Zuege – Senior Medical Director up to Mar 1; Dan Niven, Ken Parhar – provincial project leads; Kristin Robertson, Karen Shariff, Dan Jewers, Peter Dhillon – provincial practice leads; Emma Folz, Elizabeth Benson, Dan Niven – Core Team membership; and many of our research support staff and trainees). Dr. Wendy Sligl from Edmonton assumed the role of Senior Medical Director as of Mar 1, 2023. Provincial collaboration benefits our department in many ways. This was clearly evident during the COVID-19 pandemic and continues beyond this.

Many key CCSCN provincial initiatives are underway, many led by individuals from DCCM:

- Venting Wisely – a program aiming to optimize the care of ventilated patients with hypoxemic respiratory failure in Alberta ICUs. Project Lead – Ken Parhar. Funding – HHS (awarded in 2020); CIHR. This program, despite the significant stresses of a pandemic, successfully completed its implementation phase in 2023 and has now entered a sustainment phase. This program optimizes the care patients with hypoxemic respiratory failure receive through rigorous measurement, audit and feedback, education supported by practice leads, and clinical decision support embedded in our information systems, ultimately improving care, patient outcome and health system costs. Thus far, this program has clearly demonstrated substantial and sustained uptake of the intervention and improved processes of care across the ICUs of Alberta. Analysis of numerous outcome measures is underway and eagerly anticipated.
- Don't Misuse My Blood – a program aiming to optimize use of blood products (other than albumin) in Alberta ICUs. Project Lead - Dan Niven. Funding – PRIHS (awarded in 2020); Choosing Wisely Alberta. This program is in the midst of its implementation phase and aims to influence practices of transfusion and the ordering of blood tests to reduce the exposure of patients to blood products, contribute to conservation of our scarce blood supply, and reduce healthcare costs.
- RATIONALE – a program aiming to optimize the use of Albumin in the critically ill. Project Lead - Dan Niven. Funding – CIHR; MSI Foundation. This program, despite the limitations of the pandemic, completed its full implementation stage and is now in a sustainment phase. This program continues to demonstrate significant increases in the appropriate use of Albumin in the ICUs in Alberta translating into substantial health system cost savings.
- Delirium – a well-established quality improvement program aiming to optimally prevent, detect and manage delirium in critically ill patients. This program is in its sustainability phase with process of care measures showing sustained benefit over time. Ongoing important investigations related to the roles families can play in the detection, prevention and management of delirium continue, led by Dr. Kirsten Fiest and her team.

Several other CCSCN-led programs of work are evolving with close collaboration with members of DCCM:

- Dialyzing Wisely – a program, led by Dr. Oleksa Rewa from Edmonton, aiming to optimize the use of renal replacement therapy in ICU, ultimately translating to more effective and efficient use of dialysis resources and less survivors of critical illness ending up with dialysis-dependency and/or needs for transplantation. In 2023, this program was implemented in all Calgary ICUs.
- Supporting Our Staff – a program of work emanating from the pandemic experience which recognizes the high rates and substantial impact of burnout in ICU staff across disciplines and

looks to identify and action mitigations to this phenomenon that are useful and applicable to the critical care environment. This work occurs in close collaboration with Dr. Tanya Mudry (Werklund School of Education, UofC) who is leading a comprehensive study of burnout in ICU professionals.

- Prevention of Central Line Associated Bloodstream Infections (CLBSI) – the CCSCN in collaboration with provincial partners is refreshing best practices for the prevention of this complication of critical care. DCCM members and Calgary Zone ICUs are participating in this important work.
- ICU Exit Block – the CCSCN is creating provincial measures to reflect the burden, variation and impact of ICU exit block (which occurs when patients recover from critical illness and are ready to be managed on inpatient wards but experience delays in moving to more appropriate care environments resulting in reduction in available ICU capacity and suboptimal and less cost effective care).
- TRM Refresh – the CCSCN in 2023 undertook a collaborative process to refresh their Transformational Road Map (TRM). This has resulted in the identification of new projects and re-prioritization of existing projects. Validation of the revised TRM is underway.

Dr. Dan Zuege, CCSCN Core Team Representative (Senior Medical Director, Critical Care SCN up to Mar 1 2023)
Elizabeth Benson, CCSCN Core Team Representative



Critical Care Strategic Clinical Network

Extracorporeal Life Support

Extracorporeal Life Support (ECLS) is a method of life support used in patients with catastrophic cardiac and respiratory failure. It primarily serves to oxygenate and remove carbon dioxide from the blood, along with providing hemodynamic support. ECLS encompasses veno-venous extracorporeal membrane oxygenation (VV-ECMO), utilized for refractory respiratory failure, and veno-arterial extracorporeal membrane oxygenation (VA-ECMO), employed for refractory cardiac failure.

ECLS has been available at the Foothills Medical Center CVICU for several years. The 2008/2009 H1N1 influenza epidemic sparked renewed global and local interest in expanding ECLS usage. Since then, it has increasingly been employed for refractory respiratory and cardiac failure. In 2015, a multidisciplinary ECLS committee was established to oversee and enhance ECLS delivery in Calgary. The committee aims to prioritize this resource-intensive modality for patients most likely to benefit while enhancing safety and reducing morbidity during ECLS procedures. 2016 marked the first full year of the formalized ECLS program.

In 2023, just under 40 ECLS runs were performed in total (including both VA and VV). We actively utilized our new CardioHelp systems, several of which were generously donated to our program by the Calgary Health Trust. These units have improved monitoring and transport ease while minimizing risks such as air emboli and clotting.



CardioHelp ECLS system

In 2023, notable accomplishments were achieved. Nursing certifications for ECLS care were finalized, and our first cohort of nurses underwent certification training in the first quarter of 2024. Additionally, we entered a collaborative effort with colleagues from the University of Toronto to contribute to a national Canadian ECLS database. We are expanding our experience with high-fidelity simulations to include cannulation and ECLS emergencies. We developed our own ECLS cannulation simulator and routinely train our CVICU fellows on cannulation. Collaboration continues with ECLS programs at the Mazankowski Heart Institute in Edmonton and the Alberta Children's Hospital, focusing on policy, education, and simulation. We are moving closer to our goal of being accredited by the international Extracorporeal Life Support Organization as a "Center of Excellence," further demonstrating our commitment to providing the highest quality of care for ECLS patients.

The ability to provide ECLS is a team effort. This achievement would not be possible without the hard work and dedication of our multidisciplinary team, including nurses (CVICU, CICU, general ICU, and OR), the Perfusion team, respiratory therapists, physician colleagues (including intensivists, cardiologists, cardiac surgeons, and cardiac anesthetists), allied healthcare workers, as well as senior administrative support locally and provincially.

Dr. Ken Parhar, ECLS Committee Chair and FMC CVICU Medical Director

Neurocritical Care

The Department of Critical Care Medicine (DCCM), Neurocritical Care (NCC) Program has continued to formalize and grow over this past year with the ongoing support of our stakeholders and the generous donation of \$2.5 million dollar donation from the Calgary Health Foundation. With a mission to advance NCC through clinical, education and research excellence, we envision all patients in Calgary and Central/Southern Alberta receiving exceptional, comprehensive, patient and family centered NCC.

The DCCM NCC program consists of three fellowship-trained and board certified neurointensivists – Dr. Andreas Kramer, Dr. Philippe Couillard and Dr. Julie Kromm – who work with a multidisciplinary team. The program serves Calgary and Central/Southern Alberta clinical teams and patients in need.

Clinically we strive to assist with diagnostic workups and coordination of targeted care, prevention and management of secondary neurologic injury and systemic complications, evidence-based neuro-prognostication, and when appropriate supporting organ and tissue donation. This is done via both in-person and telephone support. This past year with the support of Calgary Health Foundation we have been able to purchase a state-of-the-art Transcranial Doppler Machine to help specific patients in need of vasospasm monitoring, emboli detection, non-invasive ICP estimation, and ancillary screening or testing for death by neurologic criteria. We have also purchased several regional oximetry monitors to aid in non-invasive autoregulation and cerebral oxygenation monitoring for patients. We are currently in the process of procuring much needed EEG equipment to facilitate continuous monitoring of patients with non-convulsive seizures, and another ultrasound machine.

Research remains an additional focus for us. We continue to conduct local research. With support of the DCCM research team, we have also continued our involvement in several national and international research trials. Both HEMOTION and SaHARA trials looking at optimal HGB targets in patients with traumatic brain injury (TBI) and subarachnoid hemorrhage respectively have complete enrollment and we look forward to their results. We continue to enroll into the PROTEST trial, aimed at assessing the optimal timing for DVT prophylaxis in patients with TBI. We started up two additional studies this past year. The RAISE trial is an international multicenter randomized trial assessing the use of ganaxolone for refractory status epilepticus. The NeuPaRT study is aimed at better understanding the neurophysiology of death by circulatory criteria with a goal to inform donation after circulatory death practices. We have been working hard to start up BOOST3, another international randomized study focused on determining the best strategies for monitoring and treating patients with TBI. We are proud to be a part of the recently published Neuroprognostication in the Post Cardiac Arrest Patient Canadian Cardiovascular Society Position Statement, the Brain-Based Definition of Death and Criteria for It's Determination After Arrest of Circulation or Neurologic Function Canadian guidelines and the Common Data Elements for Disorders of Consciousness Recommendations from the Electrophysiology Working Group of the international Curing Coma Campaign.

We continue to expand our postgraduate and continuing medical education endeavors. We are thrilled to welcome Dr. Atul Philips an accomplished anesthesiologist and intensivist and the Head of the Neurological and Surgical ICU at St. Stephen's Hospital in Delhi India. Dr. Phillips is completing a Neurocritical Care Fellowship with us with



Expanding our postgraduate and continuing medical education with Dr. Atul Philips

goals to expand his knowledge of using neuromonitoring modalities to provide comprehensive, evidence-based, precision-guided neurocritical care, expand his research experience and skills, and develop collaborative partnerships. His overall mission is to use this international training experience to improve neurocritical care in resource limited settings.



Neurocritical Care Team

We look forward to onboarding Dr. Andy Wong, in July of 2024, who will be completing a one-year NCC fellowship with us as well. We continue to facilitate NCC elective rotations that have been requested by both Canadian and International Medical Graduates. Our group has also had the privilege of presenting at several national and international conferences this past year including the Canadian Neurological Science Federation Congress, Canadian Critical Care Forum, Canadian Critical Care Review, and the World Congress of Neurology.

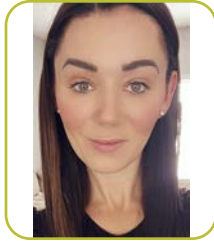
Drs. Julie Kromm, Philippe Couillard and Andreas Kramer – Neurointensivists

Nurse Practitioners

2023 has been a year marked by significant developments, achievements and growth for the DCCM NPs. We have welcomed Nicole Poirier who will cover a maternity leave at the PLC and Margaret (Maggie) Maldonado who has relocated from the US to join the DCCM at RGH. We also thrilled to welcome back Joanna Everson, who has accepted the inaugural NP position for FMC-CVICU. The DCCM-NP Role Description has been formalized and updated to provide clear guidance on NP responsibilities and expectations and we are in the final stages of implementing and standardizing a DCCM-NP Interview and Evaluation tool. The utilization of these tools will provide an additional framework in which to further build upon the high degree of excellence in continuing education, skill competency, research and role development for the DCCM-NP group.

The group has also established a DCCM Multidisciplinary Research Committee solidifying our commitment to promoting multidisciplinary research. This committee collaborates with the Department's research initiatives, supports multidisciplinary-led research through mentorship, and shares opportunities for research and funding within the DCCM. Areas of active research are: the impact of NPs in critical care settings, multidisciplinary collaboration in providing consistent patient and family focused care for the chronically critically ill patient, and multimodal neuro prognostication.

Additional and ongoing work continues in providing a consistent orientation framework for the new to ICU-NP. We continue to foster collaboration provincially with the Critical Care Strategic Clinical Network and



Caralyn Bencsik



Kirsten Deemer



Charissa Elton-Lacasse



Joanna Everson



Jessica Jenkins



Maggie (Margaret) Maldonado



Andrea Petkovic-Wintemute



Nicole Poirier



Robert Ralph



Mathew Wenger

hope to engage with our ICU colleagues in Edmonton. These partnerships enhance patient care, facilitate knowledge exchange, and contribute to quality improvement initiatives. A successful inaugural DCCM NP retreat held last November facilitated positive collaboration and dialogue among our team members. This event allowed us to explore avenues for enriching our role within the department, emphasizing our commitment to continuous education and professional development. The accomplishments outlined in this report underscore the dedication, innovation, and teamwork exemplified by the DCCM Nurse Practitioner Program. We look forward to building upon these successes in the year ahead as we strive for excellence in critical care practice and patient outcomes.

Elizabeth Benson, PLC Executive Director and Zone Program Lead for Critical Care
Charissa Elton-Lacasse, Nurse Practitioner
Mathew Wenger, Nurse Practitioner

Organ Tissue Donation

Offering organ and tissue donation to families of patients is an essential aspect of end-of-life care.

In 2023, there were more deceased organ donors in southern Alberta than in any previous year. In total, there were 63 organ donors, including 36 following deaths by neurological criteria (DNC), 13 following deaths by circulatory criteria (DCD), and 14 that began as DCD donors but progressed to DNC during the period of organ allocation. Critical Care also remains a local leader in referral of patients for ocular and tissue donation.

Effective April of 2023, the Alberta Human Tissue and Organ Donation Act was modified to mandate referral of patients in whom withdrawal of life sustaining measures (WLSM) is being planned to the Southern Alberta Organ and Tissue Donation Program (SAOTDP). Referral must also be made for potential tissue donation, but in this case, referral may occur after death. The goal of “mandatory notification” is to ensure that donation opportunities are not missed, and that patients’ wishes, as expressed through the provincial donation registry, are respected. There are a few exceptions where mandatory notification is not necessarily required (Figure 1). Compliance with Alberta legislation within the Department of Critical Care Medicine is improving, but there is still room for improvement. Critical Care professionals should be careful about avoiding unjustified assumptions regarding eligibility for donation. In the Calgary Zone, there has been a modest increment in referrals for tissue donation since implementation of new legislation.

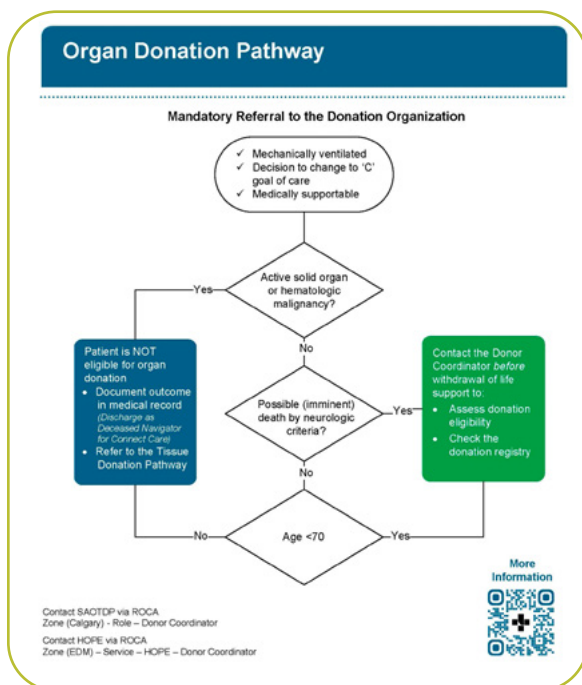


Figure 1. Organ donation pathway

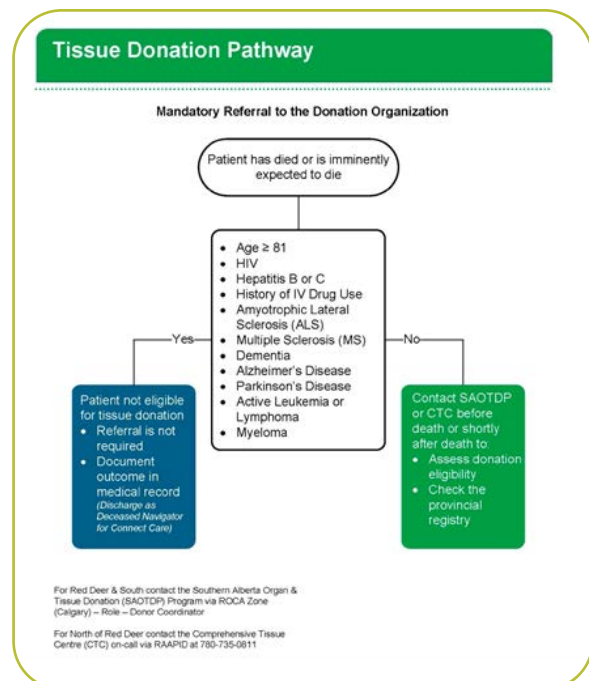


Figure 2. Tissue donation pathway

New national guidelines for death determination by neurological and circulatory criteria were published in the Canadian Journal of Anesthesia in April. Drs. Kromm, Doig, and Kramer from DCCM were all co-authors. Table 1 summarizes key aspect and changes compared with previous guidelines.

Table 1. Changes in new Canadian Guidelines for death determination.

Topic	2023 Guidelines	2006 NDD Guidelines
Conceptual definition of death	Death conceptualized as permanent loss of brain function (loss of circulation leads to loss of brain function)	Presents circulatory and neurologic death as separate entities
Diagnosis death by circulatory criteria	Arterial blood pressure monitoring is strongly recommended for patients undergoing DCD	Not relevant
Definition circulatory arrest	Arterial pulse pressure ≤ 5 mmHg defines cessation of circulation	Not relevant
Definition death by circulatory criteria	Death by circulatory criteria is defined based on ≥ 5 minutes cessation of circulation	Not relevant
Terminology	Death by neurologic criteria (harmonizes with international terminology)	Neurologically determined death
Diagnosis death by neurologic criteria (DNC)	All components of clinical assessment for DNC must be performed to fullest extent possible (including apnea test). Ancillary testing alone is not sufficient.	Previous guidelines said the same thing, but not as overtly
Indications for ancillary testing	<ul style="list-style-type: none"> • Inability to complete a valid clinical assessment, including apnea test • Confounding that can't be resolved • Uncertainty in interpretation of spinally mediated movements • Isolated infratentorial brain injury • SDM request 	The latter 3 are not mentioned in previous guidelines
Diagnosis death by neurologic criteria	Post cardiac arrest patients should not be diagnosed within 48 hours unless imaging evidence of devastating brain injury (i.e., in many cases there needs to be repeat neuroimaging)	No mention of neuroimaging DNC should not be declared clinically within the first 24 hours

Table 1. continued on next page...

Topic	2023 Guidelines	2006 NDD Guidelines
Blood pressure during DNC assessment	SBP \geq 100, MAP \geq 60	Not defined
Body temperature during DNC assessment	Core body temperature \geq 36	Core body temperature \geq 34
Diagnosis DNC	Only vestibulo-ocular and not oculocephalic reflex required	Both vestibulo-ocular and oculocephalic reflex required
Apnea testing	Exogenous CO2 administration permitted (we have no plans of doing this)	Not mentioned
Ancillary testing	Radionuclide scans, CT angiography, CT perfusion, and TCD (with caveats)	Radionuclide scans or DSA
Confounders	Decompressive craniectomy is considered a confounder (ancillary testing required)	Not mentioned
Infratentorial brain injury	Ancillary testing required	No mention whether ancillary testing required

In 2023, the new Alberta Organ and Tissue Donation Program (AOTDP) was introduced. HOPE and SAOTDP are now part of a larger provincial program aiming to harmonize practices and increase efficiency. Dr. Kramer was appointed as Medical Director. The program is currently developing a new name to replace AOTDP.

The Specialist in End-of-Life Care, Neuro-prognostication, and Donation (SEND) program continues to support organ and tissue donation across Alberta. Consultants in Calgary include Drs. Kromm, Au, Couillard, Doig, Boucher, Wang, and Kramer. These individuals are available for consultation in matters relevant to donation. The SEND program is also responsible for audit and feedback regarding missed donation opportunities. Over the past 2-3 years, there has been a gradual decline in missed opportunities.

Dr. Andreas Kramer, Medical Director, Alberta Organ and Tissue Donation Program

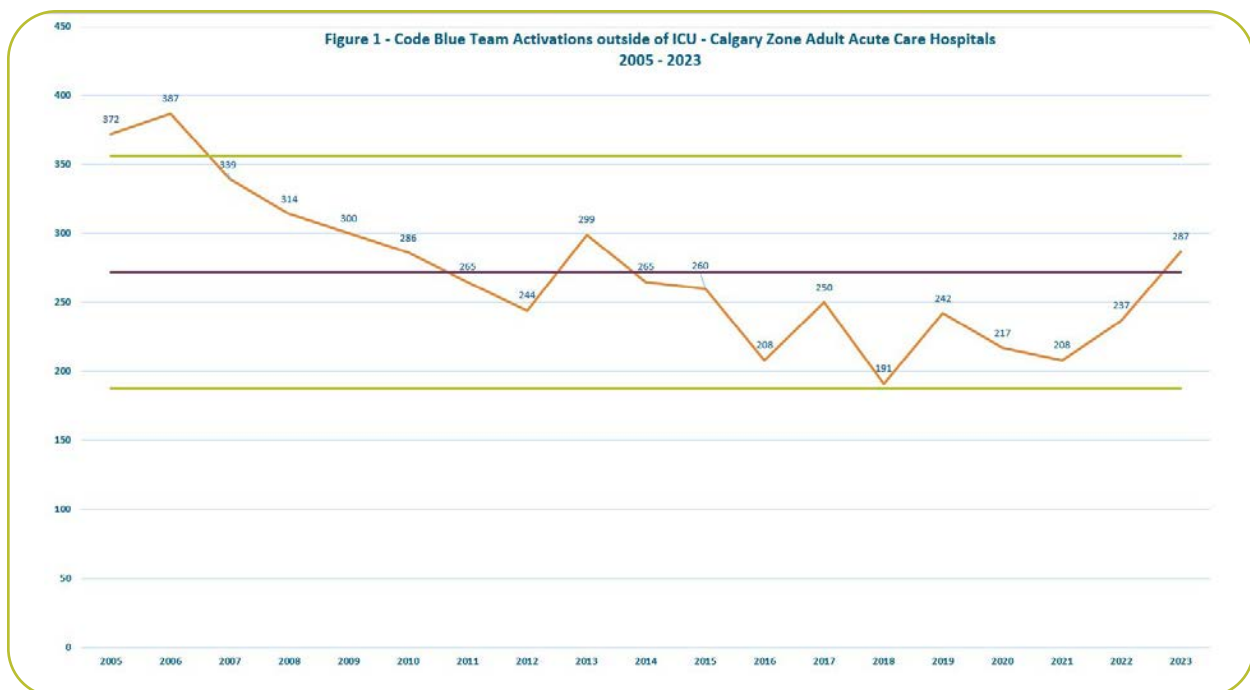
Outreach Program

The provision of high-quality critical care within our five busy ICUs in the Calgary Zone requires the 24/7 on-site presence of providers who continuously oversee the complex care needs of this patient population, including responding to rapid changes in physiology which happen frequently and over short-time spans. In addition to the care provided to those already admitted to the ICU, an integral, component of our program is a multidisciplinary rapid response (“outreach”) team, comprised of an experienced ICU nurse, respiratory therapist and physician, who respond to urgent medical activation and code blue calls,

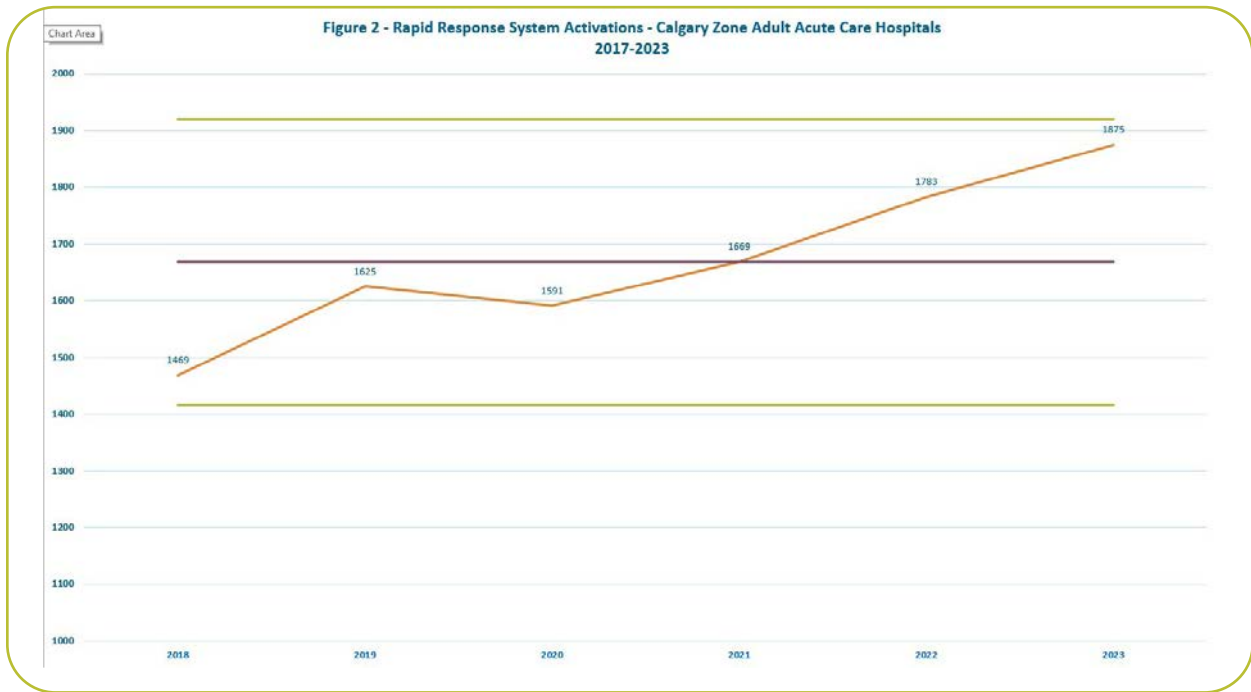
and consult on clinically deteriorating patients on inpatient units in all acute care hospitals in the Calgary Zone. The overriding goal of this team is to improve patient outcomes – either by preventing the need for intensive care (via rapid assessment and appropriate ward-based treatment and decision-making) or by the rapid institution of critical care. ICU outreach physicians are the core physician providers for the ICU outreach teams and are also key tier one providers in all five ICUs from 17:00—08:00 hours every night, thus providing mission-critical staffing enabling safe patient care for our adult ICUs and acute care facilities.

Our ICU outreach program was implemented in 2006 in all adult Calgary hospitals at the request of the former Calgary Health Region, to address concerns about the safety of care provided to hospitalized ward patients whose health deteriorates during their hospital stay. During off-hours fewer medical resources are available on-site. Recently published systematic reviews have shown that implementation of ICU outreach/rapid response programs results in clinically significant reductions in cardiac arrests and deaths in hospitalized patients. The ready availability and advanced skill set of multidisciplinary ICU outreach teams were pivotal in our care protocols during the COVID-19 pandemic, when hospitalizations and inpatient acuity significantly increased. In April 2022, 13 new beds were permanently added to our four medical-surgical ICUs, from 66 to 79, a relative 19.7% increase.

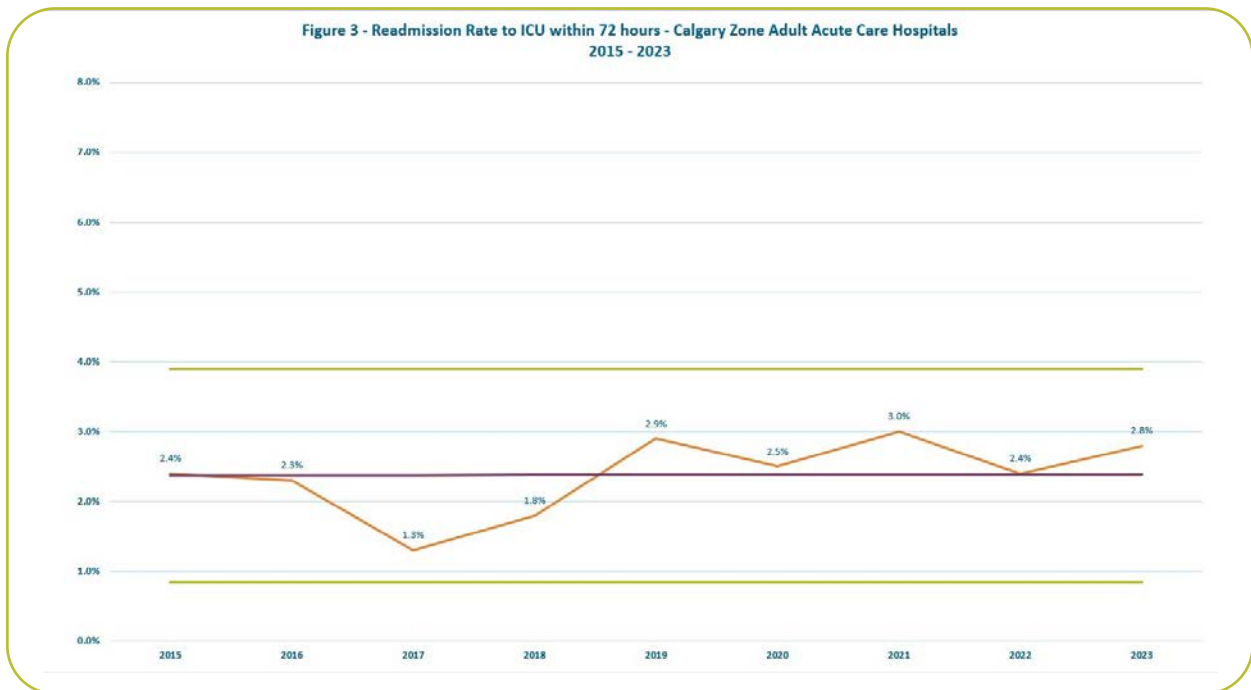
As shown in **Figure 1**, the number of **code blue team activations** in hospitalized patients outside of our adult ICUs decreased from 387 in 2006 to 287 in 2023, despite progressively increasing patient acuity and significant increases in both the number of hospital beds in operation and the number of hospital admissions during and after the COVID-19 pandemic.



This has occurred despite a 27.6% relative increase (from 1469 to 1875) in the number of overall rapid response team activations during the past six years, as shown in **Figure 2**.



These data highlight the positive impact that our ICU outreach/rapid response team has had in reducing the incidence of inpatient cardiac arrests, despite increasing patient numbers. In addition, as shown in **Figure 3**, our ICU readmission rate within 72 hours of discharge from the unit has remained at or below 3% during the past nine years, despite high patient acuity during and after successive waves of the pandemic.



The specific metrics related to multidisciplinary rapid response calls in calendar year 2023 are highlighted for each of our four medical-surgical (non-cardiac) ICUs in **Table 1**. Despite an increasing number of calls relative to previous years, the time spent at the patient's bedside has averaged 56 minutes, highlighting the complex care needs of this patient cohort.

2023	FMC				PLC				RGH				SHC				Zone			
# Outreach Calls	797				310				631				137				1875			
Level of Call	I 48%	II 46%	III 7%		I 37%	II 54%	III 9%		I 22%	II 72%	III 6%		I 23%	II 55%	III 22%		I 35%	II 57%	III 8%	
Time on a call	65 minutes				45 minutes				52 minutes				54 minutes				56 minutes			
% admitted to ICU	28%				19%				11%				10%				19%			
MRP responded	70%				65%				86%				46%				72%			
MRHP directed care	61%				58%				79%				35%				65%			
GOC	R 79%	M 20%	C 0%	U 1%	R 73%	M 26%	C 0%	U 1%	R 63%	M 35%	C 0%	U 2%	R 64%	M 31%	C 0%	U 5%	R 71%	M 27%	C 0%	U 2%
Change in GOC	<u>R-M</u> 2.9%	<u>R-C</u> 0.5%	<u>M-C</u> 2.3%	<u>M-R</u> 0.3%	<u>R-M</u> 0.3%	<u>R-C</u> 1.0%	<u>M-C</u> 1.6%	<u>M-R</u> 0.3%	<u>R-M</u> 1.9%	<u>R-C</u> 1.9%	<u>M-C</u> 4.4%	<u>M-R</u> 0.5%	<u>R-M</u> 2.2%	<u>R-C</u> 2.2%	<u>M-C</u> 5.8%	<u>M-R</u> 0.0%	<u>R-M</u> 2.0%	<u>R-C</u> 1.2%	<u>M-C</u> 3.2%	<u>M-R</u> 0.4%

Table 1

In 2023, eleven new ICU outreach physicians were hired. There are presently 36 active ICU outreach physicians on our rota, who are credentialed family physicians, anesthesiologists, emergency medicine physicians, internal medicine physicians or cardiologists, with additional Critical Care training and experience. We are continuing to recruit highly skilled and motivated practitioners to this mission-critical role.

Dr. Richard J. Novick, Deputy Dept Head, DCCM
Kevin Sedor, Outreach Program Assistant

Clinical Informatics

Informatics plays a vital role in the delivery and planning for excellent critical care in Calgary. We are fortunate to have robust clinical information systems, data repositories, clinical analytics resources, and teams to support us in our daily work. These include Connect Care – as of May 2023, Connect Care has been successfully implemented at all Calgary Zone acute care sites. While optimization work continues at the unit and end user level, the Connect Care Critical Care Area Council continues to support optimization at a provincial critical care level.

Following the implementation of Connect Care, we are busy ensuring that we continue to provide near real-time summary operational, quality and performance data to support optimal care delivery and planning. Several provincial quality improvement initiatives have been supported by reporting of this data. For example, these datasets have been an invaluable resource for provincial initiatives such as those related to the appropriate use of albumin in critically ill patient, the appropriate use of mechanical ventilation in patients with Acute Respiratory Distress Syndrome (ARDS), the appropriateness of initiation of renal replacement therapy and lastly, ensuring the appropriate use of blood product administration. Without these datasets, these initiatives would not be possible potentially compromising the care of our patients, and limiting the opportunity for our health system to improve.

The vital importance of a critical care focused informatics team, with knowledge and skill with both the clinical and informatics aspects of critical care in Alberta, independent of the information systems in use, cannot be overstated. Looking forward, the importance of excellent informatics resources will only be growing to support the drive for high quality, appropriate, cost effective care. Our department looks forward to the continued evolution of our informatics assets to enhance our measurement of quality of care at department, unit and provider levels.

Dr. Luc Berthiaume, Medical Informatics Lead

Quality Improvement and Patient Safety

Quality Improvement starts with understanding local practice and then making systematic efforts to improve it. For the DCCM in 2023, this has included several front line educational initiatives:

1. **Creation of “DCCM QI and PS Rounds” (Formally Zonal Mortality Working Group)**

Our DCCM QI rounds is both a tool for learning evidence-based medicine and reflecting on personal practice. In this multi-professional educational forum held virtually every two months, front-line staff review their selected key clinical practices and related outcomes and processes via a live dashboard. Local practice is compared directly to best practice guidelines, allowing the rounds to serve as a launch pad for both individual and unit level practice improvement. The rounds are led and facilitated by Dr. Selena Au as DCCM QI Medical Director to allow feedback to the ICU Executive and Quality Assurance Committee for departmental support in QI endeavors.

Surveys on QI Rounds as a continuing education and QI tool were strongly positive, with respondents noting facilitated dashboard review adding value to their learning, and four out of five respondents indicating they are likely or extremely likely to make a practice change! We'd like to thank the Physician Learning Program for their expertise and support of our DCCM dashboard creation and co-facilitating alongside Dr. Au!

2023 meeting topics included:

- My ICU sedation practice
- Best Practices in Organ Donation
- Post-Cardiac Arrest Targeted Temperature Management

2. **“Healthcare Serial Killers” Grand Rounds**

In January 2023, Dr. Au and Clinical Safety Lead Tracey Receveur used the Departmental Grand Rounds as a venue to educate staff on AHS' response when adverse events occur. They discussed “Healthcare Serial Killers” (i.e. recurring patient safety issues) over the last ten years of DCCM Quality Assurance Committee work and how we are addressing these issues as a system. Themes that made the culprit list for discussion included difficult airway management, retained guidewires, and non-medical allergy cases.

3. **Measures for Staff Safety from Patient and Visitor Violence**

Instrumental to the care of our patients is the well-being of our staff. Following several reports of patient and family violence against staff members, we organized a departmental learning session led by Chris Hall (Senior Advisor for Prevention of Workplace Violence), Katie Kissel (Clinical Nurse Specialist), Selena Au (QI Medical Director), and Ila Vargas (Patient Care Manager) on staff response and support available when they face threat in the line of duty. Following this educational session, our unit managers and nurse educators have continued to build staff curriculum around Preventing Staff Violence to continue our system learning and to promote a culture of discussion around this challenging topic.

Quality Assurance Committee

Patient safety culture starts with awareness and readiness to respond to safety events in a timely and just manner. It is how we learn as a system so that patients continue to get the best care possible. DCCM has created a Patient Safety Roadmap that includes learning from the frontlines via RLS and formalized mortality patient safety chart audits that are presented at site-based Morbidity and Mortality rounds. Learnings from QAC work are looped back and disseminated to staff via the DCCM QI and PS Rounds.

2023 Major Quality Assurance Reviews

1. Difficult Airway Events – Aggregate QAR led by Selena Au, Tracey Receveur, and Anne Chang in collaboration with Departments of Surgery (Otolaryngology), Anesthesia, and Emergency Medicine

Three events related to failure to capture a difficult airway occurred during the 2021-22 year. In December 2022, we hosted a virtual QAR meeting focused on improving care for difficult airway patients with nearly 100 multi-professional participants from DCCM, ENT, Anesthesia and Emergency Medicine. The QAR was completed in January 2023. The recommendations from these rounds include formation of an Advanced Airway working group involving The Departments of Critical Care Medicine, Anesthesiology, Emergency Medicine, Airway Surgical Services, Respiratory Services and Connect Care to address issues of difficult airway documentation/provider flagging, creation of a Difficult Airway Care Plan, and creation of Site-Specific Difficult Airway Resource Pathway algorithm. These recommendations are currently being actioned.

2. Safe antipsychotic use in Delirium – QAR led by Dr. Natalia Jaworska and Carly Dyck

Antipsychotics are frequently used in the ICU for delirium treatment. Given a known adverse event risk profile (including extrapyramidal symptoms) for these medications, we engaged pharmacy services for support on how to best optimize safe dosage, and balance risk benefit in vulnerable populations. This QAR is active and will be presented to QAC in early 2024.

3. Partnership with Other QACs

Several cases were referred by DCCM in partnership to other Calgary Zone QACs given broader departmental system issues. Thank you to Dr. Kevin Solverson for joining the PLC site-wide QAC for a Cancelled DI Testing QAR and Dr. Selena Au for working with the Medicine QAC for a Missed Euglycemic DKA referral.

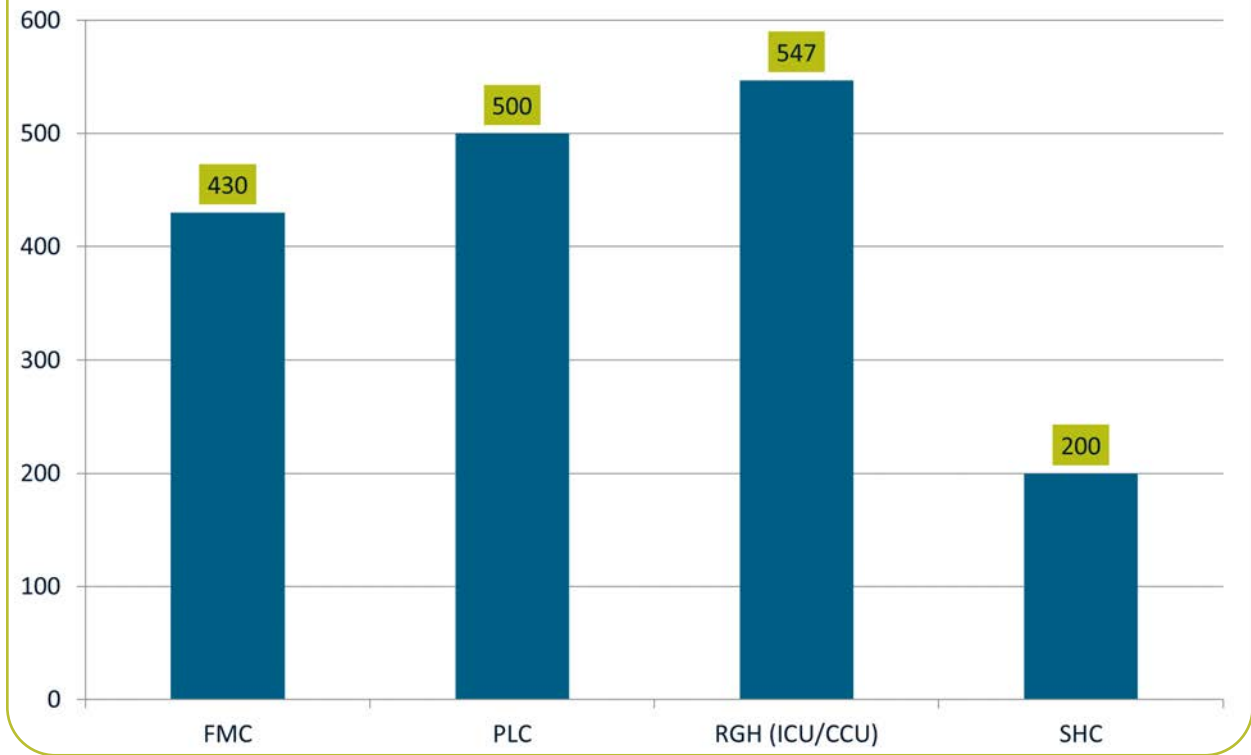
4. Optimizing Palliative Ventilator Weaning Pathway

Not all safety cases result in QARs; sometimes a case have obvious solutions and go directly to quality improvement work. An example is a case reviewed at the QAC with suboptimal sedation practices prior to palliative extubation. This case was presented by Dr. Au at the DCCM QI and PS Rounds in November 2023 with a focus staff education on local best practices for extubation in a palliative patient. With great staff engagement, this led to a 2024 update of our Palliative Extubation Pathway – Much thanks to Jon Pryznyk (RT lead), Katie Kissel (Clinical Nurse Specialist) and Patty Infusino (Unit Manager) for updates to this important clinical practice!

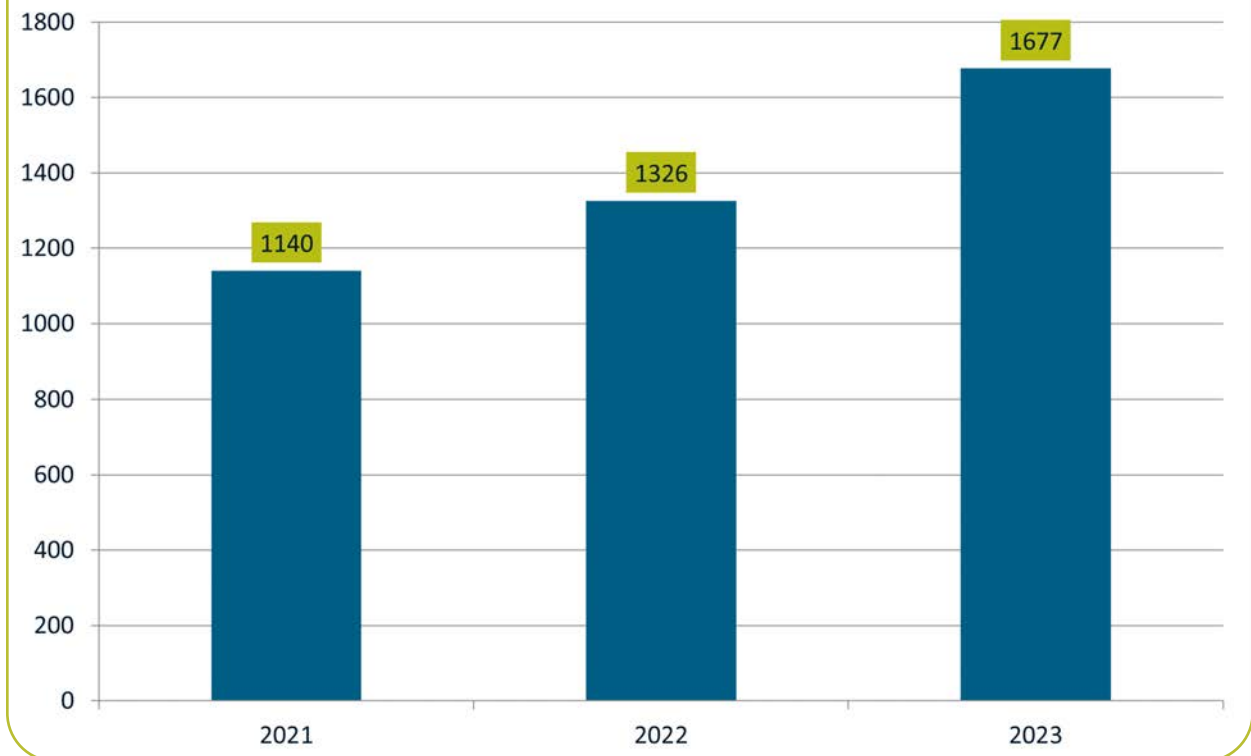
Just Culture

Over the course of 2023, the DCCM has submitted 1677 RLS. The staff are encouraged to submit events where they see risk of harm or actual harm. Thank you to our staff for their tireless efforts to document safety events within a Just culture! These reports are reviewed both individually and in aggregate for trends that drive change. An example of a RLS trend reviewed that resulted in an intervention was a dyskinesia event that led to a QAR.

DCCM RLS Reports - 2023 by Site



Calgary Zone DCCM RLS 2021-2023



The data from the past three years illustrates that RLS reporting has increased. Coupled with review and communication, this highlights DCCM's commitment to a just and learning safety culture.

Learning Culture

All charts from patients dying within the ICU and within 48 hours of ICU discharge are subject to quality assurance review by the 33-physician member Mortality Working Group. Multi-professional site-based meetings are held to discuss opportunities for system improvement, as well as to learn from academic autopsies presented in partnership with the Department of Pathology. Cases requiring longer analysis and/or with learnings ready for staff dissemination are presented at bimonthly Zonal Mortality Working Group meetings to allow for department-wide sharing in a collaborative open-discussion environment.

2023 Mortality Working Group Year at a Glance										
Site	MWG Cases (Deaths)		Educational Autopsy Cases	Summary of Classification (Collected for notable themes)				Summary of Recommendations (Summarized for classes II to IV)		
	Number of Charts Reviewed	Charts Reviewed out of ICU deaths		I	II	III	IV	External	Internal	Both
FMC	77	77/180	22	67	7	2	1	5	2	2
PLC	110	110/120	8	101	7	2	0	3	0	0
RGH	50	50/71	5	39	11	0	0	3	3	1
SHC	76	76/89	15	66	8	2	0	6	2	2
TOTAL	308	308/461	50	268	33	6	1	17	7	5

Note: FMC dates are totals before ConnectCare implementation. Those values will be calculated under 2024 stats.

Legend: Classification I- No care process concern, II- Suboptimal care processes, III- Suboptimal care processes causing patient harm, IV-Suboptimal care processes causing severe patient harm

Cases of Classification II-IV are referred to the QAC for review internally (DCCM) or externally (non-DCCM)

Thank you to members of the DCCM for your ongoing support of a learning culture!

Special thanks to Emma Folz for her leadership a QAC Co-Chair – Your support of staff and encouragement of open dialogue has been impactful for moving the dial for safer patient care.

Members of the QAC 2023

- Dr. Selena Au, QAC Co-Chair and QI Medical Director
- Emma Folz, QAC Co-Chair and Executive Director
- Elizabeth Benson, QAC Co-Chair and Executive Director
- Dr. Dan Zuege, Department Head DCCM
- Carly Dyck, Patient Safety Lead
- Katie Kissel, Clinical Nurse Specialist
- Alan Sutton, Respiratory Therapy Lead
- Kelly Coutts and Dr. Paul Boiteau, FMC Representatives
- Patty Infusino and Dr. Kevin Solverson, PLC Representatives
- Melissa Redlich and Dr. Victor Dong, RGH Representatives**
- Rachel Taylor and Dr. Selena Au, SHC Representatives
- Miranda Kavalench, Administrative Support

Provincial Quality Improvement Highlight

Members of DCCM lead several provincial initiatives, in collaboration with the Critical Care SCN, each aiming to improve the care of the critically ill and the efficiency and effectiveness of our health system. Below is one example of these:

Don't Misuse My Blood

Led by Dr. Niven, sponsored by the Critical Care Strategic Clinical Network (SCN), funded by an Alberta Innovates PRIHS V grant, and in collaboration with the Physician Learning Program (PLP), The Don't Misuse My Blood (DMMB) project has seen considerable activity in 2023. DMMB is a Provincial Quality Improvement initiative with two main objectives: 1) to improve the appropriateness of blood product utilization; and 2) to reduce overuse of unnecessary laboratory testing among a target population of all adult ICUs, CVICUs, CCUs, pediatric ICUs, and six post-operative adult surgical wards in Alberta – a total of 40 units.

The research team which includes members of Dr. Niven's research team, the Critical Care SCN, and the PLP began work on the project in April 2022. Since that time, the main focus has been on the blood product aspect of the project. For this, the team has: 1) developed clinical decision support tools to guide the use of each of the target blood products (RBCs, platelets, plasma, fibrinogen, and prothrombin complex concentrate) within the target units; 2) obtained data on baseline utilization of the target products from Connect Care (the provincial electronic medical record) as mapped against the guidelines within the decision support tools; 3) developed the quality improvement intervention; and 4) implemented the quality improvement intervention in nearly half of the 40 target units. The clinical decision support tools were developed through review and distillation of hundreds of evidence-based guidelines and expert stakeholder consensus and are available via smart phone through QR code as well as within the Critical Care SCN website, and Alberta Precision Labs product-specific monograph. The quality improvement intervention is multi-modal inclusive of identifying local champions, multi-disciplinary education, clinical decision support tool availability at the point of care, and regular audit and feedback. At this point, the team continues to implement the intervention among the target units and provide audit and feedback data to those units that have already received the intervention. All units will have received the intervention by May 2023. Following the main audit and feedback phase, sustainability will be facilitated through integrating the clinical decision support tools within Connect Care, and development of a blood product utilization dashboard.

In 2023, the DMMB team also began work required to address objective 2 of the project, namely the overuse of potentially unnecessary lab tests. For this aspect of the project, artificial intelligence methodology was conducted to examine for lab test redundancy. This work was published (JMIR Medical Informatics 2022; 10(6):e35250). Data on lab test utilization, within the aforementioned target units, was obtained from Connect Care. A working group was developed and had their first meeting to brainstorm different approaches to improving lab test utilization. Work is ongoing to further develop the lab test utilization intervention with a goal of roll out to target units beginning Fall 2024.

Dr. Dan Niven PLC ICU Medical Director and DMMB Study Lead

Education

Critical Care Medicine Residency Program

The Department of Critical Care Medicine (DCCM) at the University of Calgary has been fortunate to train adult Critical Care Medicine (CCM) physicians for the past 35 years. At the end of 2022 our program was reviewed and successfully accredited by the Royal College of Physicians and Surgeons for another seven years. 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 their respective centers.

Presently, there are eight trainees in our CCM Training Program from a variety of base specialty backgrounds. We continue to provide entry positions for four trainees each year with a guarantee of two years of funding. Recruitment was once again highly successful this 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. The quality of our program is underscored by the results of our graduating trainees on their national licensing exams—all four graduating trainees were once again successful in attaining their CCM FRCPC designation this past fall, contributing to our long running line of success.

In July 2019, we implemented a once-in-a-generation change in our educational paradigm by transitioning to a competency-based medical education (CBME) model. This Royal College initiative called “Competence by Design” (CBD) has been 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. Experience with the new paradigm continues to be positive and has afforded our trainees and clinical faculty greater hands-on experience with workplace-based observation, feedback, and coaching in the moment. With direction from the Royal College, we continue to adjust our day-to-day delivery of CBD and we are actively furthering education scholarship.



Difficult Airway Workshop

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 case rounds, 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 and Provision of Feedback as well as Biomedical Ethics, Physician Wellness, and Medico-Legal aspects of practice.

Continuing Professional Development

High caliber citywide CCM Grand rounds continue to be a weekly staple as part of our continuing professional development activities. A variety of local and national experts continue to offer state of the art topic reviews and cutting-edge talks on the science (and art) of CCM as part of our CME offerings. We continue to offer these sessions in webinar format. Webinar recordings are available for review on our DCCM website. Our monthly journal clubs and clinicopathological case rounds are also accredited learning opportunities through the Royal College.



Difficult Airway Workshop



Difficult Airway Workshop

MDSC Program

Believing that we needed to continuously “raise the bar” in critical care education, a Critical Care MSc/PhD graduate training program was developed over two decades ago within the University of Calgary Department of Medical Sciences to better support departmental academic activities. It offers MSc/PhD graduate students and CCM residents a structured education environment to further their academic pursuits. The program offers a tremendous amount of flexibility to allow training in diverse areas related to Critical care. The program currently offers three graduate courses: The Fundamental Basis of Critical Illness (MDSC 623.02), Basic Pulmonary and ventilator Physiology (MDSC 623.03) and Advanced Pulmonary Physiology (MDSC 623.04). Many graduate students have successfully trained in this MDSC subspecialty training program pursuing advanced graduate MSc and PhD degrees. Students enrolled in the program are expected to present their basic science and clinical research at local, national and international conferences and many students have published their research in well-respected, peer-reviewed scientific journals. The program requires students to have a supervisor who is a member of the Department of Critical Care as well as a supervisory committee that may be made up of diverse members within the University.

The Critical Care Graduate Program is coordinated by Dr. Brent Winston (bwinston@ucalgary.ca).

Curriculum Innovations

Several curriculum innovations have been firmly embedded in recent years. Our didactic and hands-on curriculum on application of ultrasound and echocardiography in the ICU is now a staple. State of the art on-line educational modules to augment the didactic and practical experiences as part of the curriculum have been implemented since 2016. A novel IT solution, Qpath (enabling image archiving and review of ultrasounds acquired at each of the various sites in the city) has been ramped up further this year to facilitate expert feedback on image acquisition and image quality. Top-quality portable ultrasound platforms continue to be accessible to our trainees to allow them to more easily be able to develop their point of care ultrasound (POCUS) skills and to meaningfully inform patient care. We hope to launch new POCUS rounds in 2024 for all members of the DCCM.

Clinicopathological case rounds (CPC) rounds have been embedded as a 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 and 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 continue to be extremely well received by participants due to the high-quality teaching and learning opportunity they afford us. We are grateful to our colleagues in Pathology for helping to sustain the impact of these rounds.

Two additional important curricula continue to grow, 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.

Community ICU

To further enhance our clinical and academic collaboration with our referring rural centers, the Training Program integrates a one-month community-based rotation at the Red Deer Regional Hospital intensive care unit. Our fellows participate in this rotation supported by the Distributed Learning and Rural Initiative (DLRI) Program offered by the University of Calgary. The educational experience and professional development afforded by this rotation continues to be universally highly-regarded and immensely valued by our trainees. We're appreciative of our Red Deer colleagues for fostering such a great experience as well as the resources in kind put in place by DLRI to make these learning experiences possible. The program also supports community-based ICU rotations and electives in other centers with several of our fellows benefiting from great educational experiences at Chinook Regional Hospital, Surrey Memorial Hospital, Kelowna General Hospital, and Victoria General Hospital, to name a few.

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 over 150 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, Vascular Surgery, 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 or within acute care facilities, a one-month rotation is offered for all trainees 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. The number of medical students who have chosen CCM electives remained high in 2023. Based on medical student requests for the upcoming academic year, CCM rotation interest remains strong.

Clinical Scholar Program

2022 heralded the reinvigoration of a Clinical Scholar Program for the DCCM and a renewed commitment by the DCCM to sustaining it long term. In 2023, two scholarship opportunities have been made available to Canadian-trained Critical Care Medicine (CCM) physicians who desired additional specialized training in anticipation of an academic CCM career. Nurtured and led by Dr. Jessica Wang, and enthusiastically supported by our CVICU colleagues, the Cardiovascular Intensive Care (CVICU) Clinical Scholar program awarded a position this year to Dr. Stefan Edginton. This advanced clinical fellowship training opportunity allows for 12 months of integrated training in CVICU and all relevant related disciplines to allow Dr. Edginton to develop the requisite knowledge and skills required to work in today's specialized CVICU environment.

The second Clinical Scholar role was a general Clinical Scholar position awarded to Dr. Rachel Jeong. This academic opportunity allows up to 24 months of protected time to complete academic pursuits relevant to the field of CCM. The program allows for the Clinical Scholar to pursue a higher degree (M.Sc. or Ph.D.) as part of the academic component of the Clinical Scholar role and/or additional sub-specialized clinical training relevant to the practice of CCM. To support additional academic training, Clinical Scholars are provided the opportunity to work a limited number of locum physician weeks within the Calgary Zone of Alberta Health Services. The successful completion of the Program is an important pathway of individual professional development and career advancement for Canadian trained CCM specialists after their base training. It's also an important way that the DCCM contributes to the development of subspecialized national CCM expertise and advances the science of caring for the critically ill.

Helios UCMG Post Fellowship Training Awards

Our two clinical scholars were awarded prestigious Helios UCMG Post Fellowship Training Awards in 2023. These training awards allow some of our most outstanding clinical trainees to undertake additional fellowship training/graduate degrees that further their skill set and expertise. Dr. Stefan Edginton's Helios award helped him in pursuit of further CVICU and echocardiography training as part of his CVICU clinical scholar position and Dr. Rachel Jeong's award helped her to pursue a master's degree in Clin-Epi at Harvard along with additional training in critical care nephrology in London, England as part of her general clinical scholar position. Helios awards are very competitive, so this was a great recognition for both Stefan and Rachel in their budding careers.

Neurocritical Care Fellowship Program

In 2021, the DCCM was thrilled to develop and launch a neurocritical care fellowship program at the University of Calgary. Recognizing the paucity of opportunity within Canada to obtain subspecialized training in caring for neurologically injured patients, the DCCM has responded by developing a structured, competency-based fellowship opportunity. Spearheaded by Dr. Julie Kromm and neuro-intensive care colleagues Drs. Andreas Kramer and Philippe Couillard this comprehensive training opportunity has sprung to life welcoming two fellows so far. The DCCM was thrilled to welcome Dr. Atul Phillips from Delhi, India to this role in the fall of 2023. Dr. Phillips joined our program with goals to expand his knowledge of using neuromonitoring modalities to provide comprehensive, evidence-informed, precision-guided neurocritical care and to expand his research skills and develop collaborative partnerships. His overall mission is to use this training experience to improve neurocritical care in resource limited settings. The program also continues to facilitate NCC elective rotations that have been requested by both Canadian and International Medical Graduates. Under Dr. Kromm's leadership we anticipate one formal fellowship position available on a yearly or biennial basis and elective opportunities on an ad hoc basis going forward to help grow local, national, and international expertise in neurocritical care to meaningfully impact patient care in centers across Canada and beyond.

Inaugural PGME Education Awards

In 2023, twenty-six of our DCCM members were recipients of the inaugural PGME Clinical Teaching Award. This award recognizes outstanding resident teaching in all clinical disciplines across the Cumming School of medicine. Award winners were identified using anonymous resident feedback submitted to PGME through teaching assessment forms. Approximately 150 awards were given out this year. To have so many of our colleagues recognized out of the denominator across the entire school is a wonderful testament to the impactful teaching our faculty members continue to provide.

COVID-19 Pandemic – End in Sight!

2023 remained a challenging year with far reaching impacts experienced across all facets of the Education Office's endeavors. The DCCM benefitted from the "can-do" attitude of all members as we continued to navigate this important health system crisis. We would like to recognize and celebrate all our trainees who have risen to the occasion time and time again in providing high quality care amidst a very busy, once-in-a generation, public health emergency. Their resolve and commitment have not gone unnoticed and are hugely appreciated during a time of immense challenge. We're thankful to see the pandemic wane and begin to subside and we're all very much looking forward to brighter days ahead.

Dr. Jonathan Gaudet, DCCM Education and Residency Program Director

Research

DCCM is very active in critical care related clinical research. Supported by the Director of Research and Innovation, the Research Program Manager, and a team of research assistants and support personnel, DCCM actively supports (and in some cases leads) numerous industry and non-industry (including Tri-council) supported research studies spanning observational to interventional designs.

Clinical Research Overview

1. Studies in Close-out:
 - REVISE (Dr. Niven and Dr. Stelfox) – recruitment completed in October 2023.
 - STARRT-AKI (Dr. Stelfox)
 - PROSPECT (Dr. Stelfox, Dr. Niven)
 - BALANCE (Dr. Stelfox, Dr. Niven)
 - SAHARA (Dr. Kramer)
 - REVIVAL (Dr. Doig)
2. Studies in Start-up:
 - RAISE (Dr. Kromm)
 - SCABP (Dr. Zuege)
 - BOOST-3 (Dr. Kramer)
 - LIBERATE (Dr. Dong and Dr. Posadas)
 - NeuPaRT (Dr. Kromm)
3. Studies Actively Recruiting:
 - FISSH (Dr. Parhar)
 - HEMOTION (Dr. Kramer)
 - REMAP-Cap (Dr. Doig)
 - PROTEST (Dr. Kramer)
 - NeurO2 (Dr. Kramer)
 - CCEPTR (Dr. Winston)

Studies Currently Paused:

CAN-SARI (SPRINT-SARI) (Dr. Fiest)
ARBs Corona (Dr. Winston)
ECMOCARD (Dr. Parhar)

Dr. Kirsten Fiest, Director of Research and Innovation
Dr. Monica Cepoiu-Martin, Research Program Manager

Research Day – May 10, 2023

The 16th Annual DCCM (Department of Critical Care Medicine) Research Day, held on May 10, 2023, stands as a hallmark of academic and research excellence within our critical care community. This event was made possible through the generous support of the Winston family, marking not just a celebration of ongoing research and innovation but also serving as a tribute to Miriam and Arnold Winston through the establishment of the Miriam and Arnold Winston Lectureship and endowment at the Canadian Intensive Care Foundation (CICF). The CICF is a non-profit charity focused on raising funds for research and education in Critical Care in Canada. Established in 1992, Miriam Winston was the first executive director of the CICF and had a major role in raising over 1.5 million dollars for the foundation over the years.

The DCCM Research Day saw the gathering of clinicians, researchers, and trainees affiliated with the DCCM, all united by a common goal: to explore and expand the horizons of critical care medicine. After several years of pause due to the COVID pandemic, the in-person event underscored the department's commitment to fostering an environment of inquiry and discovery, where the latest advancements and research findings were shared and discussed among peers. The day was a vibrant showcase of the diverse, innovative efforts taking place within the DCCM, helping shape a path forward for critical care research and practice.

Key to the day's proceedings was the keynote address by Dr. Sangeeta Mehta, the first lecturer of the Miriam and Arnold Winston Lectureship. Dr. Mehta, who holds positions as a Professor in the Department of Medicine and a Clinician Scientist in both the Division of Respiriology and the Interdepartmental Division of Critical Care at the University of Toronto, as well as a Clinician Scientist at the Lunenfeld Tanenbaum Research Institute, delivered insights on EDI in research – from research teams to trials, that were both enlightening and inspiring. Her expertise and perspective provided a compelling backdrop for the day's discussions, fostering a deeper understanding of the challenges and opportunities that lie ahead in critical care.

The event's success was further highlighted by the impressive number of presentations—20 in total—showcasing the rich tapestry of research being conducted within the department. Particularly noteworthy was the participation of ten trainees, whose involvement underscores the department's dedication to nurturing the next generation of critical care researchers and practitioners. Breena Dobson's presentation on Sexual dimorphism of disease severity in sepsis is independent of the gut microbiota received the Best Trainee Presentation award. The DCCM trainees' contributions not only enriched the day's discussions but also signified the vibrant future of critical care research, characterized by curiosity, rigor, and a relentless pursuit of knowledge.

The 16th Annual DCCM Research Day was a tremendous success, not just in terms of the quality and range of research presented but also in fostering a sense of community and shared purpose among those dedicated to advancing critical care. The event highlighted the importance of collaboration, mentorship, and continuous learning, principles that are at the heart of the DCCM's mission.

Dr. Monica Cepoiu-Martin, Research Program Manager
Dr. Kirsten Fiest, Director of Research and Innovation



Arnold and Miriam Winston



Dr. Sangeeta Mehta

Fiest Lab Highlights

Trainee Highlights 2023

- PhD candidacy-Laurie Lee (PhD candidate) successfully completed her PhD candidacy exam
- PhD candidacy-Janelle Boram Lee (PhD Candidate) successfully completed her PhD candidacy exam
- MSc defense-Abby Thomas successfully defended her MSc thesis
- New student-Gwen Knight joined the lab as a MSc student
- New student-Thérèse Poulin joined the lab as a MSc student
- Award-Thérèse Poulin received a Canadian Institutes for Health Research graduate scholarship masters award and an MDCH first author publication award

Select Study Highlights 2023

- **ACTIVATE:** The ACTIVATE study empowers family members of ICU patients to be partners in delirium prevention, detection, and management using non-pharmacological strategies. On June 28, 2023, we recruited our last patient/family pair for the ACTIVATE pilot trial. We are in the process of evaluating the data from 64 patient/family pairs to help inform the next step of our family-administered delirium detection research program.
- **Clinical Research in the ICU:** This cross-sectional study described the ICU care team's experiences in ongoing clinical research, identifying perceived barriers and enablers to their participation in its conduct. We completed recruitment in March 2023 (n=172 ICU care team members from five Calgary area ICUs and PICU). The manuscript was accepted to Critical Care Explorations.
- **COLLABORATE:** The COLLABORATE study educates patients, families, and healthcare professionals on communication strategies that can be used to promote a positive, patient and family-oriented ICU rounds experience. We restarted this study at South Health Campus ICU at the beginning of August 2023. We've completed recruitment for Phase 1 (Family members: 15; ICU care team members: 21). We are currently recruiting family members and ICU care team members for Phase 2.
- **RC Attire:** This survey-based study evaluates patient and family's perceptions of research coordinators. During 2023, we completed recruitment at FMC ICU (n=172 patients/families). During 2023, we've recruited 134 patients and families at PLC ICU and SHC ICU, and will begin recruitment at RGH ICU shortly.

Select Collaboration Highlights 2023

- **CONFOCAL (with Dr. Gordon Boyd; Queens University):** This study evaluates the association between cerebral oxygenation, delirium, and long-term cognitive outcomes in ICU survivors. During 2023, we recruited 10 patients at FMC ICU (for a total of 18 patients from Calgary to date).
- **Patient-important bleeding (with Dr. Deborah Cook):** We worked with Dr. Deborah Cook and Dr. Meredith Vanstone to create a definition of patient-important upper gastrointestinal bleeding. Over the last year, we interviewed 49 ICU survivors and family members of ICU patients.

Notable Achievements

World Delirium Awareness Day: The Fiest team was the Canadian lead for the World Delirium Awareness Point Prevalence Study. On March 15, 2023, participating sites completed a survey to report the delirium prevalence (at 8am and 8pm), ward characteristics (delirium prevention/management strategies used, barriers), and perceptions of where delirium research/care should be focused. We were able to recruit 27 sites from across Canada (ICU: 22; PICU: 5). We are currently writing the results from this work, on which all participating sites will be co-authors. This study will be reconducted in 2025, with the hope of engaging more sites.

Patient Partner Engagement Highlights

The Fiest team, together with patient partners and members of the ICU care team completed a study to identify delirium websites that could be used for patient and family education. We co-wrote a manuscript titled “An Evaluation of the Quality of Delirium Websites for Patient and Family Education” which has been submitted to and reviewed by JMIR. We are currently responding to reviewers.

Fiest team members (Karla and Nadine) co-presented with Christine Caron a talk titled “Establishing patient and family partnerships” to the members of the Critical Care Trials Group Research Coordinators group in Halifax (May 2023).

Dr. Kirsten Fiest, Director of Research and Innovation

Jenne Lab Highlights

The Jenne Lab continued its work looking at the role of inflammation in the host response to infectious and non-infectious disease with a particular focus on immunothrombosis. In addition, the Jenne lab joined a transdisciplinary team that includes population health experts, data scientists, and engineers to apply mathematic models based in geomechanics and granular materials to more precisely model infection disease transmission in heterogenous populations. This unique approach to disease modeling formed the basis of successful grant applications to the Canadian Network for Modelling Infectious Disease (CANMOD) and NSERC Discovery Horizon program. In 2023, Dr. Jenne was promoted to the rank of full professor and was recognized with an Outstanding Achievement Award (OAA) and a COVID-19 Outstanding Achievement Award. Over the past four years, Dr. Jenne has contributed to more than 1000 local, national, and international media interviews, commitment that was recognized with the Cumming School of Medicine’s Social Accountability Distinguished Achievement Award. Dr. Jenne was identified as one the top 100 Immunologists of all time in Canada by Research.com and received recognition as a Clarivate’s Web of Science Highly Cited Researchers. This recognition identifies researchers whose work is among the top 1% of citations globally and represents approximately the top 0.1% of scientists in all fields. Dr. Jenne was one of only 16 faculty members at the University of Calgary to receive this recognition.

Dr. Craig Jenne, Associate Professor, University of Calgary

Kubes Lab Highlights

Dr. Paul Kubes has taken host response to infection into animal models with co-morbidities. He has examined how the immune system is altered in patients with liver fibrosis. This year he published a paper in *Science* (Impact factor 47.7) showing how the immune system tries to adapt to major changes in liver architecture during the development of fibrosis challenged by *S.aureus* blood stream infection. He discovered a novel role for monocytes in forming giant cells in an attempt to eradicate infection. The work involved three transplant centers that provided human samples. He also published a number of additional papers exploring the turnover of macrophages in, for example, lung and showing that regardless of ontogeny the macrophages respond poorly to flu but can be trained to respond better (*Journal of Immunology*). Dr. Kubes was successful in obtaining his fourth CIHR and a collaboration on a CBRF application for pandemic preparedness. This past year he was awarded a Canada Excellence Research Chair (CERC). Dr. Kubes is on the scientific advisory board of the journal *Science* and on the editorial board of *JCI* and *JEM*.

Dr. Paul Kubes, Professor, University of Calgary

McDonald Lab Highlights

Publications (trainees indicated by *):

1. Connor CH*, **Zucoloto AZ***, Yu I, Corander J, Hoskinsson P, **McDonald B**†, McNally A†. Multidrug *E. coli* encoding high genetic diversity in carbohydrate metabolism genes displaces commensal *E. coli* from the intestinal tract. *PLOS Biology* 21(10):e3002329. (2023) †**co-senior authorship**.
2. **Chiu MH***, **Gershkovich B***, Yu IL, O'Brien ER, Li J, **McDonald B**. Heat shock protein 27 in the pathogenesis of COVID-19 and Non-COVID Acute Respiratory Distress Syndrome. *Cell Stress and Chaperones* (2023) In press.
3. **Schlechte J***, **Zucoloto AZ***, Yu I, **Doig CJ**, Dunbar MJ, McCoy KD, **McDonald B**. Dysbiosis of a microbiota-immune metasytem in critical illness is associated with nosocomial infections. *Nature Medicine* 29(4):1017-1027 (2023)
4. **Zucoloto AZ***, **Schlechte J***, Ignacio A, Thompson CA, Pyke S, Yu I, Geuking MB, McCoy KD, Yipp BG, Gillrie MR, **McDonald B**. Vascular traffic control of neutrophil recruitment to the liver by microbiota-endothelium crosstalk. *Cell Reports* 42(5):112507 (2023)
5. Sharma N, Chwastek D, Dwivedi DJ, **Schlechte J***, Yu IL, **McDonald B**, Arora J, Cani E, Eng M, Englebarts D, Kuhar E, Medeiros SK, Bourque SL, Cepinskas G, Gill SE, Jahandideh F, Macala KF, Panahi S, Pape C, Sontag D, Sunohara-Neilson J, Fergusson DA, Fox-Robichaud AE, Liaw PC, Lalu MM, Mendelson AA. Development and characterization of a fecal-induced peritonitis model of murine sepsis: results from a multi-laboratory study and iterative modification of experimental conditions. *Intensive Care Medicine Experimental* 11(1):45 (2023)

6. Burkhard R, Koegler M, Brown K, Wilson K, Mager LF, **Zucoloto AZ***, Thompson C, Hebbandi Nanjundappa R, Skalosky I, Ahmadi S, **McDonald B**, Geuking MB. Intestinal colonization regulates systemic anti-commensal immune sensitivity and hyperreactivity. *Front Immunol* 14:1030395 (2023)
7. Zhang M, Fergusson DA, Sharma R, Khoo C, Mendelson AA, **McDonald B**, Macala KF, Sharma N, Gill SE, Fiest KM, Lehmann C, Shorr R, Jahandideh F, Bourgue SL, Liaw PC, Fox-Robichaud A, Lalu MM, Canadian Critical Care Translational Biology Group, and Sepsis Canada National Preclinical Sepsis Platform. *Syst Rev* 12(1):50 (2023)
8. Biemond JJ, **McDonald B**, Haak BW. Leveraging the microbiome in the treatment of sepsis: potential pitfalls and new perspectives. *Current Opinions in Critical Care* 29(2):123-129 (2023)

New Grants in 2023:

1. Lung Health Research Grant (Alberta Lung Association) – Re-defining airway colonization by *Candida* in critical illness
2. Clinical Incubator Grant (Snyder Institute) – Combatting infections in the ICU by targeting the fungal microbiome

2023 Research Trainees:

- Dr. Niki Cho (Eye's High postdoctoral fellow)
- Amanda Zucoloto (PhD - graduated April 2023)
- Breenna Dobson (MSc - graduated Dec 2023)
- Jared Schlechte (PhD student)
- Ayesha Weersinghe (PhD student)
- Kathryn Strayer (PhD student)
- Diana Changirwa (MD/MSc student)
- Dr. Michael Chiu (clinical scholar project)
- Dr. Ann Zalucky (clinical scholar project)



McDonald Lab

Notable Achievements and Awards

- Dr. Niki Cho, Postdoctoral Fellow
 - 2023 – Eye's High Postdoctoral Fellowship (total \$50,000/year)
- Jared Schlechte, PhD Student
 - 2023 – CIHR Doctoral Canada Graduate Studentship (\$35,000/year x3 years)
 - 2023 – CSM PhD Program Entrance Award (\$2500)
 - 2023 - Alberta Graduate Excellence Scholarship – Indigenous (\$11,000)
- Amanda Zucoloto, PhD Student
 - April 2023 - Successfully defended PhD
 - 2023 – PhD thesis of distinction award, Faculty of Graduate Studies, UCalgary

- Diana Changirwa, PhD Student
 - 2023 – Alberta Graduate Excellence Scholarship – Doctoral (\$15,000)
 - 2023 - Achievers in Medical Sciences (AIMS) Award (\$30,000)
- Breenna Dobson, MSc Student
 - Dec 2023 - Successfully defended MSc
 - 2023 - Thesis of distinction award
 - 2023 Best trainee presentation award – Dept of Critical Care Research Day
- Braedon McDonald
 - Killam Emerging Research Leader Award

Dr. Braedon McDonald, Assistant Professor, University of Calgary

Niven Lab Highlights

General

In 2023, the Niven lab was busy completing applied implementation science and trainee projects. Building off results and lessons learned from a previous CIHR-funded implementation science project focused on reducing unnecessary albumin fluid resuscitation in adult ICUs (RATIONALE, NCT04187534), the main focus of the Niven lab in 2023 was the blood transfusions aspect of the Alberta Innovates PRIHS V-funded Don't Misuse My Blood project. This involved development and delivery of the implementation science initiative designed to improve appropriateness of blood product utilization within all of Alberta's adult and pediatric critical care units, coronary care units, and select post-operative surgical wards. As of the end of 2023, the team had delivered the intervention through the stepped-wedge implementation design to approximately half of the 40 participating units.

Trainees

In addition to leading the Don't Misuse My Blood project, Dr. Niven was busy supervising trainees. The PhD student he co-supervises with Dr. Chip Doig, Amanda Leong, successfully completed her candidacy exam, and is presently working on completion of her dissertation projects. Amanda presented scientific abstracts from the Niven lab at five conferences in 2023. These included a mixture of local and international meetings. Amanda also published one first author manuscript in 2023.

Dr. Niven took on a co-supervisory role of two additional graduate students (Sampson Law, PhD student; Dr. Rachel Jeong, MPH student) and joined the supervisory committee for one MSc student (Thérèse Poulin, Primary supervisor – Dr. Kirsten Fiest). Sampson Law was the recipient of the Distinguished Doctoral Recruitment Scholarship

Funding

In 2023, Dr. Niven was co-investigator on five successful grant submissions totaling approximately \$1.9M funded by Alberta Health Services, O'Brien Institute for Public Health, Alberta Innovates and CIHR.

Publications

Dr. Niven published 10 manuscripts in 2023, of which he was senior author on two that were primarily authored by trainees he supervised. He submitted an additional seven manuscripts for peer review in 2023, and published one book chapter (McKay VR, Walsh-Bailey C, Malone S, McGovern C, Niven DJ. Chapter 12: Missing the Target – Mis-implementation and De-implementation in Dissemination and Implementation Research in Health: Translating Science to Practice, 3rd Edition. Brownson RC, and Proctor EK, editors. Oxford University Press. 2023).

Dr. Dan Niven, PLC ICU Medical Director

Parhar Lab Highlights

Team members

In 2023, we had a team of two members (two research assistants) as well as one ICU fellow and one medical student as trainee researchers. We continued to collaborate with multiple multidisciplinary team members as well from nursing and respiratory therapy. In 2023, we looked forward to welcoming our first two graduate students as part of the Parhar Lab, both enrolling in the Community Health Sciences graduate program. Through hard work, resiliency and collaboration there were many major milestones and successes to celebrate in 2023.

Actively funded MAJOR projects

Implementation Science and Cluster Randomized Stepped Wedge Trial (TheraPPP study)

implementing the “Venting Wisely” pathway in all adult Critical Care studies. In this study, our team in partnership with the Critical Care Strategic Clinical Network completed the implementation of a care pathway for patients who are mechanically ventilated. This trial was designed as a type 1 implementation-effectiveness hybrid study and used a cluster randomized stepped wedge trial format. Most importantly it uses an implementation science-based strategy to adopt this pathway. The pathway was piloted successfully in one ICU and has successfully been implemented in all 17 adult ICUs in the provinces as a stepped wedge cluster randomized study. The study successfully recruited over 20,000 patients. Data cleaning of the final data set was the biggest priority of 2023. This work has been funded by CIHR (KP-NPA) and Alberta HHS funding (KP – NPA).



Helmet non-invasive ventilation in the Parhar lab

Awake Prone Positioning for COVID respiratory failure. We co-led (with Jason Weatherald-Edmonton and Waleed Alhazzani-McMaster University) an international multicenter RCT looking at the role of awake prone positioning for patients with COVID-19. As follow-up to work successfully published in the Journal of the American Medical Association (JAMA) and the British Medical Journal in late 2022, where Ken Parhar was the co-first and corresponding author, a rapid practice guideline was developed. We also assisted the World Health Organization (WHO) with a rapid practice synthesis of the awake proning evidence to support a WHO guideline.

Collaborative Projects

Ken is a co-applicant and co-investigator on several CIHR based project grants from within the Department of Critical Care (Stelfox – Accelerate and Fiest – COVID family), as well as outside DCCM (Muruve – Inflammation). In addition, he has an expanding role in multiple national and international collaborations including being a steering group/CIHR co-applicant on several respiratory failure projects including the use of helmets and non-invasive ventilation (HONOUR, Scales Sunnybrook), and Dual Lumen catheters for ECMO (Fan, TGH). Most recently he has been invited to be on the steering group for a large international platform trial (PRACTICAL) for respiratory failure interventions being led by the University of Toronto. As a co-applicant, the first two domains were funded in separate successful CIHR grants. This will provide Calgary the opportunity to play a key role in likely future landmark Critical Care trials which will include re-examining the role of steroid in ARDS and the role of Driving Pressure in the mechanical ventilation strategy.

Notable Presentations in 2023

In 2023, Ken was invited present both at the Canadian Critical Care Forum as a speaker to provide a presentation on Mechanical Power and was faculty at the Canadian Critical Care Review Course and gave a lecture on Management of Cardiac Patients in the ICU.

Selected Publications in 2023

1. **Parhar KKS**, Soo A, Knight G, Fiest K, Niven DJ, Rubinfeld G, Scales D, Stelfox HT, Zuege DJ, Bagshaw S. Protocol and statistical analysis plan for the identification and treatment of hypoxemic respiratory failure and acute respiratory distress syndrome with protection, paralysis, and proning: A type-1 hybrid stepped-wedge cluster randomised effectiveness-implementation study. *Crit Care Resusc.* 2023 Dec 13;25(4):207-215. doi: 10.1016/j.ccrj.2023.10.008. PMID: 38234326; PMCID: PMC10790012.
2. **Parhar KKS**, Knight GE, Soo A, Bagshaw SM, Zuege DJ, Niven DJ, Fiest KM, Stelfox HT. Designing a Behaviour Change Wheel guided implementation strategy for a hypoxaemic respiratory failure and ARDS care pathway that targets barriers. *BMJ Open Qual.* 2023 Dec 30;12(4):e002461. doi: 10.1136/bmjopen-2023-002461. PMID: 38160019; PMCID: PMC10759109.
3. Tisminetzky M, Nepomuceno R, Kung JY, Singh G, **Parhar KKS**, Bagshaw SM, Fan E, Rewa O. Key performance indicators in extracorporeal membrane oxygenation (ECMO): protocol for a systematic review. *BMJ Open.* 2023 Dec 9;13(12):e076233. doi: 10.1136/bmjopen-2023-076233. PMID: 38070916; PMCID: PMC10728968.
4. Al Duhailib Z, **Parhar KKS**, Solverson K, Alhazzani W, Weatherald J. Awake prone position in patients with acute hypoxic respiratory failure: A narrative review. *Respir Med Res.* 2023 Nov;84:101037. doi: 10.1016/j.resmer.2023.101037. Epub 2023 Jun 30. PMID: 37625375.
5. **Parhar KKS**, Doig C. The authors reply. *Crit Care Med.* 2023 Sep 1;51(9):e188-e189. doi: 10.1097/CCM.0000000000005971. Epub 2023 Aug 17. PMID: 37589527.

6. Edginton S, Kruger N, Stelfox HT, Brochard L, Zuege DJ, Gaudet J, Solverson KJ, Robertson HL, Fiest KM, Niven DJ, Bagshaw SM, **Parhar KKS**. Methods for determination of optimal positive end-expiratory pressure: a protocol for a scoping review. *BMJ Open*. 2023 Aug 1;13(8):e071871. doi: 10.1136/bmjopen-2023-071871. PMID: 37527894; PMCID: PMC10401233.
7. Myatra SN, Alhazzani W, Belley-Cote E, Møller MH, Arabi YM, Chawla R, Chew MS, Einav S, Ergan B, Kjaer MN, McGloughlin S, Nasa P, **Parhar KKS**, Patel A, Piquilloud L, Pisani L, Scala R, Tripathy S, Weatherald J, Oczkowski S. Awake proning in patients with COVID-19-related hypoxemic acute respiratory failure: A rapid practice guideline. *Acta Anaesthesiol Scand*. 2023 May;67(5):569-575. doi:10.1111/aas.14205. Epub 2023 Feb 9. PMID: 36691710.
8. **Parhar KKS**, Doig C. Caution-Do Not Attempt This at Home. Airway Pressure Release Ventilation Should Not Routinely Be Used in Patients With or at Risk of Acute Respiratory Distress Syndrome Outside of a Clinical Trial. *Crit Care Med*. 2023 Jan 20. doi: 10.1097/CCM.0000000000005776. Epub ahead of print. PMID: 36661571.
9. Clinical management of COVID-19: living guideline, 18 August 2023. Geneva: World Health Organization; 2023 (WHO/2019-nCoV/clinical/2023.2). Licence: CC BY-NC-SA 3.0 IGO. Section 3.8 – updated systematic review and meta-analysis by **K Parhar** and J Weatherald.

Students and Trainees

- Natalia Kruger BHSc – Medical Student - ARDS
- Dr. Stefan Edginton MD – Critical Care Fellowship and MSc candidate – Pain strategies post cardiac surgery
- Gwen Knight – MSc candidate – Variability in neuromuscular blockade strategies and clinical outcomes
- Dr. Kyle Murnaghan – Critical Care Fellowship – Academic Advisor
- Abby Thomas, MSc in Epidemiology – Supervisory committee

Dr. Ken Parhar, FMC CVICU Medical Director

Roze des Ordons Lab Highlights

Awards and Distinctions

- Postgraduate Medical Education Teaching Award, University of Calgary (Sep/23)
- Canada Graduate Scholarship Doctoral Award, Social Sciences and Humanities Research Council (SSHRC; May/23)

Research Funding

- Nov/23 – Mar/26. Seow H, Myers J, Winemaker S, Incardona N, Steinberg L, Levine O, Apramian T, Kulasegaram K, Jia Z, Roze des Ordons A, Simon J, Sander J. Integrating early palliative care into practice: Testing and evaluating practical tools for providers, patients, and families. *Health Canada*. Nov/23 – Mar/26. Amount: \$2,390,680.

Publications/Presentations

1. Ko J, Roze des Ordon A, Ballard M, Shenkier T, Simon JE, Fyles G, Lefresne S, Hawley P, Chen C, McKenzie M, Sanders J, Bernacki R. Exploring the value of structured narrative feedback within the Serious Illness Conversation-Evaluation Exercise (SIC-Ex): A qualitative analysis. *BMJ Open*. 2024;14:e078385.
2. Lockyer J, Lee-Krueger R, Armson H, Hanmore T, Koltz E, Könings K, Mahalik A, Ramani S, Roze des Ordon A, Trier J, Zetkolic M, Sargeant J. Application of the R2C2 model to in-the-moment feedback and coaching. *Acad Med*. 2023;98:1062-1068.
3. Lu M, Moinul D, Crooks R, Kelly-Turner K, Roze des Ordon A, Keegan D, Roach P. Evaluating transformative health leadership education for Indigenous health: a mixed methods study. *BMJ Leader*. 2023 May 5. doi: 10.1136/leader-2022-000721.
4. Rame A, Kelly-Turner K, Roze des Ordon A, de Groot J, Keegan D, Crowshoe L, Henderson R, Roach P. Informing critical Indigenous health education through critical reflection: A qualitative consensus study. *Health Educ J*. May 2023. doi: 10.1177/00178969231174872.

Conference Abstracts and Presentations

- Poster: Roze des Ordon A, Ellaway R. Trauma in medical education: A metanarrative review. Association for Medical Education in Europe Conference 2023. Glasgow, UK (Aug/23)
- Oral: Roze des Ordon A, Ellaway R. Doctoral dilemma: Trauma in medical education. Rogano Meeting. Glasgow, UK (Aug/23)
- Oral: Roze des Ordon A, Armson H, Lee-Krueger R, Sargeant J, Lockyer J. Application of the R2C2 model to in-the-moment feedback and coaching. Office of Health and Medical Education Scholarship Symposium. Calgary AB (May/23)

Dr. Amanda Roze des Ordon, Intensivist and Clinical Associate Professor, University of Calgary

Stelfox Lab Highlights

Summary of Accomplishments by Anmol Shahid, Postdoctoral Scholar

With mentorship from Dr. Stelfox, I led several projects aiming to foster patient-and family-centered care in the intensive care unit leading to first author publications. This included development and testing of several tools:

- family-administered pain assessment tool for non-communicative patients (Critical Care Pain Observation Tool for Families; four publications*)
- family-led coaching tool for patients being weaned from sedation and mechanical ventilation (2 publications*)
- the Patient-Oriented Discharge Summary Tool for Intensive Care Unit patients (one publication), and a scoping review of citizen engagement in health research (two publications)

Awards Received

I received the O'Brien Institute Postdoctoral Fellowship (\$12,500/year – one year), The Cumming School of Medicine Postdoctoral Fellowship (\$12,500/year – one year), and the CIHR Health System Impact Postdoctoral Fellowship (\$77,500/year – two years).

Conferences

I presented work at several international (2023 Organization for the Study of Sex Differences Annual Meeting), national (2021-2023 Critical Care Canada Forums), regional (2022-23 Alberta Society of Intensive Care Physicians Meetings), and local (2023 UCalgary Gairdner Symposium, 2021 Late Life Team Grant Virtual Symposium 2021) conferences.

*Some publications are currently in the peer-review process.

Summary of accomplishments by Fiazan Khan, Postdoctoral Scholar

- March 2023
Co-Developing a Transitions in Care Bundle for Critically Ill Patients and Their Family Caregivers
Funder: Canadian Institutes of Health Research
Program: Banting Postdoctoral Fellowship
Amount: \$140,000 ****ranked #3 out of 144 applications****
- Apr 2023
Best Oral Presentation at 2023 Gairdner Symposium
University of Calgary and O'Brien Institute for Public Health
- May 2023
OSSD Conference Travel Award – \$500 USD
Organization for the Study of Sex Differences, Society for Women's Health Research

Summary of accomplishments by Julian Kennett, Research Associate

Juliane Kennett is a Research Associate working within the Department of Critical Care Medicine conducting meta-research on the reproducibility of health sciences research. She is currently leading a systematic review investigating empirical evidence of predictors of research reproducibility. In addition, she is undertaking research on eating disorder etiology and treatment. Juliane is finalizing a manuscript on intersections in awareness, early intervention, and treatment of eating disorders.

Summary of accomplishments by Niklas Bobrovitz, Research Assistant

Five peer review publications

First author article in the Lancet ID on the protective effectiveness of prior infections and hybrid immunity against SARS-CoV-2 that was cited 250 times in one year, was featured on live television (CTV Calgary), recorded television (CBC Calgary), live radio (Canadian Broadcasting Corporation), print media (Calgary Herald), and informed both national and international vaccination guidelines.

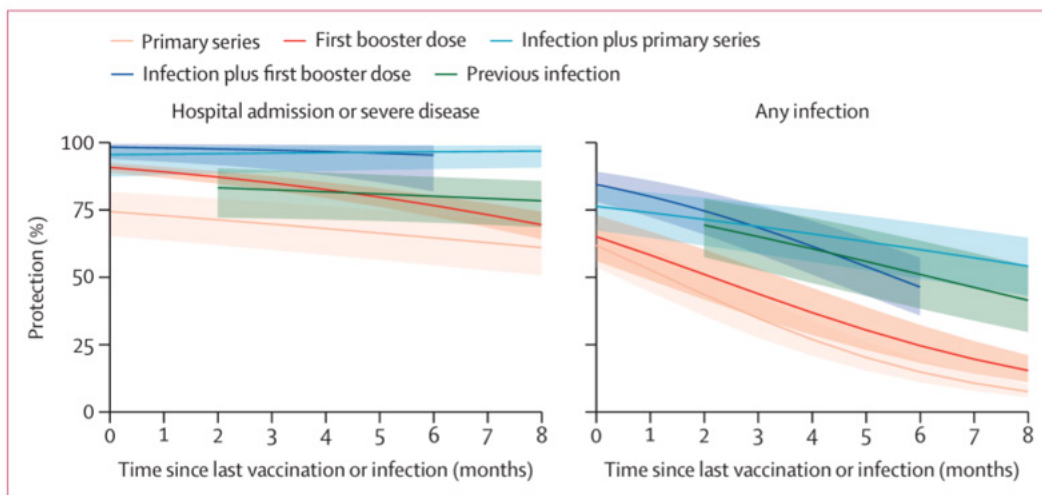


Figure 3: Protection against omicron variant conferred by the primary series vaccine, first booster vaccine, previous infection, and hybrid immunity compared to immune-naïve individuals over time
The shaded areas denote 95% CIs. Vaccine effectiveness data were procured from a separate systematic review.

Invited presentations at three World Health Organization global meetings of the Strategic Advisory Group of Experts on Immunization and Technical Advisory Group on COVID-19 Vaccine Composition.

Invited speaker at a US Clinical and Translational Serology Task Force Round Table Meeting.

Conferences

Spoke on a panel at the 15th Canadian Science Policy Conference, Symposia Panel on Mechanisms for Effective Science Advice in Public Health and Public Health Emergencies. The topic was generating and communicating trustworthy scientific advice during health emergencies: six lessons from building SeroTracker.

Dr. Thomas Stelfox, Intensivist and Professor (until Aug 31, 2023)
Deputy Dean, Faculty of Medicine and Dentistry, University of Alberta

Winston Lab Highlights

Dr. Winston continues to be active in research administration in the DCCM as the Coordinator of the Critical Care Graduate Program (a subspecialty within the Medical Sciences Graduate Program) and sits on the Graduate Educational Committee of the Medical Sciences Graduate Program. Dr. Winston is also a member of the GEC of the DCCM. In 2023, Dr. Braedon McDonald took over coordinating the MDSC 623.02 course and in 2024 Dr. Kevin Solverson took over coordinating the MDSC 623.03 course.

The Winston lab has been actively involved in examining how metabolomics can be used for diagnosis, prognosis and determining mechanisms of disease in acute respiratory distress syndrome (ARDS, both covid and non-covid mediated), in sepsis and septic shock and in severe traumatic brain injury (TBI), with the goal of applying precision medicine in these disease processes. Currently, Dr. Winston is examining the metabolomics of COVID-19 pneumonia and examining the metabolomics of COVID-19 Variants of

Concern. As part of Dr. Winston's research team, Dr. Winston is working with Mohammad Banoei (who finished his Ph.D. and continues doing metabolomics studies with Dr. Winston). He has an MSc graduate student – Dr. Eric Pimentel (an MD trained graduate student from Mexico). He works closely with Dr. Chel Hee Lee in biostatistics in the DCCM. Dr. Winston has been working closely with the ARBs Corona Group (now CAPTIVATE Group) over the last two - three years on COVID-19. The Winston team has published six publications over the year. One highlight was a publication in Critical Care – reference: Mohammad M. Banoei, Chel Hee Lee, James Hutchison, William Panenka, David A Wishart, Brent W. Winston, on behalf of the Canadian Biobank and Database for Traumatic Brain Injury (CanTBI) investigators, the Canadian Critical Care Translational Biology Group (CCCTBG) and the Canadian Traumatic Brain Injury Research and Clinical Network (CTRC). Metabolomic profiles in serum predict global functional neurological outcome and death at three and 12 months following severe traumatic brain injury. Critical Care, 2023, 27:295. <https://doi.org/10.1186/s13054-023-04573-9>.

His team has been involved in Clinical trials involving sepsis, COVID-19 and ARDS. Dr. Winston presented his work at the DCCM Grand rounds at the University of Calgary. He is a regular presenter at the Canadian Critical Care Translational Biology Group (CCCTBG) and the Canadian Traumatic Brain Injury Research Consortium (CTRC).

Dr. Brent Winston, Graduate Coordinator, Critical Care Graduate Program

Yipp Lab Highlights

The Yipp lab continues to investigate infections and host immune responses. In 2023, we published papers in iScience, Trends In Immunology and provided significant collaborative support for publications in Cell Genomics and Nature.

Dr. Bryan Yipp, Intensivist and Associate Professor, University of Calgary



Published paper in Science Translational Medicine



Yipp Lab members

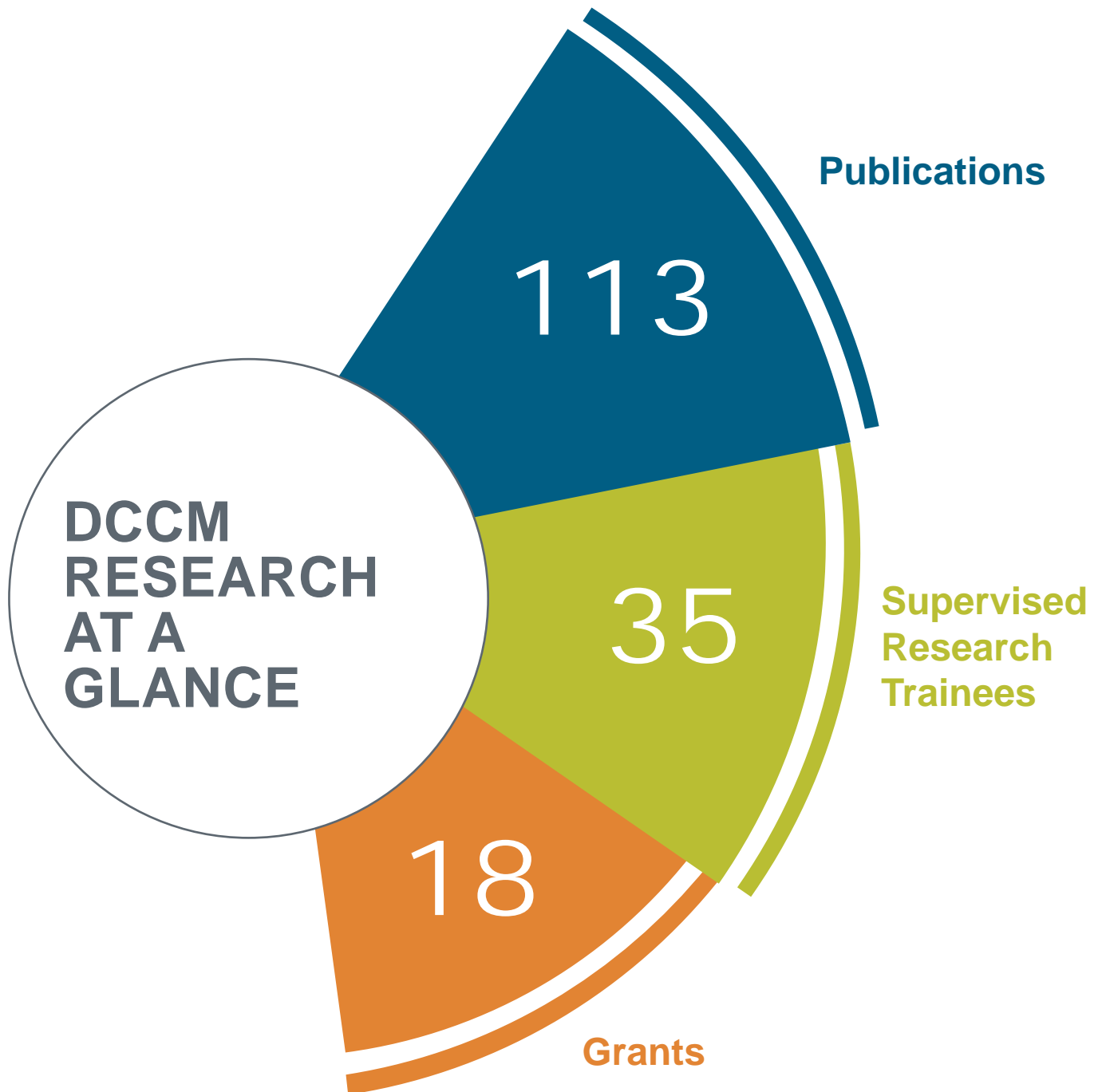
Department of Critical Care Medicine and Cumming School of Medicine Institutes

The Department of Critical Care Medicine (DCCM) is fortunate to have strong ties to multiple institutes across the Cumming School of Medicine. Researchers in our department are members of the Calvin, Phoebe and Joan Snyder Institute for Chronic Diseases, the O'Brien Institute for Public Health, the Libin Cardiovascular Institute and the Hotchkiss Brain Institute. These ties allow for collaborations across disciplines and methodologies, strengthening the impact of the research we conduct. The Snyder Institute is focused on advancing the capacity to ease the burden of chronic and infectious diseases through foundational work on prevention, treatment, and cure. The DCCM is happy to partner with the Snyder Institute on its Clinical Problems Incubator Grants, which are designed to spur novel clinical questions into experimental research. Snyder members include Drs McDonald, Winston, Doig, Kubes, Jenne and Yipp. The O'Brien Institute's mission is to advance public health through research excellence, championing research to promote population health and high-quality sustainable health care for all. Now led by Dr. Kirsten Fiest (Scientific Director), it also counts Drs Boucher, Doig, Jaworska, Lee, Parhar, Stelfox and Zuege as members. The Hotchkiss Brain Institute strives to inspire discovery and apply knowledge toward innovative solutions for neurological and mental health disorders. Drs Couillard, Kramer, and Kromm represent the DCCM as members of the Hotchkiss Brain Institute. The Libin Cardiovascular Institute connects cardiovascular research, patient care and education in Southern Alberta. Drs Boucher, Ferland, Lam, Novick, and Zuege represent the DCCM as institute members.

Dr. Dan Zuege, Department Head

The Department of Critical Care Medicine (DCCM) is fortunate to have strong ties to multiple institutes across the Cumming School of Medicine.

Research at a Glance

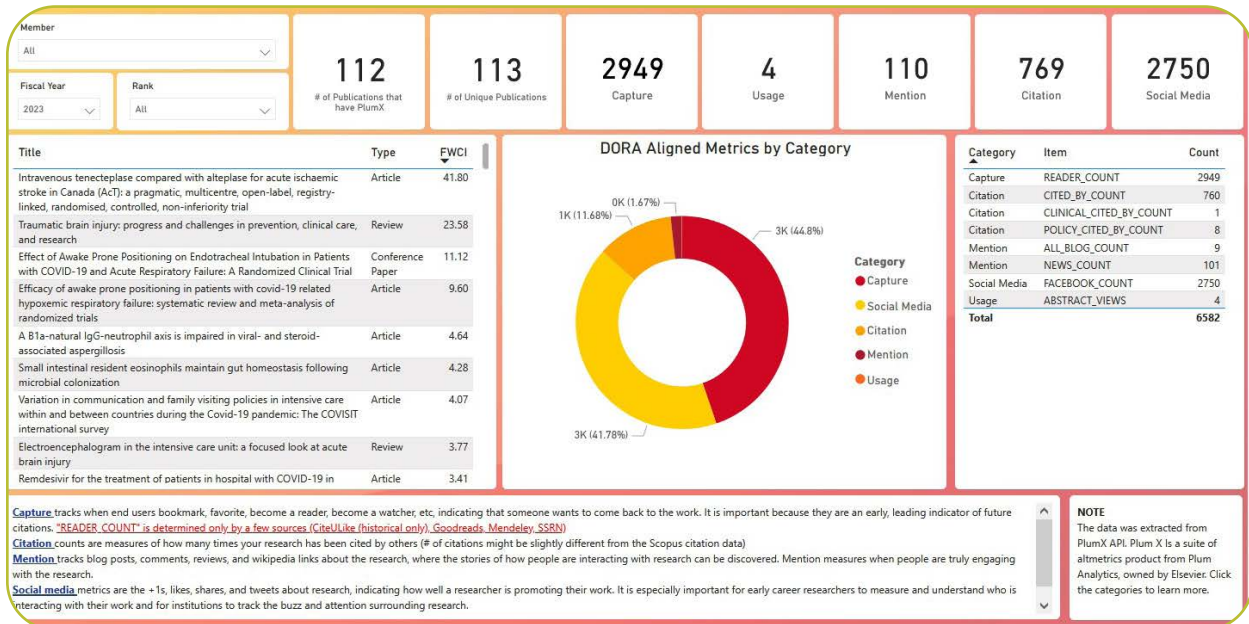


Cumming School of Medicine Research Metrics

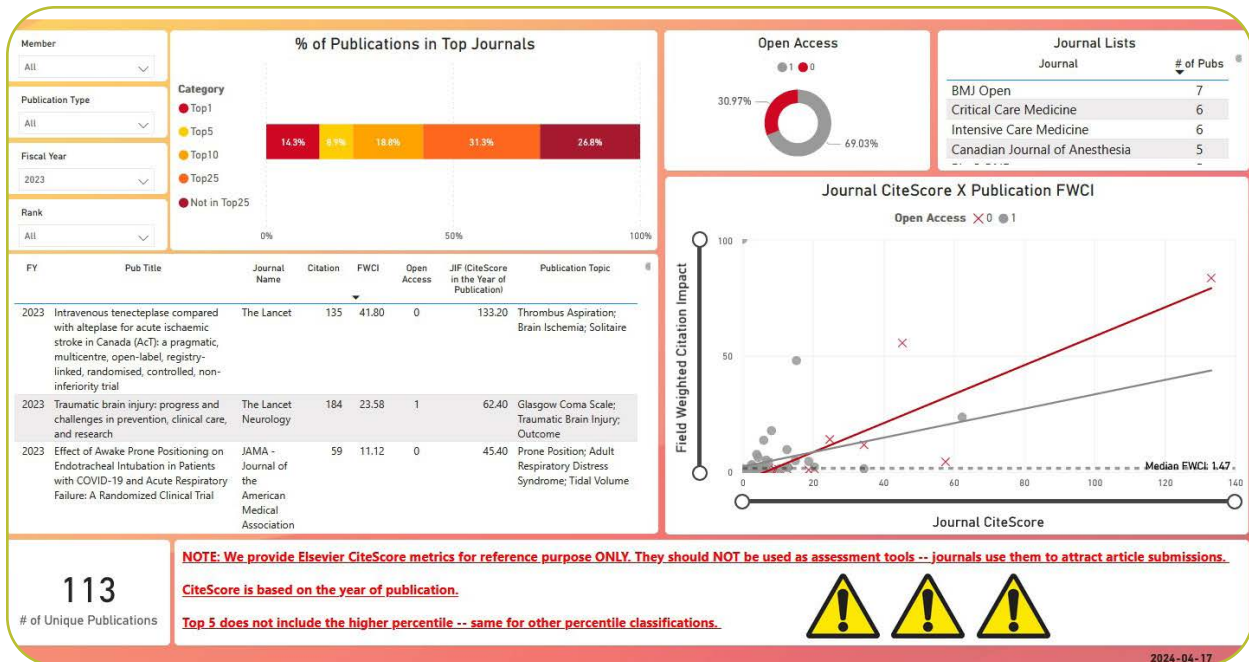
Metrics below are for the fiscal year (April 01, 2023–March 31, 2024)



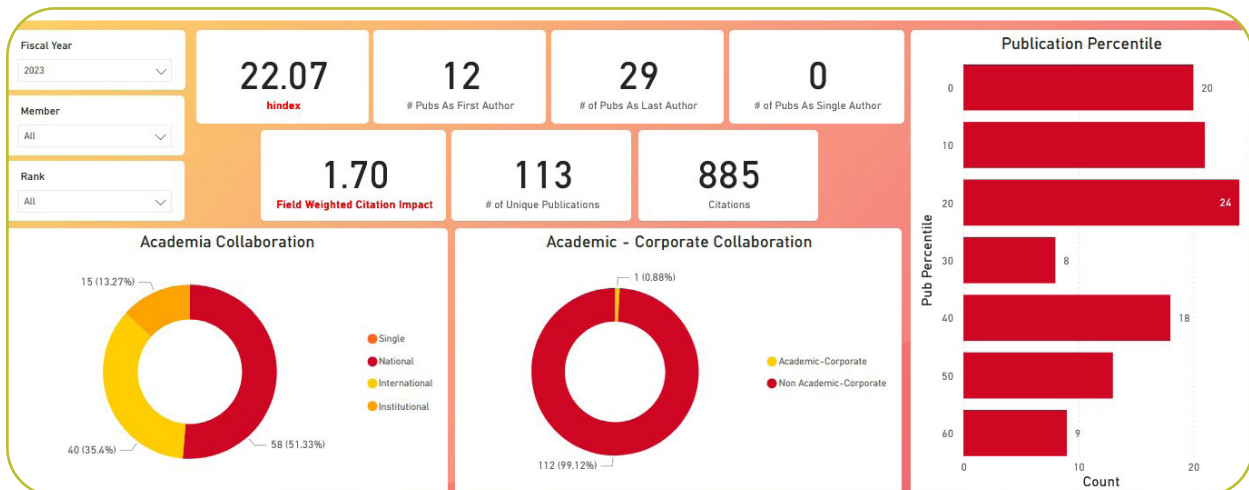
Publications 2018-2023



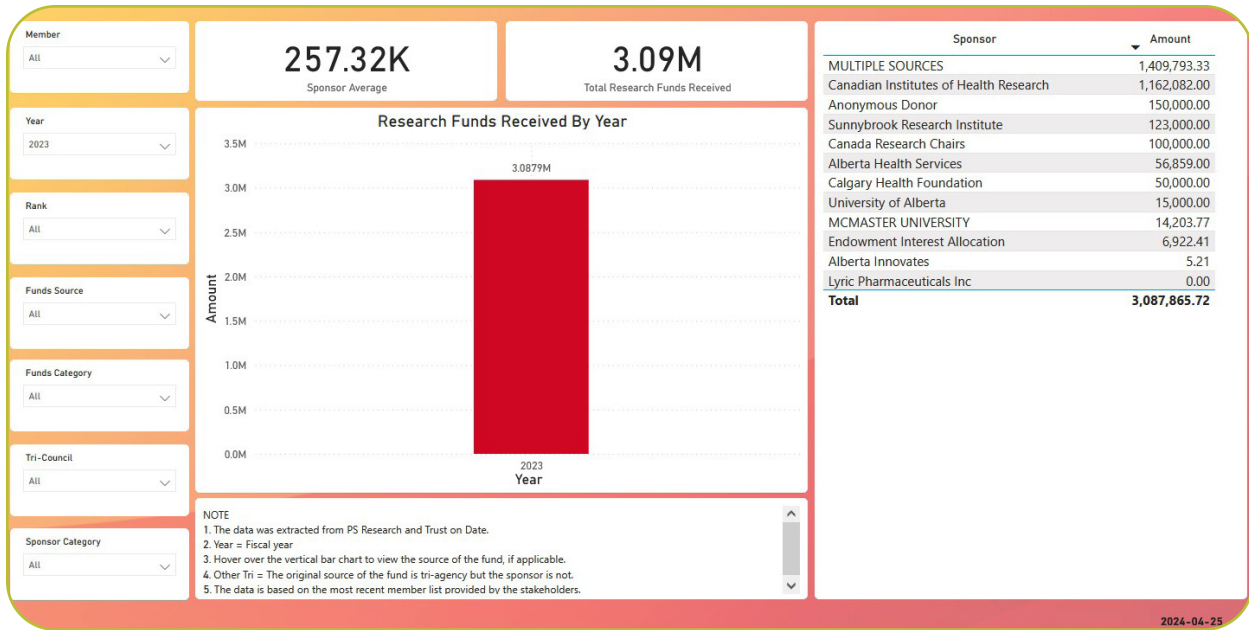
DORA Aligned Metrics for Researchers and Publications



Publications Journal Metrics



Group Metrics



Research Funds



Data provided by the Faculty Analytics Unit
Cumming School of Medicine

Supervised Research Trainees

Trainee Name	Primary/Co-Supervisor
Amanda Leong, PhD student (Co-supervises with Dr. Dan Niven)	Dr. Christopher Doig
Laurie Lee, PhD candidate Janelle Boram Lee, PhD candidate Abby Thomas MSc in Epidemiology Gwen Knight, MSc student Thérèse Poulin, MSc student Dr. Faizan Khan, Post-Doctoral Research Fellow Dr. Anmol Shahid, Post-Doctoral Research Fellow Research Mentor, Dr. Natalia Jaworska, Clinical Assistant Professor	Dr. Kirsten Fiest
Dr. Niki Cho, Eye's High postdoctoral fellow Amanda Zucoloto, PhD student (graduated April 2023) Breenna Dobson, MSc student (graduated Dec 2023) Jared Schlechte, PhD student Ayesha Weersinghe, PhD student Kathryn Strayer, PhD student Diana Changirwa, MD/MSc student Dr. Michael Chiu, Clinical scholar project Dr. Ann Zalucky, Clinical scholar project	Dr. Braedon McDonald
Amanda Leong, PhD student (Co-supervises with Dr. Chip Doig) Sampson Law, PhD student Dr. Rachel Jeong, MPH student Thérèse Poulin, MSc student (Primary supervisor – Dr. Kirsten Fiest)	Dr. Daniel Niven
Natalia Kruger BHSc, MD student - ARDS Dr. Stefan Edginton MD, Critical Care Fellowship and MSc candidate Gwen Knight, MSc candidate Dr. Kyle Murnaghan, Critical Care Fellowship Abby Thomas, MSc student	Dr. Ken Parhar
Dr. Faizan Khan, Postdoctoral Scholar Dr. Anmol Shahid, Postdoctoral Scholar	Dr. Thomas Stelfox
Eric Pimentel	Dr. Brent Winston

Trainee Name	Primary/Co-Supervisor
Luke Brown, PhD MDSC Dr. Idaira Guerrero, PhD Carlos Hiroki, PhD Immunology program Dr. YueFei Lou, Research associate Angela Nguyen, MSc Research manager Mahum Rashid, CMMB thesis Student Nicole Sarden, PhD Immunology program Dr. Masato Watanabe, Visiting Professor	Dr. Bryan Yipp

Research Grants

Year	Sponsor	PO/CO Investigator	Title	Amount
2023 - 2026	Health Canada	COI - Amanda Lee Roze des Ordon	Integrating early palliative care into practice: Testing and evaluating practical tools for providers, patients, and families.	\$2,390,680
2023 – 2025	Department of Research and Development Canada	COI – Chip Doig	Prehospital Risk-Estimation During Initial Call-Taking (Predict 2)	\$980,000
2023 - 2024	O'Brien Institute for Public Health Catalyst Award	PI – Natalia Jaworska COI – Dan Niven COI – Andrea Soo	Association between Ketamine and Delirium in Critically Ill Patients: A Retrospective Cohort Study	\$15,000
2023 - 2024	Alberta Health Services Critical Care SCN	PI – Natalia Jaworska COI – Dan Niven COI – Kirsten Fiest	Evaluation of Sedation Monitoring Practices in Critically Ill Adult Patients: A Systematic Review and Meta-Analysis	\$14,970
2023 – 2024	Department of Critical Care Medicine Seed Grant	PI – Natalia Jaworska COI – Dan Niven	Barriers and Facilitators to Healthcare Professionals Sedation Practices	\$10,000

Year	Sponsor	PO/CO Investigator	Title	Amount
2023 – 2026	Alberta Innovates	COI – Dan Niven	POWER Program: Personalized Osteoporosis Care With Early Recognition: A Novel Digital Provincial Outpatient Fracture Liaison Service	\$1,230,489
2023 – 2026	CIHR	COI – Dan Niven	Developing federated learning strategies for disease surveillance using cross-jurisdictional EMRs without data sharing	\$703,800
2023 – 2027	CIHR	COI – Kirsten Fiest	Alberta Sex, Gender and Women's Health Hub	\$840,000
2023 – 2024	CIHR	COI – Kirsten Fiest	Virtual Family Participation in Adult ICU Rounds: A Pilot Randomized Trial (The V-FAMILY Trial)	\$76,500
2023 – 2027	CIHR	COI – Tom Stelfox	Improving mental health practices in patients recovering from traumatic injuries: Identifying priorities based on knowledge to practice gaps and interested parties needs and preferences	\$558,452
2023 - 2024	CIHR	COI – Tom Stelfox	Addressing cost-related nonadherence of prescription medications through evidence-informed cost-sharing policies in public drug plans to advance health equity in Canada	\$149,804
2023 – 2024	CIHR	COI – Tom Stelfox	Establishing Stakeholder Priorities for the Development and Implementation of Strategies to Support Continued Youth and Family Recovery from the COVID-19 Pandemic	\$20,000

Year	Sponsor	PO/CO Investigator	Title	Amount
2023 – 2024	CIHR Canadian Immunization Research Network Extension Grant	COI -Tom Stelfox	Furthering our understanding and response to vaccine hesitancy: A multi-phased mixed-methods study	\$150,000
2023 – 2024	CIHR	COI – Tom Stelfox	A survey of Canadian critical care staffing to inform current policy and future need	\$300,000
2023 – 2027	CIHR	COI – Tom Stelfox	Reducing low-value practices in acute trauma care: a pragmatic cluster randomized controlled trial	\$608,176
2023 – 2028	CIHR	COI – Andrea Soo	Evaluating Individual Cancer-associated Thrombosis Mechanisms to Inform Personalized Thromboprophylaxis in Patients with Metastatic Bone Disease.	\$1,043,615
2023	University Health Network (Toronto)	COI – Ken Parhar	Driving Pressure-Limited Ventilation in Hypoxemic Respiratory Failure: the DRIVE RCT	\$7,078,340.00
2023	McMaster University	COI – Ken Parhar	The Corticosteroid Early and Extended (CORT-E2) Randomized Controlled Trial	\$3,412,833.00

Publications

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6. **Banoei, MM; Lee, CH;** Hutchison, J; Panenka, W; Wellington, C; Wishart, DA; **Winston, BW**. (2023). Metabolomic profiles in serum predict global functional neurological outcome at 3 and 12 months and death at 3 months following severe traumatic brain injury. *BMC Critical Care*. 27: 1-15.
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