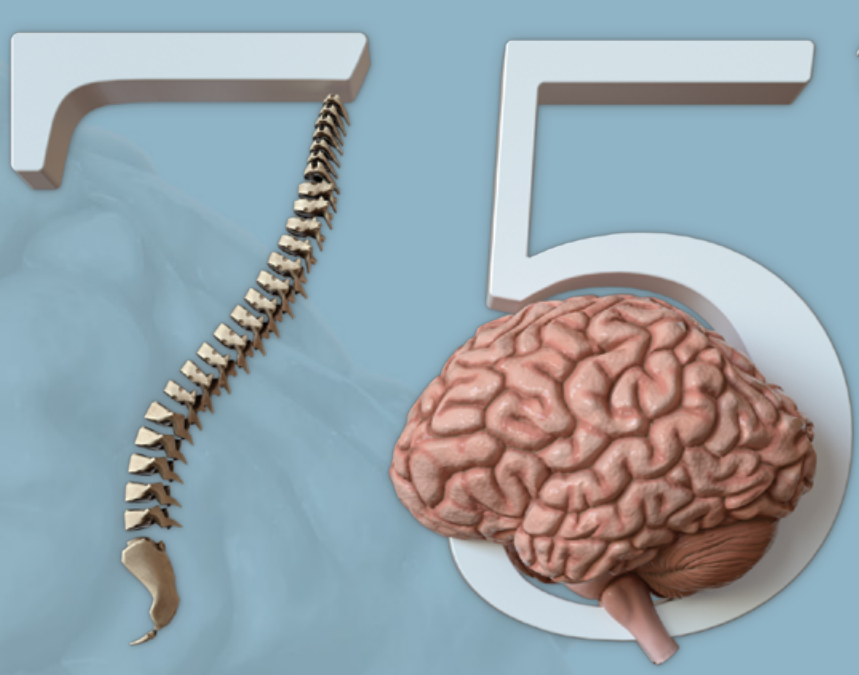

HALIFAX NEUROSURGERY 1948 - 2023

HALIFAX
NEUROSURGERY

2023

ANNUAL REPORT

Acknowledgment for Annual Report: Jenny Pierce
Cover design by Andrew Pierce

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Message from the Head of Neurosurgery

David B. Clarke MDCM, PhD, FRCSC, FACS

Seventy-five years ago, in 1948, with WW2 having concluded just three years earlier, Halifax Neurosurgery was born. Dr. William Stephenson, having finished his training in Neurosurgery in Toronto, decided to make a pioneering move east to Halifax to begin the practice of Neurosurgery.

Seventy-five years later, welcome to the Division of Neurosurgery's 2023 Annual Report! As the dark cloud of the pandemic slowly lifts (hopefully!), Halifax Neurosurgery continues to adapt to the various challenges foisted on us and continues to do remarkable things. This annual report highlights our activities over the past year, where our wonderful neurosurgery team has remained devoted and steadfast in our commitment to deliver the best in patient-focused care and in our commitment to demonstrate excellence in teaching, research, and administrative duties.

There are several highlights from 2023. For me, the most memorable was our 75th Anniversary celebration which brought faculty, fellows and residents from various parts of the world back to Halifax for a two-day symposium at Pier 21 on the Halifax waterfront. It was a wonderful experience to have so many join us for the celebration: for those who are now working elsewhere, it was a chance to see and hear first-hand the exciting work that is ongoing in Halifax Neurosurgery; for those of us working here, it was a chance to hear of our history from those who have gone before; and for all of us, it was a chance to share (often in laughter) memories and experiences. The symposium concluded with a beautiful dinner harbor cruise. There were many who helped to make this a success – thank you to all! And, in particular, I would like to thank Jenny Pierce for making it all happen.

We were delighted to have Dr. Ellen Parker join our Atlantic Canadian Neurosurgery Residency Program in July. Dr. Parker is a local recruit; she obtained her medical degree at Dalhousie University in 2023. Prior to studying medicine, Dr. Parker completed a PhD in Medical Neuroscience, also at Dalhousie. A warm welcome to Ellen as she joins the best neurosurgery training program in the country!

We also welcomed new Fellows in Spine Surgery and Functional Neurosurgery: Drs. Alwalaa Althagafi and Dr. Thomas Van Essen. Dr. Althagafi completed his neurosurgery training at Dalhousie in 2022, followed by Spine Fellowship training in Vancouver. Welcome back, Dr. Althagafi – we are so pleased to have you return home! Dr. Thomas Van Essen obtained his medical degree from Erasmus University, Rotterdam, Netherlands in 2012 and his Neurosurgical Residency in 2022, followed by neurotrauma fellowship at the University of Cambridge (UK) and University of California San Francisco (US). Welcome to the team, Dr. Van Essen!

Kudos to Dr. Pickett on winning the Dr. WJ Howes Neurosurgery Teaching Award. This award recognizes excellence in teaching, and it is a great honor to have this recognition by your peers. Dr. Pickett also received Dalhousie University's 2023 Program Director of the Year – Leadership Award. Under Dr. Pickett's leadership, Dalhousie's neurosurgery residency program became the first in the country to attain gender parity. Capping off a year of significant accomplishments, Dr. Pickett was also the first female to be promoted to Professor in the history of Dalhousie's Department of Surgery. Wow and well done, Dr. Pickett!

I am proud of our commitment to excellence in teaching – we have many great teachers in neurosurgery. Kudos to Drs. Weeks and Lownie for receiving a perfect score for their teaching undergraduate medical students, placing them in the top 10% of the tutors.

Our Division of Neurosurgery has had another very productive year in terms of research work. Research activities within the Division continue to lead at the Departmental and Faculty levels. You will see from reviewing the Annual Report that there have been many research projects that have resulted in multiple peer-reviewed publications. I would like to highlight Dr. Mark MacLean's basic science work in Dr. Alon Friedman's laboratory that was published in a leading journal, Science Advances. Ryan Greene and I from the Division of Neurosurgery are co-authors in this study. Congratulations, Dr. MacLean and the entire research team!

Congratulations to Dr. Christie for spearheading the launch of the Nova Scotia Health Spine Assessment Clinic, a new provincially funded program to facilitate early spine patient assessment, therapy and surgical referral. This has been a multi-year effort and, working with Alissa Decker and others, we are delighted to see this finally come to reality. This program promises to make a real positive difference in many people who are referred to us for spine care. Well done, Dr. Christie and team!

We should celebrate our academic achievements because a dynamic academic team is crucial for attracting and retaining top talent that provides the best of clinical care. We must always keep our primary purpose in mind – the care of our patients.

Delivering excellence in patient care requires a collective effort that extends beyond our team to include the many outstanding colleagues with whom we collaborate. The success of our endeavors is made possible by dedicated individuals: our exceptional OR teams, hardworking in-patient teams, clinic teams serving as the public face of Neurosurgery, and research teams contributing to progress in neurosurgical care. These efforts are not overlooked or unrecognized. I am reminded of how much this effort is appreciated by the correspondence that I see. This is an excerpt from correspondence one of our nurses received from a grateful patient: "...I cannot thank you enough for how you have helped my niece and her family navigate through this battle they are currently facing... I have worked in the system long enough and know this is well above the norm and for that I thank you."

What Dr. Stepheson could not have imagined when he came to Nova Scotia 75 years ago were the long-term manifestations of his team's pioneering work, and how Halifax Neurosurgery would grow, develop and mature into a leading academic program. I am delighted that Halifax Neurosurgery continues to thrive... and it thrives because of all the work that each person does. To our neurosurgery family members at the QEII Health Sciences Centre, IWK Health Centre, and Dalhousie University, I say thank you to each one for courageously showing up every day, giving your best and supporting your colleagues. Neurosurgery 2023 has indeed been an exceptional year: at 75 years young, I am so proud to be part of this great team and to be wowed by what we accomplish together!

Neurosurgery Faculty

David B. Clarke MDCM, PhD, FRCSC, FACS

- Head, Division of Neurosurgery
- Professor, Departments of Surgery, Medical Neuroscience, Medicine (Endocrinology) and Ophthalmology & Visual Sciences

Areas of Interest:

- Transsphenoidal Surgery
- Neuro-Oncology
- Epilepsy Surgery
- Neurotrauma and Injury Prevention
- Neurosurgery Simulation/Education

Sean Christie MD, FRCSC

- Vice-Chair, Division of Neurosurgery
- Director of Research, Division of Neurosurgery
- Professor, Department of Surgery

Areas of Interest:

- Minimally Invasive Spinal Surgery
- Complex Spinal Surgery
- Neurotrauma
- Sport-Related Neurological Injuries

Sean Barry MD, FRCSC

- Treasurer, Division of Neurosurgery
- Assistant Professor, Department of Surgery

Areas of Interest:

- Minimally Invasive Spinal Surgery
- Complex Spinal Surgery
- Spinal Oncology
- Neurotrauma

Gwynedd Pickett MD, FRCSC

- Program Director, Neurosurgery Residency Program
- Associate Professor, Department of Surgery

Areas of Interest:

- Cerebrovascular Surgery
- Endovascular Treatment of Aneurysms

Daniel McNeely MD, FRCSC

- Chief, Pediatric Neurosurgery, IWK Health Centre
- Associate Professor, Department of Surgery

Areas of Interest:

- Pediatric Neurosurgery
- Pediatric & Adult Epilepsy Surgery
- Spinal Dysraphism
- Hydrocephalus
- Intraventricular Neuroendoscopy

Simon Walling MBCHB, FRCSC

- Assistant Professor, Department of Surgery

Areas of Interest:

- Neurotrauma
- Injury Prevention
- Neuro-Oncology
- Pediatric Neurosurgery
- Surgical Education
- Skull base Surgery

Adrienne Weeks MD, PhD, FRCSC

- Assistant Professor, Department of Surgery

Areas of Interest:

- Cerebrovascular Disease
- Endovascular Treatment of Aneurysms
- Neuro-Oncology

Jacob Alant MBChB, MSc, MMed, FRCSC

- Assistant Professor, Department of Surgery

Areas of Interest:

- Minimally Invasive Spinal Surgery
- Peripheral Nerve Surgery

Lutz Weise MD, PhD

- Associate Professor, Department of Surgery

Areas of Interest:

- Functional Neurosurgery
- Movement Disorders
- Complex Pain
- Stereotaxy
- Image Guidance
- Neurophysiology
- Spinal Surgery

Stephen P. Lownie MD, FRCSC, FAANS

- Professor, Department of Surgery
- Emeritus Professor, Departments of Clinical Neurological Sciences and Medical Imaging, Western University

Areas of Interest:

- Skull Base Surgery
- Cerebrovascular Disease

Atlantic Canadian Neurosurgery Residency Program

Director: Dr. Gwynedd Pickett
Program Administrator: Katharine Anderson

The primary objective of the Atlantic Canadian Neurosurgery Residency Program is the development of highly skilled neurosurgeons who can practice anywhere in the world they choose. Residents are exposed to a broad range of clinical neurosurgery cases, with graduated levels of responsibility in patient care as training progresses. The majority of cases are carried out with significant resident involvement, and at the senior resident level, independent clinical and operative decision-making is promoted. Training in professional, communication and health advocacy skills complement their technical education.

We strive to provide an academic environment in which residents are continually provided with opportunities and challenges suitable for their level of learning, and receive the regular, quality feedback necessary to refine their clinical and technical skills. National changes to the post-graduate medical/surgical training curriculum have placed greater emphasis on formative feedback and individual progression through levels of competence.

Dr. G. Pickett

Katharine Anderson

The majority of our residents are now training under the new national system of "Competence By Design," with more senior residents being grandfathered through under the prior system of evaluation.

The 1:1 ratio of faculty to residents facilitates individual coaching and enables mentoring in a collegial and respectful training environment. Regular teaching rounds and seminars create ample opportunities for in-depth discussion of neurosurgical cases and collaboration with colleagues in neurology, neuroradiology, and other specialties.

The Atlantic Canadian Neurosurgery Residency Program is based in Halifax, Nova Scotia with rotations at the QEII Health Sciences Centre (adult) and the IWK Health Centre (pediatrics). Residents also pursue rotations at our affiliated Atlantic Canada neurosurgical sites in Saint John and Moncton, New Brunswick, and St. John's, Newfoundland and Labrador. This provides residents with exposure to a wide variety of neurosurgical problems and practice experiences.

The Division of Neurosurgery strongly believes in the role of research in residency training, and we endeavour to facilitate resident involvement in research projects that suit their interests and support their individual career goals. We are committed to developing a multi-disciplinary approach to research including clinicians and basic scientists. Residents have the opportunity to enroll in Dalhousie University's Clinician Investigator Program (CIP), which provides structured research training that enables them to become clinician scientists upon completion of their residency. Over the past year, our research residents have been highly successful in obtaining competitive funding awards.

There are currently eleven neurosurgery residents in the program.

Neurosurgery Residents and Fellows

Mosaab Alsuwaihel MBChB (PGY6)

MBChB National University of Ireland 2015 | Dublin, Ireland

Dr. Alsuwaihel obtained his medical training in 2015 from the Royal College of Surgeons in Ireland and joined the Dalhousie program in 2017. Dr. Alsuwaihel is expected to complete his residency training with Dalhousie University in 2023.

Erika Leck MD (PGY6)

MD Dalhousie University 2017 | Nova Scotia, Canada

Dr. Leck obtained her Doctor of Medicine at Dalhousie University in 2017. Prior to studying medicine, Dr. Leck obtained a Bachelor of Science Degree (Honours) in Life Sciences at Queen's University. She is currently pursuing her Masters in Practical Ethics at Oxford University and is also enrolled in the Dalhousie Clinician Investigator Program, supported by a Ross Stewart Smith Research Scholarship. She is expected to complete her residency training with Dalhousie University in 2024.

Mark MacLean MD, MSc (PGY6)

MD Dalhousie University 2018 | Nova Scotia, Canada

Dr. MacLean obtained his Doctor of Medicine at Dalhousie University in 2018. Prior to studying medicine, Dr. MacLean completed an MSc in Chemistry at Dalhousie University. He is currently pursuing research in Dr. Alon Friedman's lab, supported by a major grant from the Neurosurgery Research and Education Foundation of North America, and a Ross Stewart Smith Research Scholarship. He is expected to complete his residency training with Dalhousie University in 2024.

Jae Ho Han MD (PGY5)

MD Dalhousie University 2018 | Nova Scotia, Canada

Dr. Han obtained his Doctor of Medicine at Dalhousie University in 2018. Prior to studying medicine, Dr. Han completed a Bachelor of Science degree (Honours) in Biochemistry & Molecular Biology and Neuroscience at Dalhousie University. He is currently undertaking a Masters in Science in Dr. Weeks' lab, through the Dalhousie Clinician Investigator Program, supported by a Beatrice Hunter Cancer Fellowship. He is expected to complete his residency training with Dalhousie University in 2025.

Abdulaziz Bokeris MBChB (PGY5)

MBChB National University of Ireland 2017 | Dublin, Ireland

Dr. Bokeris obtained his medical training in 2017 from the Royal College of Surgeons in Ireland and joined the Dalhousie program in 2019. Dr. Bokeris is expected to complete his residency training with Dalhousie University in 2025.

Neurosurgery Residents and Fellows Cont'd

Jenna Smith-Forrester MD, MSc (PGY4)

MD University of British Columbia 2019 | British Columbia, Canada

Dr. Smith-Forrester obtained her Doctor of Medicine at the University of British Columbia in 2019. Prior to studying medicine, Dr. Smith-Forrester completed a Bachelor of Science (with Distinction) in Neuroscience and Biology at Dalhousie University, followed by a Masters of Neuroscience at the University of British Columbia. She is a leader and lecturer in quality improvement and patient safety education. She is expected to complete her residency training with Dalhousie University in 2026.

Katherine Tourigny MD (PGY4)

MD University of British Columbia 2020 | British Columbia, Canada

Dr. Tourigny obtained her Doctor of Medicine at the University of British Columbia in 2020. Prior to studying medicine, Dr. Tourigny completed a Bachelor of Science in Behavioural Neuroscience at the University of British Columbia. She is expected to complete her residency training with Dalhousie University in 2026.

Ali Alwadei (PGY3)

MBBS King Khalid University 2017| Abha, Saudi Arabia

Dr. Alwadei obtained his Bachelor of Medicine and Surgery from King Khalid University, College of Medicine in Abha, Saudi Arabia in 2017, and joined the Dalhousie program in 2021. He is expected to complete his residency training with Dalhousie University in 2027.

Rachel Vaughan MD (PGY3)

MD McGill University 2021 | Montreal, Canada

Dr. Vaughan obtained her Doctor of Medicine at McGill University in 2021. Prior to studying medicine, Dr. Vaughan completed a Bachelors in Life Sciences, Psychology, Literature and Linguistics at McGill University. She is expected to complete her residency training with Dalhousie University in 2027.

Balgees Ajlan MD (PGY2)

MBBS King Abdulaziz University 2015 | Jeddah, Saudi Arabia

Dr. Ajlan obtained her Bachelor of Medicine and Surgery from King Abdulaziz University, College of Medicine in 2015. She completed an internship, and then began an Internal Medicine residency and Neurosurgery residency in Jeddah. She joined the Dalhousie program in 2022. She is expected to complete her residency training with Dalhousie University in 2028.

Suna Jung MD (PGY2)

MD Western University 2021 | Seoul, Korea

Dr. Jung obtained her Doctor of Medicine at Western University in 2022. She is expected to complete her residency training with Dalhousie University in 2028.

Ellen Parker MD PhD (PGY1)

MD Dalhousie University 2023 | Halifax, Canada

Dr. Parker obtained her medical degree at Dalhousie University in 2023. Prior to studying medicine, Dr. Parker completed a PhD in Medical Neuroscience in 2019. She is expected to complete her training in 2029.

Thomas Van Essen MD (Fellow)

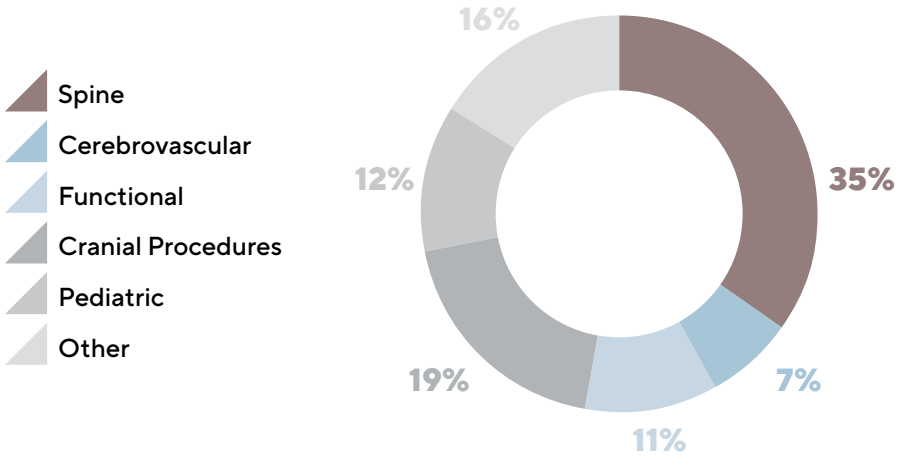
Dr. Van Essen obtained his medical degree from Erasmus University, Rotterdam, Netherlands in 2012 and then continued to complete his Neurosurgical Residency in 2022. Dr. Van Essen started his fellowship in Functional Neurosurgery at Dalhousie in July 2023.

Alwalaa Althagafi MD (Fellow)

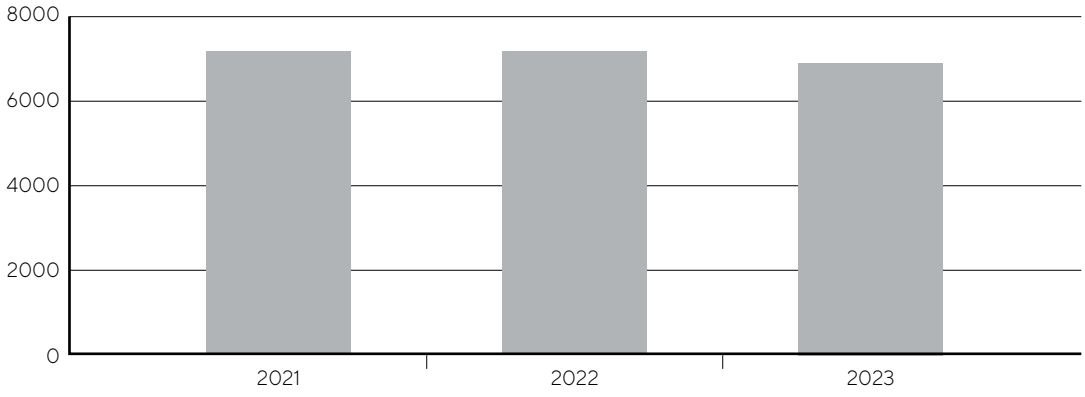
Dr. Althagafi obtained his medical degree from MBBS King Abdulaziz University, Jeddah, Saudi Arabia in 2013. He completed his Neurosurgery Residency at Dalhousie University. Dr. Althagafi started his Spine Fellowship with the Dalhousie Spine Program in 2023.

Clinical Activities

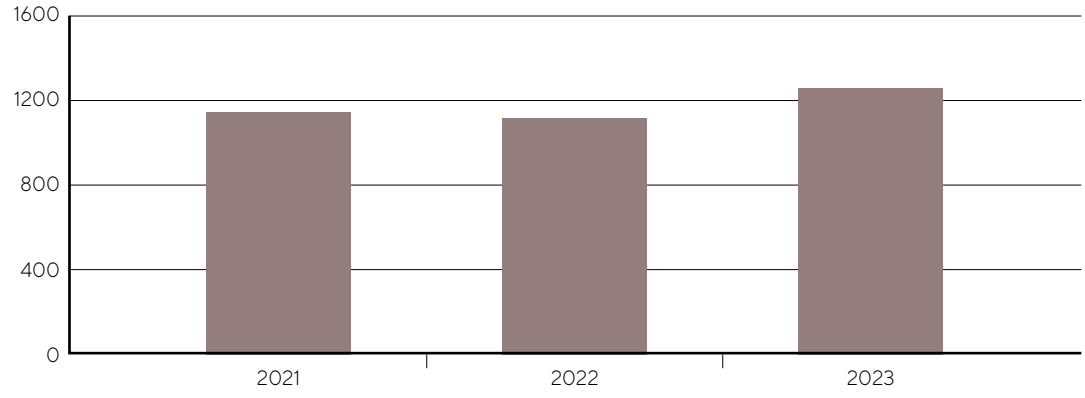
Neurosurgical Procedures



Ambulatory Care Visits



Neurosurgical Procedures



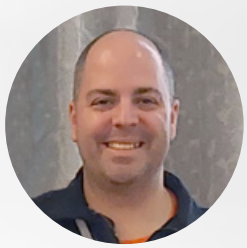
Academic Neuroscience Program and Neurosurgery Inpatient Unit 7.3

Director: Alissa Decker
Health Services Manager:
Joel Misson, Manager 7.3 Nursing Team
Health Services Manager:
Andrea Goldstein,
Manager 7.3 Inter-disciplinary Team

2023 was another busy year for the 7.3 Inpatient Neurosurgery Unit, filled with change and its associated welcomes and goodbyes. Similarly, to 2022, staffing pressures and flow issues remained at the forefront of our daily operations. The staff of 7.3 continued to rise to these challenges and worked tirelessly to keep up with the daily demands and provided exceptional care and compassion to our patients, families and each other whilst supporting access and flow to inpatient neurosurgical care for our province and Maritime region - a big thank you to this dedicated team.

The main goal this year focused on mentoring new staff to ensure our patients and families receive the excellence in neurosurgical care that we strive to provide. Our clinical nurse lead, clinical nurse educator and many frontline preceptors played a huge and beneficial role in this mentoring process. A special thank you to experienced staff who spent a lot of time orientating new staff and mentoring students this year.

Joel Misson



Alissa Decker

Andrea Goldstein

Like all years, we said goodbye to some staff as they moved on to continue growing their career paths elsewhere and we gave warm welcome to many new and returning faces. Unfortunately, we said goodbye to our previous manager of the nursing team, Laura Croft. A big thank you to Laura for her many years of dedicated care and leadership in various roles on the 7.3 team. A warm welcome to Joel Misson, new Manager of 7.3 nursing team. From a leadership perspective, we also welcomed a new director, Alissa Decker and thank Cheri Gunn for her interim support and leadership and we look forward to continuing to work with Cheri as Director of Rehabilitation and Supportive Care. Nova Scotia Health also welcomed many internationally educated nurses to practice this year and we are so pleased some have chosen to join the 7.3 inpatient team- welcome!

The inter-disciplinary team on 7.3 continues to work collaboratively with the nursing team on education events and striving to provide the best patient care. Andrea Goldstein is the new manager of the allied health team on 7.3 and 7.4. Andrea brings a wealth of experience from her work as a physiotherapist on the neuro/SCI team, a quality leader, and a manager in acute care. Joanne Comeau's leadership with Neurosciences over the past 13 years will be greatly missed but she and Andrea continue to work together for a smooth transition. This year we added prioritized occupational therapy services on Saturday. This will facilitate more timely access to OT service and assist with any possible weekend discharges. This new service will be evaluated over the coming months. Additional recreation therapy resources were also added this year. The 7.3 allied health team continues to grow and work together with 7.4 Neurology colleagues to ensure coverage and high-priority needs are addressed daily. This shared approach enhances patient care within our Neurosciences Program, and patient care on 7.3.

Leadership positions on 7.3:

Charge Nurse: We thank Emily Rose Tarasco-McGrath and Dayna El-Hassan as they both finished their charge role this year. We welcome Jaklynn Brunet and Kelsey Wynn into their new roles as charge!

Clinical Nurse Lead: Renee Boudreau
Neurosciences Clinical Nurse Educator: Melissa Brinson

Brain Tumor Nurse: Samantha Warren and Stacey Siler

Clinical Assistant: Chidinma Achilefu

Clinical/Research Staff

Lorelei Audas
RN, BScN, CCRP

Program Coordinator:
Neurotrauma/Simulation

Nicky Ayles
RN

Neurosurgery Clinic

Renee Boudreau
RN

Clinical Lead
Neurosurgery 7.3

Missy Brinson
RN

Clinical Nurse Educator

Peggy Flynn
RN

Neuromodulation

Ryan Greene
MSc

Research Coordinator:
Neurosurgery Spine

Andrea L.O. Hebb
MSc., PhD, RN

Clinical/Research Coordinator:
Brain Tumour
Maritime Lateral Skull Base
Neuropituitary

Murray Hong
PhD

Neurosurgery OR/
Technical Specialist

Judith Jarrett
RN, CCRP

Program Coordinator:
Cerebrovascular

Lisa Julien
RB, BScN, CCRP

Research Manager/
Coordinator:
Neurosurgery Spine

Nelofar Kureshi
MD, MHI

Research Associate:
Neurotrauma/Simulation/
Neurosurgery Spine

Angela Meagher
RN, NP

Neurosurgery Spine

Carole-Ann Miller
RN, NP

Cerebrovascular

Shirley MacLeod

Research Assistant:
Neurosurgery Spine

Jaime Mason
RN

Neurosurgery Clinic

Saranyan Pillai
PhD

Research Associate:
Neurosurgery Spine

Christine Potvin
RN

Program Coordinator:
Neuromodulation

Marlee Richardson
RN, BScN

Epilepsy Program Nurse

Taryn Roberts
RN

Neurosurgery Clinic

Michelle Rowicki
RN

Neuromodulation

Clinical/Research Staff Cont'd

Sarah Szego
RN, NP

Pediatric Neurosurgery, IWK

Samantha Warren

Brain Tumour Liaison Nurse

Anas Tahir
MASC (Biomed Eng)

Technology Coordinator

Rachel Woodman

Neurosurgery Clinic Aide

Administrative Staff

Debbie Amirault

Assistant to
Dr. Sean Barry

Julia Hickey

Assistant to
Dr. Jacob Alant

Katharine Anderson

Residency Program
Coordinator

Diane Jardine

Assistant to
Dr. David Clarke

Lorraine Bell-Hill

Administrator
Division of Neurosurgery

Ramani S. Kalavathy

Assistant to
Dr. Gwynedd Pickett

Cathy Caron

Assistant to
Dr. Daniel McNeely

Jenny Pierce

Executive Assistant
to Dr. David Clarke

Melissa Cook

Assistant to
Dr. Sean Christie

Elizabeth Scott

Assistant to
Dr. Stephen Lownie
& Dr. Weise

Administrative Staff Cont'd

Chrissy Shay

Assistant to
Dr. Simon Walling

Aissa Thomas

Assistant to
Dr. Adrienne Weeks

Pam Slauenwhite

Assistant to
Dr. Lutz Weise

OR Nurses

Team Lead: Denyne Park

Meghan Anderson
Ivy Ambrosio
Kandis Church
Brianna Dunn
Kelly Lebrasseur
Dawn Manthorne
Lisa McCarthy
Roge Paciones
Amanda Penny
Logan Sampson
Jessica Taylor
Liam Fagan
Sheila Christobal

Neurosurgery Spine Program

Director: Dr. Sean Christie
Program Manager/Coordinator: Lisa Julien

Mission

The Neurosurgery Spine Program provides comprehensive care to patients with spinal disorders and spinal cord injuries, and advances the specialty through education/training, innovation, and research.

Events and Accomplishments

- Dr. Christie performed the 1st spinal robot-assisted surgery in Canada in July 2022 using Medtronic's MAXOR X Stealth Edition platform. Since then, Drs. Barry, Glennie, Oxner and Weise have been trained and are using this new technology. To date we have completed 42 cases.
- Clara Lownie, Research Coordinator, BSc, BScN, MN joined our program in September 2023. Clara comes with an impressive background in nursing and research. We are very excited that she has joined our team.
- We congratulate our graduating Spine Fellows and wish them all the best for outstanding careers: Dr. Aboubakr Amer has accepted a faculty position as an assistant professor at the University of Florida; Dr. Peyton Lawrence is completing a second spine fellowship at the University of Toronto before returning to Jamaica. It was a pleasure working with both of you!
- Welcome to our new Spine Fellow, Dr. Alwalaa Athagafi who joined our team in September 2023. Dr. Athagafi completed his neurosurgical training here at Dalhousie University in 2022 and then completed a fellowship in Vancouver, BC before re-joining our combined Spine Program.
- Enrollment in all our studies continued at a steady pace. We currently have the highest enrollment in Canada for AbbVie's MT3291-A01 clinical trial.

Clara Lownie
RN, BSc, BScN, MN

RN Research Coordinator

Research Projects

We have had an active research year in the Spine Program, participating in investigator-initiated and industry-driven studies, as well as multi-center national and international studies. The following lists the projects that our Spine Research Program are involved in:

Ongoing Multi-Centered Studies Clinical Trials

- **MT3291-A01:** A Phase 2, Randomized, Double-blind, Placebo-controlled Study to Assess the Efficacy and Safety of MT-3921 in Subjects with Acute Traumatic Cervical Spinal Cord Injury.
- **M16-077:** A Randomized, Double-Blind, Placebo Controlled Proof of Concept Study to Assess the Safety and Efficacy of Elezanumab in Acute Traumatic Cervical Spinal Cord Injury (ELASCI).
- **CASPER:** The Canadian American Spinal Cord Perfusion Pressure and Biomarker Study.
- **PROTEST:** Prophylaxis for Venous Thromboembolism in Severe Traumatic Brain Injury, a double-blind Randomized Controlled Trial.
- **AK1320:** First-In-Human Study of AK1320 Encapsulated Microspheres (AK1320 MS) In Subjects with Degenerative Spondylolisthesis and Concomitant Symptomatic Spinal Stenosis Who Are Undergoing Decompression and Single Level Instrumented Posterolateral Lumbar Autograft Fusion Surgery.

Neurosurgery Spine Program Cont'd

Ongoing National Registries

- **RHSCIR:** This year marks our 16th year of enrollment in the Rick Hansen Spinal Cord Injury Registry (RHSCIR), a national registry of patients with traumatic spinal cord injury (tSCI). Since 2020 we have also been collecting data on non-traumatic SCI patients who are admitted to the Nova Scotia Rehabilitation Center.

- **CSORN:** The Canadian Spine Society (CSS) Registry is a national health data registry that tracks outcome measures of the surgical and non-surgical treatment of specific spinal conditions. We are currently in our 9th year of enrollment for this registry. The spine patient populations who are offered participation at our site are surgically managed for the following procedures/indications:
  - Cervical Arthroplasty
  - Cervical Myelopathy/Myeloradiculopathy
  - Lumbar Spondylolisthesis.

  Within this registry, patients may/have been eligible for three sub-studies:
  1. Management and Outcome of Cervical Spondylotic Myelopathy – A Standardized Clinical Assessment and Management Plan
  2. Surgical Treatment of Degenerative Spondylolisthesis: A Standardized clinical assessment and management plan (SCAMPS) Canadian Spine Society (CSS) multi-center prospective cohort study
  3. Anterior vs posterior surgery for lumbar isthmic spondylolisthesis: multicenter prospective cohort study

Ongoing local studies

- **NSAIDS:** Are NSAIDs appropriate for patients recovering from lumbar fusion surgery for elective spine procedures? A systematic review and meta-analysis.

- **HEALTHCARE in CLIMATE CRISIS:** Measuring individualized and total annual greenhouse gas emission through a life cycle assessment of a cervical laminectomy and fusion procedure in a closed cohort. We hope to determine the annual greenhouse gas emissions of all cervical laminectomy and fusion procedures in NS from time of referral to 1 year post operative, identify future areas of procedural change/ intervention to limit greenhouse gas emissions, and present information in a way by which health care providers and patients can comprehend the procedural contribution to climate change.

- **E-Health:** Digital Health and Artificial Intelligence based Platform for Early Chronic Disease Risk Assessment and Prediction to Improve Population Health is a new project funded by CIHR with Dr. Samina Abidi as PI.

- **ULTRASOUND:** A High-Resolution Ultrasound Endoscope for Minimally Invasive Spine Surgery is being designed and tested in conjunction with Dr. Jeremy Brown.

- **SAVES: Spine AdVerse Events Severity:** Since 2018 we have been capturing all adverse events on all spine surgeries in Nova Scotia Health.

- **FITBIT:** Can We Better Predict Long-Term Success of Permanent Spinal Cord Stimulators?

- **MELATONIN:** Plasma Melatonin Levels After Acute Traumatic Spinal Cord Injury in Individuals with Complete and Incomplete Cervical and Thoracic Spinal Cord Injury.

- **TITANIUM:** A Study of Titanium Ion Concentrations in the Whole Blood of Patients Following Metal-on-Metal Cervical Arthroplasty.

Completed studies: Manuscript writing and/or publication pending

- **FRAILTY SCI:** Frailty Index in Spinal Cord Injury Patients: The assessment of frailty may be an important determinant in the appropriate management of older SCI patients. A series of standard laboratory values and clinical data have been previously used to determine a frailty index, which has been linked to clinical outcomes in the elderly. This project investigated whether the frailty index is associated with in-hospital mortality in SCI patients, and survival over five years.

- **FRAILTY in SPINE PATIENTS:** In collaboration with the Canadian Spine Outcomes and Research Network, we are developing a frailty index in spine surgery patients using routinely collected health record data. The questions we are asking are:
  1. What is the association between frailty and adverse outcomes following spine surgery?
  2. Is preoperative frailty associated with functional outcomes following spinal surgery?
  3. Does spinal surgery result in lower frailty levels?

- **HEALTHCARE in CLIMATE CRISIS:** Surveying the knowledge and attitudes of moving to a high quality, low carbon system in Nova Scotia. We have surveyed members of the Department of Surgery, Canadian Spine Society, Department of Anesthesia, Medical Students, neurosurgery clinic patients. We also completed an interview series with 10 healthcare sector professionals.

- **MODIC:** Occult Bacterial Discitis and Modic Change in Patients receiving Surgical Therapy for Lumbar Disc Herniation.

- **MRIs:** Appropriateness of Ordering Lumbar Spine MRI in Nova Scotia. We are conducting a retrospective study to assess the appropriateness of ordering Lumbar spine MRIs in Nova Scotia. We are collaborating with the Department of Diagnostic Imaging.

- **NECK PAIN:** Epidemiology and Outcomes of Neck Pain after Surgery for Cervical Radiculopathy. The study highlights a significant improvement in 12-month post-operative PROMs, including NP, across various commonly employed surgical procedures for the treatment of cervical radiculopathy. These studies offer insight into the utility of these procedures for the reduction of axial neck pain and may allow clinicians to more accurately prognosticate patients' convalescence and aid in surgical decision-making.

- **QoL/cSCI/EOL:** A Canadian Exploration of Medical Assistance in Dying (MAiD) From the Perspective of Individuals Living with a Cervical Spinal Cord Injury (cSCI).

Posters

Dr. Mary Kathryn McIntosh
Opportunities and challenges for robotic-assisted spine surgery: feasible indications for the MAZOR™ X Stealth Edition - 45th Annual International Conference on the IEEE Engineering in Medicine and Biology Society, July 24-27, 2023, Sydney, Australia

Presentations

Dr. Jacob Alant
Lumbo-Sacral CSF Cysts - 12th Annual Atlantic Canada Spine Meeting, Oct 12-15, 2023, Wallace NS

Dr. Sean Barry
The Current and Future Medicolegal Landscape of Spine Surgery in Canada - 12th Annual Atlantic Canada Spine Meeting, Oct 12-15, 2023, Wallace NS

Dr. Christie
The Impact of Healthcare Systems on Climate - January 18, 2023, University of Saskatchewan Planetary Health Group, virtual

Discussion on the importance of interdisciplinary collaboration to achieve healthcare sustainability, (Panel Member), January 19, 2023, Dal Planetary Health IPE, Dalhousie University, Halifax, NS

Cervical Spine Trauma - February 7, 2023, Canadian Society of Neuroradiology, Webinar - Virtual

Spinal Biomechanics, Decision Making and surgical Options in Degenerative Spine Disease – Feb 9, 2023, Ottawa Neurosurgery Review Course, Ottawa, Ontario

Cervical Spondylosis: Diagnosis and Management – Feb 9, 2023, Ottawa Neurosurgery Review Course, Ottawa, Ontario

From OR Waste to Environmental Grace: The Science of Sustainable Surgery, Feb 10, 2023, Sickboy Podcast Interview

Developing animal models of human disease – What is cervical cervical myelopathy? - Feb 16, 2023, Graduate Students, Dalhousie University, Halifax, NS

The Impact of Healthcare Systems on Climate - Lecture for Planetary Health, February 24, 2023, MED I Pro Comp Lecture, Dalhousie University, Halifax, NS

How Chemistry Prepared me for an Academic Surgical Career - Careers in Chemistry Symposium - Mar 10, 2023, Chemistry Society, Saint Mary's University, Halifax, NS

A Playbook for Surgical Sustainability - April 12, 2023, Department of Surgery Grand Rounds, Dalhousie University, Halifax, NS

Sustainability in Surgery - OR Nursing Rounds, May 17, 2023, NSHA- QE II, HSC, Halifax, NS

Metastatic Spine Disease - Canadian Congress of Neurological Sciences, June 6, 2023, Banff, AB

Robotics in Neurosurgery – Canadian Congress of Neurological Sciences, June 8, 2023, Banff, AB

Neurosurgery Spine Program Cont'd

What can you do to reduce the health carbon footprint - Summer Institute on Sustainable Health Systems, CASCADES and the Dalhousie Faculty of Medicine Global Health Office, June 19, 2023.

Ocean eReferrals to Streamline and Enhance Access to Care in Nova Scotia – Quality and Patient Safety Rounds, Nova Scotia Health and Doctors Nova Scotia, June 28, 2023, Virtual.

Update on the Current Management of Spinal Cord Injury and What the Future Holds - 12th Annual Atlantic Canada Spine Meeting, Oct 12-15, 2023, Wallace NS

The Climate Paradox of Healthcare – October 20, 2023, Canadian Association of Physician Assistants Annual Conference Fredericton, NB (Attended Virtually)

Cost Challenges and Opportunities: Is now the time to adopt spinal robotics? - Medtronic Innovations in Spinal Robotics - Dec. 1, 2023, Toronto, Ontario

Ryan Greene
Development of Enhanced Patient Educational Material for Elective Spine Surgery: A Patient Engagement Initiative - Clinical Neurosciences Resident Research Day, March 22, 2023, Halifax, NS

The Effect of Enhanced Recovery After Surgery Protocols for Elective Spine Procedures on Hospital Length of Stay: A Systematic Review and Meta-Analysis
- 23rd Annual Scientific Conference, Canada Spine Society, March 1-4, 2023, Quebec City, Quebec
- Dalhousie Dept of Surgery Research Day, April 5, 2023, Halifax, NS

An Introduction to Enhanced Recovery After Surgery, Identification of Factors which Prevent Discharge, and Development of Improved Patient Educational Material for Patients who Undergo Elective Spine Surgery - 12th Annual Atlantic Canada Spine Meeting, Oct 12-15, 2023, Wallace NS

Lisa Julien and Clara Lownie
Nursing consideration when caring for a Spinal Cord Injury patient - 5.2 ICU Education Days - October 13-20-27—30, 2023, Halifax, NS

Modified ASIA - 7. 3 Nursing Staff- Nov 3-10-17-24, 2023, Halifax, NS

Modified ASIA and SCPP - PACU Nursing Staff - December 20, 2023, Halifax, NS

Dr. Erika Leck
Exploring end-of-life decision making and perspectives on Medical Assistance in Dying through the eyes of individuals living with cervical spinal cord injuries in Nova Scotia
- Clinical Neurosciences Resident Research Day, March 22, 2023, Halifax, NS
- 23rd Annual Scientific Conference, Canada Spine Society, March 1-4, 2023, Quebec City, Quebec
- Dalhousie Dept of Surgery Research Day, April 5, 2023, Halifax, NS

Implications of SCI on Quality and End of Life 12th Annual Atlantic Canada Spine Meeting, Oct 12-15, 2023, Wallace NS

Dr. Mark Maclean
Perception of Frailty in Spinal Metastatic Disease: International Survey of the AO spine Community
- 23rd Annual Scientific Conference, Canada Spine Society, March 1-4, 2023, Quebec City, Quebec.

Exploring the Bacterial Hypothesis of Low Back Pain: A Prospective Cohort Study
- 23rd Annual Scientific Conference, Canada Spine Society, March 1-4, 2023, Quebec City, Quebec.
- 2023 Canadian Neurological Sciences Federation Congress, June 5-9, 2023, Banff, Alberta
- Clinical Neurosciences Resident Research Day, March 22, 2023, Halifax. NS

Dr. Mary Kathryn McIntosh
Opportunities and Challenges for Robotic-Assisted Spine Surgery: Feasible Indications for the MAZOR™ X Stealth Edition - 12th Annual Atlantic Canada Spine Meeting, Oct 12-15, 2023, Wallace NS

Publications

1. Ajoku U, Johnson MG, McIntosh G, Thomas K, Bailey CS, Hall H, Fisher CG, Manson N, Rampersaud YR, Dea N, **Christie S**, Abraham E, Weber MH, Charest-Morin R, Attabib N, le Roux A, Phan P, Paquet J, Lewkonia P, Goytan M. *Temporal analysis of complication rates of cervical spine surgery for degenerative spine disease between younger and older cohorts using the CSORN registry: Is age just a number?* Eur Spine J. 2023 Oct;32(10):3583-3590. doi: 10.1007/s00586-023-07882-3. Epub 2023 Aug 18.

2. Algarni N, Dea N, Evaniew N, McIntosh G, Jacobs BW, Paquet J, Wilson JR, Hall H, Bailey CS, Weber MH, Nataraj A, Attabib N, Rampersaud YR, Cadotte DW, Stratton A, **Christie SD**, Fisher CG, Charest-Morin R. *Does Ending a Posterior Construct Proximally at C2 Versus C3 Impact Patient Reported Outcomes in Degenerative Cervical Myelopathy Patients up to 24 months After the Surgery?* Global Spine J. 2023 Mar 24:21925682231166605. doi: 10.1177/21925682231166605. Online ahead of print.

3. Banaszek D, McIntosh G, Charest-Morin R, Abraham E, Manson N, Johnson MG, Bailey CS, Rampersaud YR, **Glennie RA**, Paquet J, Nataraj A, Weber MH, **Christie S**, Attabib N, Soroceanu A, Kelly A, Hall H, Thomas K, Fisher C, Dea N. *Practice Variation between Salaried and Fee-for-Service Surgeons for Lumbar Surgery.* Can J Neurol Sci. 2023 Jul;50(4):604-611. doi: 10.1017/cjn.2022.259. Epub 2022 Jun 16.

4. Dandurand C, Mashayekhi MS, McIntosh G, Street JT, Fisher CG, Finkelstein J, Abraham E, Paquet J, Hall H, Wai E, Fourney DR, Bailey CS, **Christie SD**, Soroceanu A, Johnson M, Kelly A, Marion TE, Nataraj A, Santaguida C, Warren D, Hogan TG, Manson N, Phan P, Ahn H, Rampersaud YR, Blanchard J, Thomas K, Dea N, Charest-Morin R. *Patient, clinical, surgical, and institutional factors associated with length of stay in scheduled degenerative thoracolumbar spine surgery: National Multicenter Cohort Analysis from the Canadian Spine Outcomes and Research Network.* J Neurosurg Spine. 2022 Dec 23;38(4):446-456. doi: 10.3171/2022.11.SPINE22662. Print 2023 Apr 1.

5. **Eagles ME**, MacLean MA, Kameda-Smith MM, Duda T, Persad ARL, Almojuela A, Bokhari R, Iorio-Morin C, Elkaim LM, Rizzuto MA, Lownie SP, **Christie SD**, Teitelbaum J; Canadian Neurosurgery Research Collaborative. *Subarachnoid Hemorrhage, Delayed Cerebral Ischemia, and Milrinone Use in Canada.* Can J Neurol Sci. 2023 May;50(3):380-388. doi: 10.1017/cjn.2022.44. Epub 2022 Apr 28.

6. Evaniew N, Burger LD, Dea N, Cadotte DW, Bailey CS, **Christie SD**, Fisher CG, Rampersaud YR, Paquet J, Singh S, Weber MH, Attabib N, Johnson MG, Manson N, Phan P, Nataraj A, Wilson JR, Hall H, McIntosh G, Jacobs WB; Canadian Spine Outcomes and Research Network (CSORN). *Deterioration After Surgery for Degenerative Cervical Myelopathy: An Observational Study from the Canadian Spine Outcomes and Research Network.* Spine (Phila Pa 1976). 2023 Mar 1;48(5):310-320. doi: 10.1097/BRS.0000000000004552. Epub 2022 Dec 1.

7. Evaniew N, Coyle M, Rampersaud YR, Bailey CS, Jacobs WB, Cadotte DW, Thomas KC, Attabib N, Paquet J, Nataraj A, **Christie SD**, Weber MH, Phan P, Charest-Morin R, Fisher CG, Hall H, McIntosh G, Dea N. *Timing of Recovery After Surgery for Patients with Degenerative Cervical Myelopathy: An Observational Study from the Canadian Spine Outcomes and Research Network.* Neurosurgery. 2023 Feb 1;92(2):271-282. doi: 10.1227/neu.0000000000002213. Epub 2022 Nov 15.

8. Hébert JJ, Adams T, Cunningham E, El-Mughayyar D, Manson N, Abraham E, Wedderkopp N, Bigney E, Richardson E, Vandewint A, Small C, Kolyvas G, Roux AL, Robichaud A, Weber MH, Fisher C, Dea N, Plessis SD, Charest-Morin R, **Christie SD**, Bailey CS, Rampersaud YR, Johnson MG, Paquet J, Nataraj A, LaRue B, Hall H, Attabib N. *Prediction of 2-year clinical outcome trajectories in patients undergoing anterior cervical discectomy and fusion for spondylotic radiculopathy.* J Neurosurg Spine. 2022 Sep 16;38(1):56-65. doi: 10.3171/2022.7.SPINE22592. Print 2023 Jan 1.

9. Hutchinson PJ, Adams H, Mohan M, Devi BI, Uff C, Hasan S, Mee H, Wilson MH, Gupta DK, Bulters D, Zolnourian A, McMahon CJ, Stovell MG, Al-Tamimi YZ, Tewari MK, Tripathi M, Thomson S, Viaroli E, Belli A, King AT, Helmy AE, Timofeev IS, Pyne S, Shukla DP, Bhat DI, Maas AR, Servadei F, Manley GT, Barton G, Turner C, Menon DK, Gregson B, Kolias AG; British Neurosurgical Trainee Research Collaborative, NIHR Global Health Research Group on Acquired Brain and Spine Injury, and **RESCUE-ASDH Trial Collaborators**; RESCUE-ASDH Trial Collaborators. *Decompressive Craniectomy versus Craniotomy for Acute Subdural Hematoma.* N Engl J Med. 2023 Jun 15;388(24):2219-2229. doi: 10.1056/NEJMoa2214172. Epub 2023 Apr 23.

Neurosurgery Spine Program Cont'd

10. Kameda-Smith MM, Ragulojan M, Hart S, Duda TR, MacLean MA, Chainey J, Aminnejad M, Rizzuto M, Bergeron D, Eagles M, Chalil A, Langlois AM, Gariepy C, Persad A, Hasen M, Wang A, Elkaim L, **Christie S**, Farrokhyar F, Reddy K; *Canadian Neurosurgery Research Collaborative. A Canadian National Survey of the Neurosurgical Management of Intracranial Abscesses.* Can J Neurol Sci. 2023 Sep;50(5):679-686. doi: 10.1017/cjn.2022.299. Epub 2022 Oct 3.

11. Lawrence DC, Montazeripouragha A, Wai EK, Roffey DM, Phan KM, Phan P, Stratton A, Kingwell S, McIntosh G, Soroceanu A, Abraham E, Bailey CS, **Christie S**, Paquet J, **Glennie A**, Nataraj A, Hall H, Fisher C, Rampersaud YR, Thomas K, Manson N, Johnson M, Zarrabian M. *Beneficial Effects of Preoperative Exercise on the Outcomes of Lumbar Fusion Spinal Surgery.* Physiother Can. 2023 Feb 8;75(1):22-28. doi: 10.3138/ptc-2021-0030. eCollection 2023 Winter.

12. **Maclean MA**, Touchette CJ, Duda T, Almojuela A, Bergeron D, Kameda-Smith M, Persad ARL, Sader N, **Alant J**, **Christie SD**. *Work-up and Management of Asymptomatic Extracranial Traumatic Vertebral Artery Injury.* Can J Neurol Sci. 2023 Sep;50(5):662-672. doi: 10.1017/cjn.2022.292. Epub 2022 Aug 26.

13. Malhotra AK, He Y, Harrington EM, Jaja BNR, Zhu MP, Shakil H, Dea N, Weber MH, Attabib N, Phan P, Rampersaud YR, Paquet J, Jacobs WB, Cadotte DW, **Christie SD**, Nataraj A, Bailey CS, Johnson M, Fisher C, Hall H, Manson N, Thomas K, Ginsberg HJ, Fehlings MG, Witiw CD, Davis AM, Wilson JR. *Development of the cervical myelopathy severity index: a new patient reported outcome measure to quantify impairments and functional limitations.* Spine J. 2023 Nov 1:S1529-9430(23)03484-8. doi: 10.1016/j.spinee.2023.10.018. Online ahead of print.

14. **McIntosh MK**, **Christie SD**. *Opportunities and challenges for robotic-assisted spine surgery: feasible indications for the MAZOR™ X Stealth Edition.* 45th Annual International Conference of the IEEE Engineering in Medicine and Biology Society. February 7, 2023. https://arinex.com.au/EMBC/pdf/full-paper_902.pdf

15. Senthinathan A, Cronin SM, Ho C, New PW, Guilcher SJ, Noonan VK, Craven BC, **Christie S**, Wai EK, Tsai EC, Sreenivasan V, Wilson J, Fehlings MG, Welk B, Jaglal SB. *Using Clinical Vignettes and a Modified Expert Delphi Panel to Determine Parameters for Identifying Non-Traumatic Spinal Cord Injury in Health Administrative and Electronic Medical Record Databases.* Arch Phys Med Rehabil. 2023 Jan;104(1):63-73. doi: 10.1016/j.apmr.2022.08.002. Epub 2022 Aug 21.

16. Stukas S, Cooper J, Gill J, Fallah N, Skinnider MA, Belanger L, Ritchie L, Tsang A, Dong K, Streijger F, Street J, Paquette S, Ailon T, Dea N, Charest-Morin R, Fisher CG, Bailey CS, Dhall S, Mac-Thiong JM, Wilson JR, **Christie S**, Dvorak MF, Wellington CL, Kwon BK. *Association of CSF and Serum Neurofilament Light and Glial Fibrillary Acidic Protein, Injury Severity, and Outcome in Spinal Cord Injury.* Neurology. 2023 Mar 21;100(12):e1221-e1233. doi: 10.1212/WNL.0000000000206744. Epub 2023 Jan 4.

17. **Whelan A**, **McVeigh S**, Barker P, **Glennie A**, Wang D, Chen M, Cheng CL, Humphreys S, O'Connell C, Attabib N, Engelbrecht A, **Christie S**. *The effect of rurality and distance from care on health outcomes, environmental barriers, and healthcare utilization patterns in persons with traumatic spinal cord injury.* Spinal Cord. 2023 Jul;61(7):399-408. doi: 10.1038/s41393-023-00898-y. Epub 2023 May 11.

Funding

Rick Hansen Institute. Rick Hansen Spinal Cord Injury Registry: $120,000 (2022-2023)

NSHA Research Fund Grant (Fitbit study): $25,000 (2018-2024)

NSHA Research Fund Grant (Melatonin Study): $25, 000 (2019-2024)

QEII Foundation (Donor) (Melatonin Study): $50,000 (2019-2024)

NSHA Research Fund Grant (MODIC LDH): $25,000 (2019-2023)

CIHR (PROTEST): $8,400 (2018-2023)

AbbVie (M16-077): $78,432 (2020-2023)

Mitsubishi (MT3291-A01): $161,440 (2021-2025)

UBC Network (CASPER): $147,145 (2021-2024)

NHSA Research Fund Grant (QoL/cSCI/EOL): $6,958 (2021-2023)

Environment and Climate Change Canada: $5,999,989 (2021-2026)

CIHR Catalyst Grant (e-Health): $99,970 (2022-2023)

Knowledge Translation Grant - Brain Repair Center (Ru265 Tx SCI): $35, 000 (2023)

NSHRF (Ultrasound): $99,999 (2022- 2024)

AK1320 (Enhance): $9,500 (2021-2024)

Team Members

- Dr. Sean Christie, Neurosurgeon
- Dr. Jacob Alant, Neurosurgeon
- Dr. Sean Barry, Neurosurgeon
- Dr. Lutz Weise, Neurosurgeon
- Lisa Julien, Research Manager/RN Research Coordinator
- Ryan Greene, Research Coordinator
- Clara Lownie, RN Research Coordinator
- Shirley Macleod, Research Assistant
- Dr. Anne Marie Dedek, Post-Doctoral Fellow
- Murray Hong, Neurosurgery OR/Technical Specialist
- Anika Daclan, Summer Student
- Laura Dauphinee, Master Student
- Myra Ahmad, Master Student
- Prannat Jain, Summer Student
- Nicolas Blake, RIM Student
- Dr. Mary Kathryn McIntosh, RIM student

Team Collaborators

- Dr. Samina Abidi, Department of Community Health and Epidemiology, Faculty of Medicine, and Faculty of Computer Science, Dalhousie University
- Dr. Jeremy Brown, School of Biomedical Engineering, Faculty of Medicine, Dalhousie University
- Dr. Cynthia Dunning Zwicker, Research Manager, Orthopedic Spine Service
- Dr. Andrew Glennie, Orthopedic Surgery
- Dr. Scott Kehler, Geriatric Medicine
- Dr. Jason Leblanc, Microbiology
- Dr. Sonja McVeigh, NS Rehabilitation Centre
- Dr. Kate Montgomery, NS Rehabilitation Centre
- Dr. William Oxner, Orthopedic Surgery
- Dr. Glenn Patriquin, Microbiology
- Dr. Daniel Rainham, School of Health and Human Performance, Dalhousie University
- Gillian Ritcey, Healthy Population Institute, Dalhousie University
- Dr. Ken Rockwood, Geriatric Medicine
- Dr. Matthias Schmidt, Diagnostic Imaging
- Dr. Alex Whalen, NS Rehabilitation Centre

Neuromodulation Program

Dr. Lutz Weise

Dr. Thomas Van Essen

Dr. Nitish Agarwal

Christine Potvin

Peggy Flynn

Murray Hong

Michelle Rowicki

Pam Slauenwhite

Anas Tahir

Director: Dr. Lutz Weise
Program Coordinator: Christine Potvin
Program RN: Peggy Flynn/Michelle Rowicki

Our neuromodulation program provides neuromodulation care to the people of Atlantic Canada (population ~2.3M). The program focuses on improvements to quality of life primarily for people suffering from movement disorders, complex pain syndromes, epilepsy and spasticity. The patient population includes patients with implantable neurostimulators for deep brain (DBS), cortical, spinal cord (SCS), and peripheral stimulation. We currently follow 255 people with stimulators for movement disorders, and 260 with stimulators for pain.

In January 2023, the program said farewell to Michelle Rowicki who covered Peggy Flynn's maternity leave. Peggy Flynn returned to the program RN role in March 2023. In July we welcomed Dr. Thomas Van Essen, neurosurgeon from the Netherlands who will be doing a one year fellowship. In September 2023, we bid farewell to Pam Slauenwhite, administrative assistant who was with the program for many years. We then welcomed Elizabeth Scott to the program.

Regular Deep Brain Stimulation (DBS) clinics are scheduled with several Neurologists to provide a comprehensive assessment of potential DBS candidates.

In addition, there are DBS rounds in which patients are reviewed by the team and treatment options discussed. The DBS rounds also provide regular academic sessions presenting the current evidence and guidelines. These rounds are certified by the maintenance of certification program of the Royal College. In our complex pain clinic, patients are seen and evaluated by both a neurosurgeon and a complex pain anesthesiologist and a treatment plan is developed.

With their consent, patient information including quality of life surveys and intra-operative microelectrode recording data are entered into a database for analysis.

Various research activities are in progress, including electrophysiological and tractography studies in patients undergoing Deep Brain Stimulation. Ethics approval was obtained on "Correlation of Tractography and Motor Evoked Potentials in Deep Brain Stimulation" and we enrolled 68 patients to date.

Further projects include the evaluation of the impact of disease lateralization on imaging characteristics such as tractography; Imaging-based programming; device research registry in which we collect several quality of life questionnaires, as well as pertinent information relating to the device; and examining prediction of success of a spinal cord stimulator dependent on patient activity during a trial period.

Our Team was involved in this year's annual meeting of the Canadian Neuromodulation Society in Niagara on the Lake, Ontario. Oral and poster presentations were presented by Dr. Van Essen, Neurosurgery Fellow and Dr. Rachel Vaughan Neurosurgery resident. A presentation on education and management of spinal cord stimulation patients completed by Christine Potvin RN, and poster presentation by Peggy Flynn RN on experience and challenges with dorsal root ganglion stimulation. We were able to offer another hands-on cadaver-lab course on spinal cord stimulation. The course was a great success as we were joined by an expert teacher: Dr. Ian Beauprie, Anesthesia.

After a long time of preparation, we were able to implement a new surgical planning software using machine learning to identify targets used in Deep Brain Stimulation. This will help us improve the accuracy and efficiency in the OR and in the postoperative programming of DBS patients.

Publications

Necessity of MRI-compatible deep brain stimulation systems - Hits and hints for decision making. Reitz SC, Lemmer-Etzrodt J, Eibach M, Bohmann F, Keil F, Dinc N, Thakur N, Kang JS, Weise L, Seifert V, Czabanka M, Baudrexel S, Quick-Weller, J Clin Neurol Neurosurg 2023 Jan:224:107514. doi: 10.1016/j.clineuro.2022.107514.

Oral Presentations

Invited Keynote: Patient education for Spinal Cord Stimulation, Christine Potvin, RN Combined Annual Meetings of the Canadian Neuromodulation Society and the Neuromodulation Society of United Kingdom and Ireland. Niagara on the Lake. September 21-23, 2023

A Brief History of the Start of Stereotactic Functional Neurosurgery in The Netherlands. Van Essen TA, Groen RJM, Contarino MF, Van der Gaag NA, Weise L, Hoffmann CF. Combined Annual Meeting of the Canadian Neuromodulation Society and the Neuromodulation Society of United Kingdom and Ireland. Niagara on the Lake September 21-23, 2023

Impact of Neuropsychological Testing on Surgical Decision Making and Targeting in Parkinson's Disease. Vaughan R, Van Essen TA, Fisk JD, Weise LM. Combined Annual Meeting of the Canadian Neuromodulation Society and the Neuromodulation Society of United Kingdom and Ireland. Niagara on the Lake. September 21-23, 2023

Awake Versus Asleep Subthalamic Nucleus Deep Brain Stimulation in Parkinson's Disease: Comparison of Normalized Target Accuracy and Clinical Outcomes. Weise L, Fisk J Parke E, Potvin C, Agarwal N. 74th Annual Meeting of the German Society for Neurosurgery Combined with the Brazilian Neurosurgical Society. Stuttgart, Germany. June 25-28, 2023

Invited Panel Speaker: Exploring the Latest Parkinson's Research. Dr. Lutz Weise. Parkinson's IQ and You. Patient information event sponsored and Co-organized by The Michael J. Fox Foundation and Parkinson's Canada. Dartmouth, Nova Scotia. October 28, 2023

Posters

Experience and Challenges with DRG Stimulation. **Flynn, P**, **Potvin, C**, **Weise, L**. Combined Annual Meeting of the Canadian Neuromodulation Society and the Neuromodulation Society of United Kingdom and Ireland September 21-23, 2023

Media

Radio Canada/ CBC. Maladie de Parkinson. Un traitement difficile d'acces. By Celine Galipeau/ Michele Brideau. April 19, 2023 https://www.facebook.com/100006665612864/videos/968120954202613/

Team Members

- Dr. Lutz Weise, Neurosurgeon
- Dr. Sean Christie, Neurosurgeon
- Dr. Thomas Van Essen, Neurosurgery Fellow
- Dr. Ian Beauprie, Anesthesiologist/Pain Specialist
- Christine Potvin, Program Coordinator
- Peggy Flynn, Program RN
- Michelle Rowicki, Program RN
- Anas Tahir, Neurosurgery Technology Coordinator
- Murray Hong, Neurosurgery OR/Technical Specialist
- Susan Morris, Neurophysiologist, Intraoperative Neurophysiological monitoring
- Dr. John Fisk, Neuropsychologist
- Dr. David King, Neurologist (movement disorders)
- Dr. Kerry Schoffer, Neurologist (movement disorders)
- Dr. Heather Rigby, Neurologist (movement disorders)
- Pam Slauenwhite, Administrative Assistant
- Elizabeth Scott, Administrative Assistant

Off-Site Collaborators

- Dr. Renju Kuriakose, Neurologist, NB
- Dr. Kyna Squarey, Neurologist, NL
- Dr. Antonios El-Helou, Neurosurgeon, NB

Halifax Surgical Epilepsy Program

Program Lead: Dr. David Clarke
(Co-Chair of Halifax Epilepsy Program with Dr. Kristin Ikeda)
Epilepsy Program Nurse:
Marlee Richardson

This year, the Halifax Epilepsy Program has continued to make substantial advancements. We are proud to provide care to patients with epilepsy from across Atlantic Canada.

Epilepsy patients referred from Nova Scotia, Prince Edward Island, New Brunswick, and Newfoundland and Labrador are served by a comprehensive epilepsy program supported by the Divisions of Neurology and Neurosurgery, including:

- specialty outpatient clinics
- Neuropsychologist, Psychometrist and Social Worker
- a four-bed inpatient Epilepsy Monitoring Unit (scalp and invasive recordings, bedside stimulation)
- access to a variety of structural and functional imaging techniques (including 3T MRI, fMRI, PET and ictal SPECT)
- surgical options including depth electrode implantation (SEEG, and/or subdural electrodes), cortical resection, lesionectomy, corpus callosotomy, deep brain stimulation (DBS), vagus nerve stimulator (VNS), and radiofrequency ablation

Program Goal

To provide access to extensive investigations, optimal medical management, and innovative surgical techniques in the setting of a comprehensive epilepsy program for people in Nova Scotia and Atlantic Canada.

Accomplishments

2023 saw an expansion of services as we continue to make advancements resulting from the growth of the Epilepsy Monitoring Unit.

- We would like to congratulate Neurology Fellows Dr. Yonatan Serlin and Dr. John Jeddore, who have completed their fellowships with the Halifax Epilepsy Program.
- Dr. John Jeddore has recently started his Neurology practice in Newfoundland and will be providing care to patients with epilepsy in his home province. Congratulations Dr. Jeddore!
- This year we welcomed new EEG students to the program, who will be training on site with our experienced EEG team for the next two years. Sherri Bowes and Lindsay Neynens have been wonderful additions to the team. Welcome Sherri and Lindsay!
- There were 74 admissions to the Epilepsy Monitoring Unit (EMU) in 2023. Since the start of the pandemic, 2023 will be the first year without COVID-19 related closures.
- A total of 17 patients had surgery for epilepsy; this includes 11 surgeries for SEEG and 6 for resection.

- Two new patients received VNS for epilepsy this year.
- This year, another 5 patients received DBS for epilepsy. We now have 7 patients receiving this therapy. A huge thank you to Dr. Weise and his team for their commitment to expanding DBS use in epilepsy!
- This year, Dr. Clarke and Dr. McNeely have continued to expand the use of SEEG radiofrequency ablation in our epilepsy program.
- The number of referrals to the epilepsy program continue to steadily increase for both the first seizure and general epilepsy clinics – 1374 referrals processed this year (compared to 1253 in 2022; 829 in 2021; 677 in 2020).
- We continued using a hybrid virtual/in-person model to present our weekly epilepsy case conferences this year. This has allowed for participation of health care providers from the IWK Health Centre, Maritime Medical Genetics, the MEG laboratory, and our international colleagues.
- We continue to benefit from the enthusiasm and commitment brought to the program by Fellows and Residents assigned to the Epilepsy Program.

Quality Improvement Project

Evaluating the management and assessment of seizures on the Epilepsy Monitoring Unit: A Quality Improvement Project. Braydon Connell, Krista Biggs, Marlee Richardson, Stephanie Woodroffe, Kristin Ikeda and Ben Whatley

Team Members

- Dr. David Clarke, Neurosurgeon
- Dr. Dan McNeely, Neurosurgeon
- Dr. Lutz Weise, Neurosurgeon
- Dr. Kristin Ikeda, Neurologist
- Dr. Ben Whatley, Neurologist
- Dr. Stephanie Woodroffe, Neurologist
- Marlee Richardson, Epilepsy Program Nurse
- Dr. Antonina Omisade, Neuropsychologist
- Dr. Matthias Schmidt, Neuroradiologist
- Dawnette Benedict-Thomas, Psychometrist
- Krista Biggs, Epilepsy Nurse Practitioner
- Michael Whitehead, Team Lead for EEG/EMG lab
- Dadel Gayala, EEG Technologist
- Andrew Kennedy, EEG Technologist
- Debbie MacDougall, EEG Technologist
- Sherri Bowes, EEG technologist student
- Lindsay Neynens, EEG technologist student
- Heather Smith, Social Worker
- Dr. David Skidmore, Geneticist
- Tim Bardouille, Medical Physicist
- Anas Tahir, Technology Coordinator
- Murray Hong, Neurosurgery OR Technical Specialist
- Diane Jardine, Administrative Assistant
- Cathy Caron, Administrative Assistant
- Elizabeth Scott, Administrative Assistant

Team Collaborators

- Neurosurgery Operating Room Team
- EMU/7.3 and 7.4 Inpatient Units and clinic staff
- Neuropathology
- Neuroscience and Perioperative Staff
- Biomedical Translational Imaging Centre Staff (BIOTIC)
- Health Services Managers
- Biomedical Engineering
- Sterile Processing

Cerebrovascular Program

Director: Dr. Gwynedd Pickett
Coordinator: Judith Jarrett

The Cerebrovascular Program is a multi-disciplinary program involving neurosurgeons, neuroradiologists, stroke neurologists, nurses, and trainees in each of these disciplines. Halifax is the tertiary/quaternary referral centre for the treatment of complex cerebrovascular disorders in Atlantic Canada, with extensive experience in surgical and endovascular management of aneurysms and arteriovenous malformations (AVM), and a stereotactic radiosurgery program for the treatment of patients with AVMs. The cerebrovascular team meets weekly to discuss clinical cases and provide recommendations for an evidence-based approach to patient care.

Mission

Our team is dedicated to providing world class, innovative, patient-centered care for patients with cerebrovascular disorders.

Program Goals

- To treat patients with cerebrovascular disorders using the latest technology.
- To advance the knowledge and techniques for the treatment of cerebrovascular disorders through education and research.
- To translate research into evidence-based practice.

Research

We once again have had an active year in research, participating in several multi-centre studies and local investigator driven studies as listed below. We maintain a number of databases (data collected from the hospital electronic medical records system) that provide valuable information for local research endeavors.

The REACT study assessing the efficacy and safety of a drug (Clazosentan) to improve outcomes after bleeding from a brain aneurysm concluded. Unfortunately, the results were negative: the drug did not help. This is always disappointing, but it continues to be important to do these studies to try and advance the field, aiming to improve treatment options for future patients. We remain very grateful for the altruism and trust of our research trial participants.

Ongoing Multi-Centre Studies

- **ECST-2:** The 2nd European Carotid Surgery Trial: A multi-centre randomized controlled open prospective clinical trial with blinded outcome assessment. Dalhousie is the 5th highest enrolling centre worldwide. (Funding: $33,547.00). Principal Investigator: **Dr. GE Pickett**.

- **SAHaRA:** A Canadian prospective, multi-centre, pragmatic, open-label blinded-endpoint, randomized controlled trial to determine if a liberal compared to restrictive transfusion threshold in adult patients suffering from acute aneurysmal subarachnoid hemorrhage (aSAH) and anemia decreases the combined rate of death and severe disability at 12 months. Nationally, the trial is near completion. (Funding: $9500.00). Principal Investigator: **Dr. GE Pickett**.

- **ENRICH-AF:** A prospective, multi-centre randomized clinical trial assessing the safety of edoxaban for stroke prevention in patients with atrial fibrillation who have had intracranial hemorrhage. Now enrolling. (Funding: $91,750.00). Principal Investigator: Dr. G Gubitz.

- **EVOLVE:** A phase 3 multi-centre randomized study evaluating oral peri-operative acetylsalicylic acid in subjects undergoing endovascular coiling-only of unruptured brain aneurysms. Now enrolling. (Funding: $40,000.00). Principal Investigator: **Dr. A Weeks**.

- **CREST2:** Carotid Revascularization and Medical Management for Asymptomatic Carotid Stenosis Trial. This study is near completion; the surgical arm is complete, but we are still enrolling in the carotid stenting arm. Principal Investigator: Dr. C Herman.

- **STAT:** Stenting in the Treatment of large, wide-necked or recurring intracranial Aneurysm Trial. Recruiting. Principal Investigator: **Dr. GE Pickett**.

Ongoing Local Studies

- Evaluation of the Unruptured Intracranial Aneurysm Treatment Score: how does it compare with treatment decisions made by a multi-disciplinary team? Principal Investigator: Dr. GE Pickett.

- Is there an association between geographical location of patients in NS and management of unruptured, incidental intracranial aneurysm? Principal Investigator: Dr. GE Pickett.

Events and Accomplishments

The cerebrovascular team this year was sad to say goodbye to neuroradiologist Dr. William (Bill) Maloney. In his long and distinguished career, he saw and eagerly adopted tremendous advances in imaging technology, the introduction of endovascular therapy for aneurysms and AVMs, and game-changing paradigms in stroke care. He was a compassionate, skilled clinician and a wonderful colleague whom we will miss tremendously. We wish him all best in retirement.

Dr. Gwynedd Pickett received the W. H. Howes Award for excellence in teaching neurosurgery residents and was honoured with the Program Director of the Year Award for Leadership by the Dalhousie University Faculty of Medicine. She also became the first woman in the Dalhousie Department of Surgery to be internally promoted to the status of Professor.

The volume of stroke cases treated with mechanical thrombectomy (clot retrieval) continues to grow, with about 105 cases treated in 2023.

The Brain Aneurysm Support Group has resumed in person meetings.

Publications

MacLellan AD, Easton AS, Alubankudi R, Pickett GE. Documented growth of an intra-axial capillary hemangioma: a case report. Neuropathology doi: 10.1111/neup.12933, 2023.

MacDonald I, Pickett GE, Lee M, Herman C, Volders D. All that glitters: Case presentation and review of radial access complications in neurointervention. Interventional Neuroradiology 29(3):327-331, 2023.

The SVIN COVID-19 Global Stroke Registry (incl. Cora EA). Global impact of the COVID-19 pandemic on stroke volumes and cerebrovascular events: a 1-year follow-up. Neurology 100(4):e408-421, 2023.

Kumar M, Hu S, Beyea S, Kamal N. Restricted access in the emergency department prevents MRI from being the workhorse for ischemic stroke care. J Neurol Sci 448:120637, 2023.

Kumar M, Hu S, Beyea S, Kamal N. Is improved access to magnetic resonance imaging imperative for optimal ischemic stroke care? J Neurol Sci 446:120592, 2023.

Cerebrovascular Program Cont'd

Neal JO, Hu S, Reid J, Matheson K, Gubitz G, Simpkin W, Christian C, Phillips S. Mortality after total anterior circulation stroke: a 25-year observational study. Can J Neurol Sci 50(4):535-541, 2023.

The SECRET Investigators (incl. Hu S). Study of rivaroxaban for cerebral venous thrombosis: a randomized controlled feasibility trial comparing anticoagulation with rivaroxaban to standard-of-care in symptomatic cerebral venous thrombosis. Stroke 54(11):2724-2736.

Invited Lectures

Pickett GE. Endovascular Treatment Options for Ruptured Intracranial Aneurysms. Ottawa Review Course, Ottawa ON, February 2023.

Pickett GE. Pathophysiology, Diagnosis and Management of Vasospasm. Ottawa Review Course, Ottawa ON, February 2023.

Team Members & Collaborators

- Dr. Gwynedd Pickett, Director, Neurosurgeon
- Judith Jarrett, Cerebrovascular/Research Coordinator
- Carole-Ann Miller, Specialty Nurse Practitioner
- Dr. Adrienne Weeks, Neurosurgeon
- Dr. Stephen Lownie, Neurosurgeon
- Dr. Gordon Gubitz, Neurologist
- Dr. Sean Taylor, Neurologist
- Dr. Sherry Hu, Neurologist
- Dr. Robert Vandorpe, Neuroradiologist
- Dr. Matthias Schmidt, Neuroradiologist
- Dr. Jens Heidenreich, Neuroradiologist
- Dr. David Volders, Neuroradiologist
- Dr. Adela Cora, Neuroradiologist
- Susannah Piercey, Neurology Research Coordinator
- Ramani Kalavathy, Administrative Assistant
- Aissa Thomas, Administrative Assistant

BACK (L to R): Dr. G. Pickett, Dr. Sherry Hu, C-A. Miller SNP, Dr. M. Schmidt, Dr. S. Lownie, Dr. A. Weeks, Dr. R. Vandorpe, Ramani Kalavathy
FRONT (L to R): Dr. S. Taylor, J. Jarrett RN, Dr. A. Cora, Dr. G. Gubitz, Dr. Jens Heidenreich, Dr. D. Volders, S. Piercey RN, Aissa Thomas

Brain Tumour Program

Program Co-Chairs:
Drs. Adrienne Weeks and Mary McNeil
Brain Tumour Nurse Coordinator:
Stacey Siler
Research Coordinator: Andrea L.O. Hebb

The Neurooncology Research Group has been busy in 2023-2024.

Dr. Weeks in collaboration with Dr. Jeremy Roy at the Atlantic Cancer Research Institute continue their project on longitudinal plasma sampling for extracellular vesicles in high grade glioma patients. The overarching goal is to find new biomarkers and therapeutic targets of brain cancer. This work was presented in three abstracts each at the International Society of Neuroncology Meeting in Vancouver and at the Canadian Cancer Research Alliance in Halifax in 2023.

Congrats to Dr. Kathleen Atwood, Dr. Jae Han, Mr. Tompson Phinney and Ms. Lindsay Noiles for having their abstracts presented. Thank you to the Department of Surgery for their continued research support of this important project.

Dr. Weeks and Dr. Roy received over $350 000 grant as part of an overarching larger National Terry Fox Miracle of Hope and Atlantic Cancer Consortium multi-million dollar grant, for their work on sequencing genomic and transcriptomics in high grade gliomas.

Dr. Mary MacNeil (neuroncology) enrolled the first patient in Atlantic Canada for Tumour Treating Fields for GBM. Dr MacNeil continues to recruit patients for a study with Dr. Melanie Keats and Dr. Weeks on an exercise programs in GBM to improve mobility and quality of life.

Dr. Jeremy Brown (Dalhousie Engineering) and Dr. Weeks continue to test and prefect a miniature endoscope for use as an operative tool in GBM.

The Neuro-oncology would like to welcome Ms. Stacey Siler the Brain Tumour Coordinator who takes over from Ms. Sam Warren while on leave.

We look forward to 2024-2025.

Neurooncology Research Team

- Dr. Adrienne Weeks (Clinicial Scientist)
- Dr. Simon Walling (Surgeon)
- Dr. David Clarke (Clinician Scientist)
- Dr. Gwynedd Pickett (Surgeon)
- Dr. Stephen Lownie (Surgeon)
- Dr. Dan McNeely (Surgeon)
- Dr. Jeremy Roy (Phd Scientist)
- Dr. Andrea Hebb (Research Ethics Director)
- Ms. Stacey Siler (Brain Tumour Co-ordinator)
- Dr. Kathleen Atwood (Research Associate)
- Dr. Jae Han (Msc Student)
- Dr. Mary MacNeil (Neuro-onoclogy)
- Dr. Lara Best (Radiation Oncology)
- Dr. Liam Mulroy (Radiation Onoclogy
- Dr. Michael Ha (Radiation Oncology)
- Dr. Sidney Croul (Pathology)

Neurotrauma and Injury Prevention Programs

Director: Dr. David Clarke
Research Coordinator: Lorelei Audas
Research Associate: Nelofar Kureshi

Traumatic brain injury (TBI) is a significant contributor to global injury burden, with an age-standardized incidence rate of 369 per 100,000 population. Worldwide, the age standardized prevalence of TBI increased by 8.4% from 1990 to 2016. In Canada, there are 166,455 TBIs annually, resulting in approximately 20,000 TBI hospitalizations; annual direct medical cost of patients hospitalized with a TBI is approximately $120.7 million CAD. TBI is a leading cause of mortality in Canada, accounting for approximately 23% of all injury-related deaths.

The Neurotrauma and Injury Prevention Program is dedicated to conducting research for preventative strategies and improved clinical management for TBI patients and their families. We aim to deliver targeted, evidence-based injury prevention, and clinical programming for TBI care.

Mission

Provide leadership in injury prevention and neurotrauma research, advocacy, education and knowledge translation.

Goals

- Participate in regional and national traumatic brain injury research.
- Support evidence-based care solutions that improve access to neurosurgical care, reduce lengths of stay and optimize patient outcomes.
- Implement and support advocacy efforts for neurotrauma injury prevention.

Research

- "Geospatial and Machine Learning Methods for Traumatic Brain Injury Prevention and Outcome Prediction in Nova Scotia" is a three-year study (led by our Research Associate and PhD Candidate, Nelofar Kureshi). This research brings together expertise from neurotrauma, computer science, epidemiology and biostatistics. Within this big data project, we aim to explore novel methods of geovisualization, spatiotemporal analysis, and prediction modeling by linking clinical and administrative data sources. A paper resulting from this study was recently published in the Journal of Neurotrauma. A second manuscript is under preparation.

- Mental health disorders are a common sequelae of traumatic brain injury (TBI) and are associated with worse health outcomes including increased mental health care utilization. Using data from the Canadian Community Health Survey, we assessed mental health care utilization among those with a TBI, compared with a propensity matched non-injured control group. Our results indicate that there is a 2.25-fold increased probability of mental health care utilization in TBI patients. A paper resulting from this study was published in Injury Epidemiology.

- "A Data-Driven Approach for Traumatic Brain Injury Phenotyping: Defining Clinical, Laboratory and Radiological Features Predictive of Traumatic Brain Injury-Associated Mental Health Disorders" is funded by the Department of Surgery Operational Grant. Within this study, our goals are to determine the prevalence of pre-existing mental health disorders in patients with TBI and the incidence of new mental health disorders post-TBI. We are further interested in which common features segregate TBI patients into clusters. A manuscript resulting from this study is under review at the Canadian Journal of Public Health.

- "A Data-Driven Model of Mental Healthcare Utilization in Traumatic Brain Injury Patients" is funded by the Nova Scotia Health Research Fund. The objectives of this study are to determine the rate of mental healthcare utilization in TBI patients and to compare the rate of MHCU between TBI patients and healthy controls. A second objective is to determine the demographic and clinical predictors of mental healthcare utilization in TBI patients. The primary outcome is any number of mental healthcare visits within two years of TBI which is defined as: 1) a hospital visit for a mental health disorder; 2) an outpatient psychiatry visit); or 3) an outpatient general practitioner visit for mental health symptoms. To achieve these objectives, TBI patients will be linked to outcomes through administrative databases held by Health Data Nova Scotia. This study has important implications for Nova Scotia's overburdened healthcare system; an understanding of mental healthcare utilization patterns can identify TBI patients who may benefit from increased screening, monitoring, or early intervention to decrease the need for long-term use of mental health services in the future.

- We are collaborating with Dr. James Rioux and BIOTEC in a study titled "Development and Optimization of Point-Of-Care Magnetic Resonance Imaging". There are eight patients currently enrolled in this study.

- Halifax is a member site of the Canadian Traumatic Brain Injury Research Consortium (CTRC), a partnership of Canadian basic and clinician scientists focused on TBI research. (Dr. Clarke, member).

- Halifax TBI database: all TBI admissions to Neurosurgery are reviewed at TBI teaching and quality rounds, overseen by Drs. David Clarke and Simon Walling. Currently, over 3202 cases have been reviewed for inclusion in the TBI database.

- The QEIIHSC is one of the three Atlantic Canadian sites participating in the "National Study of Impaired Driving in Canada" led by Dr. Jeff Brubacher and locally by Drs. David Clarke and Kirk Magee. This study is investigating the prevalence of drug use, and type of drugs used, in drivers who are moderately or severely injured in a motor vehicle crash. We have collected > 771 samples since study inception. A manuscript from this study is under review at the Canadian Journal of Emergency Physicians.

- We are in the fourth year of recruitment for "Usage of impact monitoring sensors to monitor head impact burden, concussion incidence, and traumatic microvascular injury in university football players" (led by Dalhousie Medical student, Cole Smolensky). This study utilizes impact-detecting helmets in an entire university gridiron football team. In 2023, we consented 69 Dalhousie football players and completed 4 baseline scans, 2 post injury scans and 2 post-season scans. A manuscript from the 2021 and 2022 seasons is in the process of being completed.

Publications

Kureshi N, Abidi SSR, **Clarke DB**, Zeng W, Feng C. Spatial Hotspots and Sociodemographic Profiles Associated with Traumatic Brain Injury in Nova Scotia. J Neurotrauma. 2023 Dec 4. doi: 10.1089/neu.2023.0257. Epub ahead of print. PMID: 38047531.

Kureshi N, **Clarke DB**, Feng C. Association between traumatic brain injury and mental health care utilization: evidence from the Canadian Community Health Survey. Inj Epidemiol. 2023 Mar 13;10(1):16. doi: 10.1186/s40621-023-00424-x. PMID: 36915175; PMCID: PMC10012583.

Jones CM, Kamintsky L, Park**er E**, **Kureshi N**, **Audas L**, Wilson L, Champagne AA, Boulanger MM, DiStefano V, **Fenerty L**, Bowen C, Beya S, Atkinson C, **Clarke DB**, Friedman A. Blood–Brain Barrier Dysfunction and Exposure to Head Impacts in University Football Players. Clinical Journal of Sport Medicine ():10.1097/JSM.0000000000001164, June 7, 2023. | DOI: 10.1097/JSM.0000000000001164

Neurotrauma and Injury Prevention Programs Cont'd

Conferences

Kureshi N, Abidi SSR, Clarke DB, Feng C. Geospatial and Machine Learning Methods for Identifying Hotspots of Traumatic Brain Injury. Trauma Association of Canada Annual Scientific Meeting and Conference April 20-21, 2023, Edmonton, Alberta, Canada, 2023.

Kureshi N, Abidi SSR, Clarke DB, Feng C. A Spatial and Spatiotemporal Analysis of Traumatic Brain Injury: Mapping High-Risk Neighborhoods to Inform Public Health. Canadian Public Health Conference (Public Health 2023), June 20-22, 2023, 2023.

Kureshi N, Abidi SSR, Clarke DB, Feng C.A Geospatial Analysis of the Burden of Traumatic Brain injury
Brain Repair Centre Research Day, February 23, 2023, Halifax, Nova Scotia, Canada, 2023.

Jones CMA, Kamintsky L, Smolensky C, Mirloo S, Audas L, Kureshi N, Atkinson C, Friedman A, Clarke DB. Head impact exposure and blood-brain barrier dysfunction in university football players. Canadian Academy of Sports and Exercise Medicine conference, Banff, AB, March 11, 2023.

Jones CMA, Kamintsky L, Smolensky C, Mirloo S, Audas L, Kureshi N, Atkinson C, Friedman A, Clarke DB. Head impact exposure and blood-brain barrier dysfunction in university football players. Brain Repair Center Research Day, February 23, 2023, Halifax, Nova Scotia, Canada, 2023.

Funding and Grants

Mitacs Accelerate
"Geospatial and Machine Learning Methods for Traumatic Brain Injury Prevention and Outcome Prediction in Nova Scotia"
Principal Investigator: **Nelofar Kureshi** (student award)
Co-Investigators: Academic supervision by
Drs. Cindy Feng, Raza Abidi, **David B. Clarke**
Duration of support: 3 years
(April 2022-April2025)
$90,000

Department of Surgery Operational Grant
"A Data-Driven Approach for Traumatic Brain Injury Phenotyping: Defining Clinical, Laboratory and Radiological Features Predictive of Traumatic Brain Injury-Associated Mental Health Disorders"
Principal Investigator: **David B. Clarke**
Co-Investigators: Drs. Cindy Feng, Raza Abidi, Abraham Nunes
Duration of support: 1 year
(May 26, 2022-May 26, 2023)
$11,726.00

Nova Scotia Health Research Fund (Category 3)
"A Data-Driven Model of Mental Healthcare Utilization in Traumatic Brain Injury Patients"
Principal Investigator: **David B. Clarke**
Co-Investigator: Dr. Abraham Nunes
(Department of Psychiatry)
Duration of support: 2 years
(June 20, 2022-June 20, 2024)
$42,744.80

Health Canada (Substance Use and Addictions Program – SUAP), 2019-2022
"Monitoring and Preventing Drug-Impaired Driving in Canada"
Principal Investigator: Jeff Brubacher
Co-Investigators: Herbert Chan, Shannon Erdelyi, Mark Asbridge, Robert Mann and the Canadian Drug-Impaired Driving Research Team (**David B. Clarke**, Raoul Daoust, Philip Davis, Marcel Emond, Chrystal Horwood, Rao Jagadish, Glenda Kaban, Jacques Lee, Kirk Magee, Eric Mercier, Judy Morris, Brian Rowe, Christian Vaillancourt, Erin Weldon, Ian Wishart)
Duration of support: 5 years (June 2019 - May 2024)
$1,361,356

Department of Health Promotion and Protection, 2013-current
"An Investigation of the Health and Economic Outcomes of Alcohol-Related Traumatic Brain Injury in Nova Scotia".
Principal Investigator: **David B. Clarke**
Co-investigators: **Simon Walling**, **Nelofar Kureshi**, Rob Green, Mete Erdogan
$20,000

Team Members

- Dr. David Clarke, Neurosurgeon
- Dr. Simon Walling, Neurosurgeon
- Nelofar Kureshi, Research Associate
- Lorelei Audas, Research Coordinator
- Dr. Casey Jones, resident in Emergency Medicine
- Casey Jones, Dalhousie Medical School (RIM student)
- Cole Smolensky (RIM student)

Team Collaborators

- Dr. Alon Friedman, Department of Medical Neuroscience
- Dr. Christina Atkinson, Department of Family Medicine
- Dr. Kirk Magee, Department of Emergency Medicine
- Dr. Mark MacLean, Neurosurgery resident
- Dr. Robert Green, Department of Critical Care and Trauma Nova Scotia
- Dr. Raza Abidi, Faculty of Computer Science
- Dr. Cindy Feng, Department of Community Health and Epidemiology
- Brain Repair Centre
- Department of Physical Medicine and Rehabilitation
- Department of Health Promotion and Protection
- Atlantic Collaborative for Injury Prevention
- Parachute (ThinkFirst) Canada
- Emergency Health Services

Halifax Neuropituitary Program

Halifax Neuropituitary Program
~ Compassion, Dedication, and Excellence ~

Program Co-Chairs:
Drs. David B. Clarke and S. Ali Imran

Mission
Our team provides high quality, innovative care for patients with pituitary/parasellar tumours.

Objectives
- To provide a comprehensive, multi-disciplinary, patient-focused team.
- To be leaders in delivering accessible and innovative health care for patients with pituitary disorders.
- To create an environment that fosters education and research.

This program, unique to the Atlantic Provinces and much of Canada, provides comprehensive care to over 2000 patients with pituitary and sellar region tumours in a multi-disciplinary clinic. Patients are seen by both Neurosurgery and Endocrinology. Transsphenoidal surgery is performed by Drs. Massoud and Clarke. Collaboration with Otolaryngology, Ophthalmology, and Radiation-Oncology (Stereotactic Radiotherapy) ensures coordinated assessment, treatment and follow-up. Monthly multi-disciplinary teleconference rounds are held with external sites from Nova Scotia, New Brunswick, Prince Edward Island and Newfoundland and Labrador.

Clinical Activity Highlights
Our program referrals included 61new HNP surgical referrals, coming from Prince Edward Island (n=3), Newfoundland and Labrador (n=2), and Nova Scotia (n=56).

There were 76 new HNP medical referrals, from Prince Edward Island (n=1) and Nova Scotia (n=75).

35 transsphenoidal surgeries were performed endoscopically in 2023 by Drs. Clarke (Neurosurgery) and Massoud (Otolaryngology).

We have treated our 22nd patient and as part of our Health Canada-approved clinical trial on the stereotactic intracavitary instillation of 90yttrium for treatment of cystic sellar/parasellar lesions (Principal Investigator: Dr. Clarke). The clinical trial is being performed in collaboration with Dr. Steven Burrell and Dr. George Mawko in the Department of Diagnostic Imaging, QEII Health Sciences Centre.

Research/Program Development
In collaboration with the Canadian medical device company, Synaptive Medical Inc., patients with pituitary tumors undergo MR imaging with the Evry, a cryogen-free low-field (0.5 Tesla) system to evaluate its clinical utility relative to a standard 1.5T system.

In collaboration with the University of Ottawa and Michael Thorne (Department of Ophthalmology and Visual Sciences), we are planning to utilize visual monitoring intra-operatively as part of a multi-centre study to determine whether vision outcomes following surgery can be improved.

Our Health Canada Phase III clinical trial "Assessment of the Efficacy of Stereotactic intracavitary instillation of 90yttrium colloid for treatment of cystic lesions of the pituitary and surrounding areas (sellar/parasellar region)" has treated 22 patients.

Publications
Title M, Wang Y, Steeves K, Chen K, Ahmad S, Tramble L, Yusuf Ibrahim A, Van Uum S, Chik CL, Clarke DB, Ladouceur M, Imran SA. Joint pain, physical function, and balance self-confidence in acromegaly versus nonfunctioning pituitary adenoma patients. Eur J Endocrinol. 2023 Aug 2;189(2):156-163. doi: 10.1093/ejendo/lvad090. PMID: 37474110.

Pivonello R, Neggers S and Imran SA. Psychopathology in Acromegaly - Real and Perceived. The Journal of clinical endocrinology and metabolism. 2023 108. 10.1210/clinem/dgad237.

Abstracts and Conferences

Sadek M, Sandila N, Clarke DB, Imran SA. Natural history of untreated prolactinoma. Journal of the Endocrine Society, Oxford University Press. Annual Endocrine Society meeting, Chicago, Illinois, 2023.

MacLean M, Ahmad S, Hebb ALO, Imran SA, Clarke DB. Endocrine And Vision Outcomes Following 90Yttrium Therapy For Cystic Sellar Lesions—A Prospective Cohort Study. Journal of the Endocrine Society, Oxford University Press. Annual Endocrine Society meeting, Chicago, Illinois, 2023.

Invited speakers

Ahmad, S. Endocrine and vision outcomes following ^{90}Yttrium therapy for cystic sellar lesions: a prospective cohort study, Department of Medicine, Dalhousie University, April 20th, 2023

Parker, E. Conservative Versus Surgical Management of Pituitary Apoplexy: A Single Center Cohort Study, Department of Medicine, Dalhousie University, April 20th, 2023

Ahmad, S, Endocrine and vision outcomes following ^{90}Yttrium therapy for cystic sellar lesions: a prospective cohort study, Endocrine Society, Chicago, USA, June 2023

Outreach

Atlantic Cushing Support Group and Education

The Atlantic Cushing's support group is for those individuals who have been diagnosed with Cushing's disease within the Atlantic Canada region. Meetings occur twice yearly. Guest speakers from Neurosurgery, Otolaryngology and Endocrinology attend.

Atlantic Acromegaly Support Group and Education

The Atlantic Acromegaly support group is for those individuals who have been diagnosed with Acromegaly within the Atlantic Canada region. Meetings occur twice yearly with guest speakers addressing conditions as well as treatments available. http://www.acromegalysupport.ca

Team Members

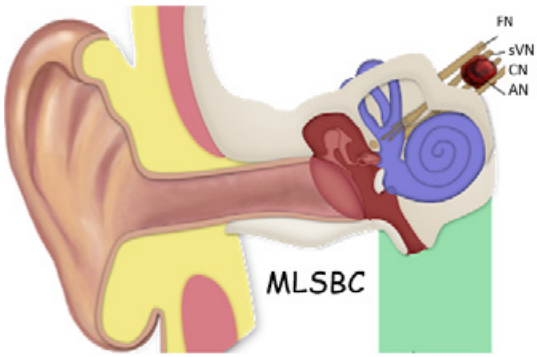
- Dr. David B. Clarke, Neurosurgeon
- Dr. S. Ali Imran, Endocrinologist
- Dr. Emad Massoud, Otolaryngology – Head & Heck Surgery
- Andrea L.O. Hebb, Neurosurgery Research Coordinator
- Lisa Tramble, Endocrinology Clinic Nurse
- Cindy Woods, Program Clinic Coordinator
- Diane Jardine, Neurosurgery Administrative Assistant
- Murray Hong, Neurosurgery OR Technologist
- Anas Tahir, Technology Coordinator
- Dr. Sidney Croul, Neuropathologist
- Dr. Liam Mulroy, Radiation Oncologist
- Dr. Steven Burrell, Diagnostic Radiologist
- Dr. George Mawko, Diagnostic Radiologist
- Dr. Deborah Zwicker, Endocrinologist, Sydney, NS
- Dr. Lenley Adams, Internal Medicine, Charlottetown, PEI
- Dr. Carol Joyce, Endocrinologist, St. John's, NL
- Dr. Cathy Murray, Endocrinologist, St. John's, NL
- Dr. Michael Pelkey, Endocrinologist, Fredericton, NB

Team Collaborators

- Neuroradiology
- Nova Scotia Eye Centre
- Operating room/7.3 Inpatient Unit/Clinic nursing

BACK (L to R): Dr. David B. Clarke and Dr. Ali Imran
MIDDLE ROW: Dr. Wael Almistehi
FRONT (L to R): Andrea L.O. Hebb and Lisa Tramble

Maritime Lateral Skull Base Program



Dr. Liam Mulroy

Dr. Simon Walling

Andrea L.O. Hebb, PhD

Dr. David P. Morris

Dr. Stephen Lownie

Dr. Nael Shoman

Program Co-Directors:
Drs. David Morris and Simon Walling
Program Coordinator: Andrea L.O. Hebb

The Maritime Lateral Skull Base Clinic provides coordinated care through Otolaryngology, Neurosurgery and the Stereotactic Radiotherapy Group to patients with unilateral or bilateral vestibular schwannomas (also called acoustic neuromas) and a range of other lateral skull base tumours.

The program provides coordinated care to over 1000 patients with a range of lateral skull base tumours including vestibular schwannomas, other cerebellopontine angle (CPA) tumours, lesions of the petrous apex and jugular foramen. Patients are carefully assessed, and appropriate plans formulated. When treatment is required, the experts on our team provide a full range of treatment options including surgery, stereotactic radiation therapy (SRT), as well as balance and hearing rehabilitation. Our program is unique in Canada in allowing members from all disciplines to formulate management decisions in the same clinic.

Neurofibromatosis Type 2 is a hereditary condition (autosomal dominant, spontaneous and mosaic) most associated with bilateral vestibular schwannomas. NF2 clinics continue to be held once every 2nd month. This clinic is dedicated to patients with Neurofibromatosis Type 2 and includes collaboration with Medical Genetics, Radiology, Nova Scotia Hearing and Speech as well as Ophthalmology. We currently follow over 35 patients with NF2.

Clinic visits

418 clinic visits occurred in 2023. There were also 64 new referrals in 2023, to include patients from NB, PEI, NL and NS.

Dr. Simon Walling and Dr. Stephen Lownie performed 24 surgeries (with Dr. David P. Morris and Dr. Nael Shoman; Otolaryngologist) to remove CPA tumours in 2023. Rehabilitation is offered using a variety of assistive devices including cochlear implants.

In addition, 27 patients underwent stereotactic radiation therapy (SRT) to control tumour growth.

Program Goals

- To offer a single center, multi-disciplinary approach.
- To be an internationally recognized centre for lateral skull base lesions.
- To be at the forefront of clinical research in lateral skull base lesions.
- To maintain a detailed database allowing critical appraisal of current treatment strategies.
- To be sensitive to new developments in our specialty allowing us to be critical of our practice and outcomes.
- To change our practice with evidence-based research.

Research in the Skull Base Program

- Quality of life related to symptomatic outcomes in patients with cerebellopontine angle tumours.
- High-resolution vestibulocochlear schwannoma imaging on 0.5 Tesla MRI.
- Integrated robotic surgical guidance system.

We have developed several research fronts in this program. Some are listed below:

- What is useful hearing? Speech in noise comprehension with asymmetric hearing in acoustic neuroma subjects, when does the tumor ear stop contributing to binaural hearing?
- Database of tumor growth and outcomes. One of the largest series in the world with the "wait and scan" policy.
- Defining the natural history of vestibular schwannoma as a foundational precept of a statistical model.
- Database of surgical outcomes: looking at facial nerve displacement.
- Patient expectations and attitudes to acoustic neuroma: questionnaire for all patients in our database.
- Subjective hearing handicaps measured with standardized instruments.
- Tinnitus and quality of life questionnaires added to each clinic visit.

Invited speakers

Dr. Morris is a regular invited speaker at the national and international level on surgical topics, has presented his research widely and has contributed as faculty to numerous temporal courses around the world. He coordinates and has co-supervised the Dalhousie Otology Neurotology Fellowship since 2003.

Dr. Stephen Lownie Invited speaker Halifax Neurosurgery 1948-2023
Outpatient stenting for carotid artery stenosis
Halifax, Nova Scotia; September 2023

Research interests

Dr. Shoman's research interests include middle ear physiology and hearing rehabilitation, innovative management of chronic ear disease, cochlear implants and other implantable auditory devices, facial nerve paralysis, and skull base surgery.

Publications

Pelz DM, Lownie SP, Iftikhar UF, Munoz C, Lopez-Ojeda P, Azarpazhooh R. Safety Evaluation of Primary Carotid Stenting: Transcranial Doppler and MRI. Can J Neurol Sci. 2023 Sep;50(5):651-655. doi: 10.1017/cjn.2022.304. PMID: 36245094.

Tamber MS, Jensen H, Clawson J, Nunn N, Wellons JC, Smith J, Martin JE, Kestle JRW; Walling SA HCRNq Investigators and Staff. Shunt infection prevention practices in Hydrocephalus Clinical Research Network-Quality: a new quality improvement network for hydrocephalus management. J Neurosurg Pediatr. 2023 Nov 24:1-8. doi: 10.3171/2023.10.PEDS23297. PMID: 38000067.

Dr. Reshma Ghedia, Otology and Neurotology fellow, joined our team in July 2023 (1 year fellowship).

Team Members:

- Dr. Simon Walling, Neurosurgeon
- Dr. David P. Morris, Otolaryngologist
- Dr. Nael Shoman, Otolaryngologist
- Dr. Stephen Lownie, Neurosurgeon
- Dr. Liam Mulroy, Radiation Oncologist
- Andrea L.O. Hebb, Program Coordinator
- Bonita Meade, Clinic Coordinator
- Adele Greene, Clinic Nurse
- Jill Jamieson, Clinic Nurse

Pediatric Neurosurgery

The goal of the Division of Neurosurgery at the IWK Health Centre is to offer the highest quality clinical service to pediatric patients of the region, in collaboration with our colleagues at referring sites. We also strive to offer high quality teaching, and to contribute to the advancement of knowledge through our participation in research.

Camp Brainiac at Brigadoon was well attended, with 8 campers during the summer of 2023. We thank our generous donors who help make this experience possible via the Neurosurgery Kids Fund.

A few testimonials from Brigadoon Village campers this summer:

"It makes such an enormous difference to him. He has something significant to look forward to each year."

"My camper has a difficult time coping with "why me" and her diagnosis. Coming to camp and connecting with others has helped her begin to come to terms with having a life-long condition. At the same time, having so many people around you who are making a safe and beautiful environment to just enjoy life, makes such a difference. So much so, that one day she wants to be a counsellor at Brigadoon!"

Team Members and Collaborators

- P. Daniel McNeely, Chief, Pediatric Neurosurgeon
- Simon A. Walling, Neurosurgeon
- Sarah Szego, Neurosurgery Nurse Practitioner
- Kelly Boileau, Brain Tumour Clinic Nurse
- Shona McConnell, Neurosurgery OR Nursing Team Lead
- Susan Morris, Neurophysiologist
- Cathy Caron, Administrative Assistant
- Chrissy Shay, Administrative Assistant

Dr. D. McNeely

Dr. S. Walling

IWK Health Centre

Intraoperative Neurophysiology

Neurophysiologist: Dr. Susan Morris
Neurosurgery OR/Technical Specialist: Dr. Murray Hong

The Intraoperative Neurophysiology (ION) Program was launched by the Division of Neurosurgery in 2009. Since its inception, the program has grown steadily, and now provides a wide array of targeted electrophysiological methods and tools for use by the neurosurgical team. Intraoperative neurophysiological mapping and monitoring uses electrophysiology to provide real-time feedback to the surgical team about critical brain, brainstem, spinal cord, and nerve function during different types of neurosurgeries.

As a mapping technique, ION provides functional guidance to help surgeons identify and navigate vital regions of the central and peripheral nervous system. As a monitoring tool, ION acts as an early warning signal, enabling timely intraoperative intervention(s) with the goal of avoiding serious post-operative deficits such as paralysis. Neurosurgeries that most benefit from ION include brain, brainstem and spinal cord tumour resections and complex spine deformity corrections.

The ION program in the Division of Neurosurgery is collaboratively run by Drs. Susan Morris and Murray Hong, both of whom have many years of experience in intraoperative neurophysiology.

Team Members:

Susan Morris (PhD), Neurophysiologist
Murray Hong (PhD), Neurosurgery OR/Technical Specialist

Susan Morris

Murray Hong

Neurosurgery Basic Science Labs

Life Sciences Research Institute and Sir Charles Tupper Building Brain Repair Centre

Spinal Cord Injury Laboratory

Dr. Sean Christie

The Christie Lab has been very active in 2023 studying mechanisms of spinal cord injury from diverse perspectives. Myra Ahmad is working to improve mitochondrial and neuronal protection after SCI, following up on previous work with the drug Ru265 in mice. She is developing a methodology for sustained local delivery of the neuroprotective compound to the spinal cord via drug laden alginate hydrogels as part of her graduate program. This novel compound mitigates mitochondrial calcium overloading due to excitotoxicity. She will also study other similar and newer compounds being developed to target mitochondrial calcium uptake after SCI. Myra holds the Canada Graduate Scholarship - Masters level and the Nova Scotia Graduate Scholarship awards.

Laura Dauphinee is studying and mapping genome-wide expression changes following spinal cord injury with the spatial transcriptomics platform in the mouse model. This platform enables her to simultaneously map the wavefronts of various genes around the expanding spinal cord injury penumbra at micrometer resolution. With this data set she aims to establish a unique atlas of the injury process, enabling interrogation of specific gene expression locations after SCI. Laura holds the Canadian Graduate Scholarship – Master's level award from CIHR and a Scotia Scholars Masters Award from Research Nova Scotia.

Dr. Annemarie Dedek joined our lab as a post doctoral fellow this fall. She is a neuroscientist and well-trained electrophysiologist, interested in studying mechanisms of pain. For one of her current projects, she is working on a systematic review on the influence of NSAIDs on bone fusion and clinical outcomes. This will inform our future grants and projects. Annemarie has held numerous awards like the CIHR - Brain Star award, MITACS Postdoctoral award, etc.

Dr. Saranyan Pillai, our Research Associate, trains our students and contributes to all projects. He is studying the blood flow distribution pattern between the brain and spinal cord in the healthy mouse model. This is an extension of interesting preliminary findings demanding further investigation.

Saranyan is also managing the large mammal spinal cord hemodynamics research project, funded by the QEII Foundation's grant and the Brain Repair Centre's Knowledge Translation grant. Here, we are studying blood flow pattens in the pig spinal cord in healthy and injured conditions. This will help us better understand blood flow requirements to different regions of the spinal cord and inform further improvement in patient care.

The lab continues to collaborate with Drs. Sonja McVeigh and Alex Whelan of the Division of Physical Medicine & Rehabilitation, we are studying melatonin levels in acute phase patients after cervical spinal cord injury. Patient recruitment is at an advanced stage for this project. In another collaboration with Drs. Danielle Tokarz and Richard Cisek of Saint Mary's University we continue to utilize second harmonic generation microscopy to image mouse otoconia, collagen arrangement in the dura mater and the glial scar after SCI. We are exploring otoconial structure changes across different age cohorts and the effect of drug regimes on otoconial integrity and ototoxicity.

Brain Tumour Laboratory

Dr. Adrienne Weeks

Dr. Weeks runs a laboratory at the Charles Tupper Building on the Dalhousie Campus. Her lab team studies the role of RNA stress granules in the malignant brain tumour, glioblastoma. A recently published paper in the Nature Group Publication "Cell Death and Disease" was the first to demonstrate that interfering with stress granule dissolution by the drug raloxifene increased glioblastoma cell death. The team is exploring other drugs that impair stress granule function in the hopes of bringing new therapeutic strategies to clinic practice.

Dr. Weeks, in collaboration with Dr. Jeremy Roy at the Atlantic Cancer Research Institute in Moncton, New Brunswick and Dr. Sidney Croul in the Department of Pathology at Dalhousie continue a translation research project to study the role of plasma extracellular vesicles in glioblastoma recurrence and pathogenesis. The group received a grant for Atlantic Genome Canada and the QEII Foundation to further this work.

Funding

Dr. Weeks' laboratory is supported by the Department of Surgery, QEII Foundation and Atlantic Genome Canada.

Research Funding

Principal Investigator: George Robertson
Co-Principal Investigator: **Sean Christie**
Knowledge Translation/Brain Repair Centre
Alginate hydrogel formulation of Ru265 for the treatment of spinal cord injury.
2023-2025
$35,000

Principal Investigator: Rainham, Daniel
Co-applicant: **Sean Christie**
NSERC Alliance
Climate Crisis: Estimating greenhouse gas emissions and environmental impacts of surgical procedures and hospital operations.
2023-2025
$470,500

Principal Investigator: **Sean Christie**
Abbvie
M16-077: Elezanumab in Traumatic Spinal Cord Injury
2020-2023
$367,632

Principal Investigator: **Sean Christie**
Department of Surgery
Healthcare in a Climate Crisis: Surveying Knowledge and Attitudes of Moving to a High Quality, Low Carbon System in Nova Scotia
2021-2023
$30,000

Principal Applicant: Dr. Fiona Miller
Partner Applicant: **Sean Christie**
Environment and Climate Change Canada
Project CASCADES (Creating a Sustainable Canadian Health System in a Climate Crisis)
2021-2025
$6,000,000

Principal Investigator: Dr. Farhad Pirouzmand
Co-Investigator: **Sean Christie**
Canadian Institutes of Health Research
Prophylaxis for Venous Thromboembolism in Severe Traumatic Brain injury (PROTEST): A Double Blind Randomized Controlled Trial
2019 - 2023
$742,000

Principal Investigator: Farhad Pirouzmand
Co-applicant: **Sean Christie**
Canadian Institutes of Health Research
Anticoagulation Therapy Timing in Atrial Fibrillation after Chronic Subdural Hematoma External Drainage
2021-2023
$520,788

Principle Investigator: Dr. Jeremy Brown
Co-Principle Investigator: **Sean Christie**
Nova Scotia Health Research Fund
An Ultrasound Endoscope for Minimally Invasive Spine Surgery
2022-2024
$99,999

Principal Investigator: Dr. Sonja McVeigh
Co-Investigator: **Sean Christie**
Nova Scotia Health Research Fund
Plasma Melatonin Levels After Acute Traumatic Spinal Cord Injury in Individuals with Complete and Incomplete Cervical and Thoracic Spinal Cord Injury
2019 - 2023
$25,000

Principal Investigator: Alon Friedman
Clinical Site Investigator: **David B. Clarke**
Canadian Institutes of Health Research
Microvascular Pathology as a Therapeutic Target for Epilepsy
2022-2027
$849,150

Principal Investigator: **David B. Clarke**
Department of Surgery Operational Grant
A Data-Driven Approach for Traumatic Brain Injury Phenotyping: Defining Clinical, Laboratory and Radiological Features Predictive of Traumatic Brain Injury-Associated Mental Health
2022-2023
$11,726.00

Principal Investigator: **Nelofar Kureshi**
Co-Investigators: **David B. Clarke**
Mitacs Accelerate
Geospatial and Machine Learning Methods for Traumatic Brain Injury Prevention and Outcome Prediction in Nova Scotia
2022-2025
$90,000

Principle Investigator: Jeff Brubacher
Co-Investigators: **David B. Clarke** and several others
Transport Canada, Enhanced Safety Transfer Payment Program (ERSTPP)
Monitoring Impaired Driving in Canada
2021-2023
$1,416,770

Research Funding Cont'd

Principle Investigator: Steven Beyea
Co-Applicant: **David B. Clarke**
INOVAIT National Network
INOVAIT Grant
2022-2024
$1,400,000

Principal Investigator: **David B. Clarke**
Nova Scotia Health Research Fund
A Data-Driven Model of Mental Healthcare Utilization in Traumatic Brain Injury Patients
2022-2024
$42,744.80

Principal Investigator: **David B. Clarke**
Department of Health Promotion and Protection
An Investigation of the Health and Economic Outcomes of Alcohol-Related Traumatic Brain Injury in Nova Scotia
2013-2024
$20,000

Principal Investigator: Jeff Brubacher
Co-Investigators: **David B. Clarke**
Health Canada (Canada Substance Use and Addictions Program)
Monitoring and Preventing Drug-Impaired Driving in Canada
2019-2024
$1,361,356

Principle Investigator: Jeffrey Brubach
Co-Investigators: **David B. Clarke** and several others
Transport Canada,
Monitoring drug impaired driving in Canada through toxicological analyses of injured drivers
2023-2025
$1,539,000

Principle Investigator: Alon Friedman
Co-Investigators: **David B. Clarke** and several others
Neurosciences, Mental Health and Addiction,
INOVAIT - Diagnosis and Treatment of Blood Brain Barrier Leakage in Repetitive Mild Traumatic Brain Injury
2023-2028
$887,400

Principle Investigator: **Adrienne Weeks**
Canadian Cancer Society Atlantic Oncology Grant
The Role of Plasma EVS in Glioblastoma Progression
2021-2023
$150,000

Principle Investigator: Melanie Keats
Co-Applicant: **Adrienne Weeks** and several others
Atlantic Canadian Cancer Society
The Impact of Resistance Exercise on Muscle Mass in Glioblastoma Survivors
2021-2023
$150,000

Co-Applicant: **Adrienne Weeks**
Canadian Institutes of Health Research
Precision Guided Ultrasound Ablation of Brain Tumours: A Longitudinal Pre-Clinical Study Using a Newly Developed Platform
2022-2027
$156,000

Co-Principal Investigator: **Adrienne Weeks**
Terry Fox Miracle of Hope
Investigating Serial Plasma Extracellular Vesicles in High-Grade Astrocytoma
2022-2024
$430,000

Principle Investigator: **Adrienne Weeks**
NSHA DOS Award
Department of Surgery Basic Science Award
2023
$15,000

Co-Applicant: **Adrienne Weeks**
TFRI MOH
Terry Fox Miracle of Hope Low Grade Glioma Study
2023-2026
$1,200,000

Co-Applicant: **Adrienne Weeks**
DMRF
DMRF Equipment Grant
2023
$30,000

Principle Investigator: **Stephen Lownie**
Department of Surgery
The Effects of Intraoperative Tranexamic Acid on Perioperative Bleeding in Craniotomies
2023
$50,000

Principle Investigator: **Lutz Weise**
Nova Scotia Health Research Fund
Combining Motor Evoked Potential (MEP) and Machine-Learning enhanced intraoperative (XT) guided Deep Brain Stimulation (DBS) to improve efficiency and patient comfort
2023
$90,000

Principle Investigator: **Lutz Weise**
QEII Foundation
Correlation of Tractography and Motor Evoked Potentials in Deep Brain Stimulation
2023
$20,832.02

Publications

MacLellan AD, Easton AS, Alubankudi R, **Pickett GE**. Documented growth of an intra-axial capillary hemangioma: a case report. Neuropathology doi: 10.1111/neup.12933, 2023.

MacDonald I, **Pickett GE**, Lee M, Herman C, Volders D. All that glitters: Case presentation and review of radial access complications in neurointervention. Interventional Neuroradiology 29(3):327-331, 2023.

Salem M, Sweid A, Kuhn AL, Dmytriw AA, Gomez-Paz S, Maragkos G, Waqas M, Parra-Farinas C, Salehani A, Adeeb N, Brouwer P, **Pickett GE**, Ghuman M, Yang V, Weill A, Radovanovic I, Cognard C, Nicholson P, Renieri L, Kan P, Limbucci N, Pereira VM, Harrigan M, Puri A, Levy E, Moore J, Ogilvy C, Marotta T, Jabbour P, Thomas A. Repeat flow diversion for cerebral aneurysms failing prior flow diversion: safety and feasibility from multicenter experience. Stroke, 53(4):1178-1189, 2023.

Guo E, Gupta M, Sinha S , Rössler K, Tatagiba M, Akagami R, Al-Mefty O, Sugiyama T, Stieg PE, **Pickett GE**, de Lotbiniere-Bassett M, Singh R, Lama S, Sutherland GR. neuroGPT-X: toward a clinic-ready large language model. Journal of Neurosurgery. https://doi.org/10.3171/2023.7.JNS23573. 2023.

MacLean M, Muradov J, **Greene R**, Van Hameren G, **Clarke DB**, Dreier J, Okonkwo DO, Friedman. A. Memantine inhibits cortical spreading depolarization and improves neurovascular function following repetitive traumatic brain injury. SCIENCE ADVANCES. 9, eadj2417, 2023.

MacLean M, Ahmad S, **Hebb A**, **Tahir A**, **Greene R**, **Clarke DB**, Imran S. OR2804 Endocrine And Vision Outcomes Following 90Yttrium Therapy For Cystic Sellar Lesions—A Prospective Cohort Study. Journal of the Endocrine Society. 114.1366, 2023.

Kureshi N, Abidi S, **Clarke DB**, Zeng W, Feng C. Spatial Hotspots and Sociodemographic Profiles Associated with Traumatic Brain Injury in Nova Scotia. J Neurotrauma, 10.1089, 2023.

Bolous Y, Bullock M, **Clarke DB**, Massoud E. Intraosseous Cavernous Hemangioma of the Middle Turbinate: A Case Report. Ear Nose & Throat Journal, 10.1177, 2023.

Kureshi N, Feng C, **Clarke DB**. Association between traumatic brain injury and mental health care utilization: evidence from the Canadian Community Health Survey. Injury Epidemiology, 10:16, 2023.

Title M, Wang Y, Steeves K, Chen K, Ahmad S, **Tramble L**, Ibrahim A, Van Uum S, Chik C, **Clarke DB**, Ladouceur M, and Syed Imran A. Joint pain, physical function, and balance self-confidencein acromegaly versus nonfunctioning pituitary adenoma patients. European Journal of Endocrinology, 189: 156-163, 2023.

Magill S, Schwartz T, Couldwell W, Gardner P, Heilman C, Sen C, Akagami R, Cappabianca P, Prevedello D, McDermott M, **Clarke DB**. International Tuberculum Sellae Meningioma Study: Preoperative Grading Scale to Predict Outcomes and Propensity-Matched Outcomes by Endonasal Versus Transcranial Approach. Neurosurgery 00:1–14, 2023.

Magill S, Schwartz T, Couldwell W, Gardner P, Heilman C, Sen C, Akagami R, Cappabianca P, Prevedello D, McDermott M, **Clarke DB**. International Tuberculum Sellae Meningioma Study: Surgical Outcomes and Management Trends. Neurosurgery, 00:1–12, 2023.

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Banoei M, Lee CH, Hutchison J, Panenka W, Wellington C, Wishart D, Winston BW, the Canadian biobank, database for Traumatic Brain Injury (CanTBI) investigators, the Canadian Critical Care Translational Biology Group (CCCTBG), the Canadian Traumatic Brain Injury Research, Clinical Network (CTRC) (including **Clarke DB**). Using metabolomics to predict severe traumatic brain injury outcome (GOSE) at 3 and 12 months. Critical Care, 27:295, 2023.

Brubacher JR, Chan H, Erdelyi S, Yuan Y, Daoust R, Vaillancourt C, Rowe B, Lee J, Mercier E, Atkinson P, Davis P, **Clarke DB**, Taylor J, MacPherson A, Emond M, Al-Hakim D, Horwood C, Wishart I, Magee K, Rao J, Eppler J. High-'n'-dry? A comparison of cannabis and alcohol use in drivers presenting to hospital after a vehicular collision. Addiction, 3:1-10, 2023.

Publications Cont'd

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Algarni N, Dea N, Evaniew N, McIntosh G, Jacobs BW, Paquet J, Wilson JR, Hall H, Bailey CS, Weber MH, Nataraj A, Attabib N, Rampersaud YR, Cadotte DW, Stratton A, **Christie SD**, Fisher CG, Charest-Morin R. Does Ending a Posterior Construct Proximally at C2 Versus C3 Impact Patient Reported Outcomes in Degenerative Cervical Myelopathy Patients up to 24 months After the Surgery? Global Spine J. 2023 Mar 24:21925682231166605. doi: 10.1177/21925682231166605. 2023.

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Stukas S, Cooper J, Gill J, Fallah N, Skinnider MA, Belanger L, Ritchie L, Tsang A, Dong K, Streijger F, Street J, Paquette S, Ailon T, Dea N, Charest-Morin R, Fisher CG, Bailey CS, Dhall S, Mac-Thiong JM, Wilson JR, **Christie SD**, Dvorak MF, Wellington CL, Kwon BK. Association of CSF and Serum Neurofilament Light and Glial Fibrillary Acidic Protein, Injury Severity, and Outcome in Spinal Cord Injury. Neurology. 2023 Mar 21;100(12):e1221-e1233. doi: 10.1212/WNL.0000000000206744. Epub Jan 4, 2023.

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Bokeris A, Restrepo CE, Sheriko J, **McNeely PD**. Subcutaneous intrathecal catheter and port for repetitive nusinersen administration. Can J Neurol Sci, doi: 10.1017/cjn.2023.40. 2023,

Presentations

Sadek M, Sandila N, **Clarke DB**, Imran SA. Natural history of untreated prolactinoma. Journal of the Endocrine Society, Oxford University Press. Annual Endocrine Society meeting, Chicago, Illinois, 2023.

MacLean M, Ahmad S, **Hebb ALO**, Imran SA, **Clarke DB**. Endocrine And Vision Outcomes Following 90Yttrium Therapy For Cystic Sellar Lesions—A Prospective Cohort Study. Journal of the Endocrine Society, Oxford University Press. Annual Endocrine Society meeting, Chicago, Illinois, 2023.

Kureshi N, Abidi SSR, **Clarke DB**, Feng C. Geospatial and Machine Learning Methods for Identifying Hotspots of Traumatic Brain Injury. Trauma Association of Canada Annual Scientific Meeting and Conference April 20-21, 2023, Edmonton, Alberta, Canada, 2023.

Kureshi N, Abidi SSR, **Clarke DB**, Feng C. A Spatial and Spatiotemporal Analysis of Traumatic Brain Injury: Mapping High-Risk Neighborhoods to Inform Public Health. Canadian Public Health Conference (Public Health 2023), June 20-22, 2023, 2023.

Kureshi N, Abidi SSR, **Clarke DB**, Feng C.A Geospatial Analysis of the Burden of Traumatic Brain injury
Brain Repair Centre Research Day, February 23, 2023, Halifax, Nova Scotia, Canada, 2023.

Jones CMA, Kamintsky L, **Smolensky C**, Mirloo S, **Audas L**, **Kureshi N**, Atkinson C, Friedman A, **Clarke DB**. Head impact exposure and blood-brain barrier dysfunction in university football players. Canadian Academy of Sports and Exercise Medicine conference, Banff, AB, March 11, 2023.

Jones CMA, Kamintsky L, **Smolensky C**, Mirloo S, **Audas L**, **Kureshi N**, Atkinson C, Friedman A, **Clarke DB**. Head impact exposure and blood-brain barrier dysfunction in university football players. Brain Repair Center Research Day, February 23, 2023, Halifax, Nova Scotia, Canada, 2023.

Potvin C RN, **Weise LM**, Patient education for Spinal Cord Stimulation, Combined Annual Meetings of the Canadian Neuromodulation Society and the Neuromodulation Society of United Kingdom and Ireland. Niagara on the Lake. September 21-23, 2023

Van Essen TA, Groen RJM, Contarino MF, Van der Gaag NA, **Weise LM**, Hoffmann CF. A Brief History of the Start of Stereotactic Functional Neurosurgery in The Netherlands. Combined Annual Meeting of the Canadian Neuromodulation Society and the Neuromodulation Society of United Kingdom and Ireland. Niagara on the Lake September 21-23, 2023

Vaughan R, **Van Essen TA**, Fisk JD, **Weise LM**. Impact of Neuropsychological Testing on Surgical Decision Making and Targeting in Parkinson's Disease. Combined Annual Meeting of the Canadian Neuromodulation Society and the Neuromodulation Society of United Kingdom and Ireland. Niagara on the Lake. September 21-23, 2023

Weise LM, Fisk J, **Parker E**, **Potvin C**, Agarwal N. Awake Versus Asleep Subthalamic Nucleus Deep Brain Stimulation in Parkinson's Disease: Comparison of Normalized Target Accuracy and Clinical Outcomes. 74th Annual Meeting of the German Society for Neurosurgery Combined with the Brazilian Neurosurgical Society. Stuttgart, Germany. June 25-28, 2023

Weise LM. Invited Panel Speaker: Exploring the Latest Parkinson's Research. Parkinson's IQ and You. Patient information event sponsored and Co-organized by The Michael J. Fox Foundation and Parkinson's Canada. Dartmouth, Nova Scotia. October 28, 2023

Christie SD. The Impact of Healthcare Systems on Climate, University of Saskatchewan Planetary Health Group, January 18, 2023.

Christie SD. Discussion on the importance of interdisciplinary collaboration to achieve healthcare sustainability, Dal Planetary Health IPE, Dalhousie University, Halifax NS, January 19, 2023.

Christie SD. Cervical Spine Trauma - Canadian Society of Neuroradiology, Webinar, February 7, 2023.

Christie SD. From OR Waste to Environmental Grace: The Science of Sustainable Surgery, Sickboy Podcast Interview, February 10, 2023.

Christie SD. Developing animal models of human disease – What is cervical myelopathy? - Graduate Students, Dalhousie University, Halifax NS, February 16, 2023.

Christie SD. The Impact of Healthcare Systems on Climate - Lecture for Planetary Health, MED I Pro Comp Lecture, Dalhousie University, Halifax NS, February 24, 2023.

Christie SD. How Chemistry Prepared me for an Academic Surgical Career - Careers in Chemistry Symposium - Chemistry Society, Saint Mary's University, Halifax NS, March 10, 2023.

Christie SD. A Playbook for Surgical Sustainability -, Department of Surgery Grand Rounds, Dalhousie University, Halifax NS, April 12, 2023.

Christie SD. Sustainability in Surgery - OR Nursing Rounds, NSHA - QEII, HSC, Halifax NS, May 17, 2023.

Christie SD. Metastatic Spine Disease - Canadian Congress of Neurological Sciences, Banff AB, June 6, 2023.

Christie SD. Robotics in Neurosurgery – Canadian Congress of Neurological Sciences, Banff AB, June 8, 2023.

Christie SD. What can you do to reduce the health carbon footprint - Summer Institute on Sustainable Health Systems, CASCADES and the Dalhousie Faculty of Medicine Global Health Office, June 19, 2023.

Christie SD. Ocean eReferrals to Streamline and Enhance Access to Care in Nova Scotia – Quality and Patient Safety Rounds, Nova Scotia Health and Doctors Nova Scotia, June 28, 2023.

Christie SD. Update on the Current Management of Spinal Cord Injury and What the Future Holds - 12th Annual Atlantic Canada Spine Meeting, Wallace NS, October 12-15, 2023.

Christie SD. The Climate Paradox of Healthcare – Canadian Association of Physician Assistants Annual Conference Fredericton NB, October 20, 2023.

Christie SD. Cost Challenges and Opportunities: Is now the time to adopt spinal robotics? - Medtronic Innovations in Spinal Robotics - Toronto ON, December 1, 2023.

Jacobs A. Lumbo-Sacral CSF Cysts - 12th Annual Atlantic Canada Spine Meeting, Wallace NS, October 12-15, 2023.

Barry SP. The Current and Future Medicolegal Landscape of Spine Surgery in Canada - 12th Annual Atlantic Canada Spine Meeting, Wallace NS, October 12-15, 2023.

Weeks A. Plasma Extracellular Vesicle sampling from HGG demonstrates a small RNA signature indicative of disease and identifies RPPH1 as a high grade Glioma Biomarker - Society of Neuro-Oncology, Vancouver BC, November 2023.

Weeks A. Identification of EV associated splicesomal proteins found in HGG patient plasma – Canadian Cancer Research Association, Halifax NS, November 2023.

Weeks A. Investigating Plasma EVs from HGG - Beatrice Hunter Cancer Research Institute, Halifax NS, March 2023.

McNeely D. Seven Syrinxes – 12th Annual Atlantic Canada Spine Meeting, Wallace NS, October 12-15, 2023.

Walling, S. Implementation of Canadian driving guidelines following cranial procedures: a systematic review and survey of Canadian neurosurg - Canadian Neurological Sciences Federation Meeting, Banff AB, June 6-9, 2023.

Invited Lectures

Dr. Christie. Spinal Biomechanics, Decision Making and surgical Options in Degenerative Spine Disease. Ottawa Review Course, Ottawa ON, February 2023.

Dr. Christie. Cervical Spondylosis: Diagnosis and Management. Ottawa Review Course, Ottawa ON, February 2023.

Dr. Christie. The Climate Paradox of Healthcare. Canadian Association of Physician Assistants, Fredericton NB, October 2023.

Dr. Christie. Opportunities and challenges for robotic-assisted spine surgery: feasible indications for the MAZOR™ X Stealth Edition. Annual International Conference IEEE. Melbourne AU, July 31, 2023.

Dr. Christie. Exploring the bacterial hypothesis of low back pain: a prospective cohort study. Canadian Neurological Sciences Federation Annual Congress. Banff AB, June 8, 2023.

Dr. Christie. Exploring end-of-life decision making and perspectives on Medical Assistance in Dying through the eyes of individuals living with cervical spinal cord injuries in Nova Scotia. Canadian Neurological Sciences Federation Annual Congress. Banff AB. June 8, 2023.

Dr. Clarke. Surgery for Epilepsy: What You Should Know. Ottawa Review Course, Ottawa ON, February 2023.

Dr. Lownie. Outpatient stenting for carotid artery stenosis, Halifax NS, September 2023.

Dr. Pickett. Endovascular Treatment Options for Ruptured Intracranial Aneurysms. Ottawa Review Course, Ottawa ON, February 2023.

Dr. Pickett. Pathophysiology, Diagnosis and Management of Vasospasm. Ottawa Review Course, Ottawa ON, February 2023.

Dr. Weeks. Identification of Plasma Derived Extracelluar Vesicle Small RNA Biomarkers in HGG. Department of Medical Neuroscience, Halifax NS, February 2023.

Dr. Weeks. Plasma EV small RNA as biomarkers of HGG. Beatrice Hunter ILS, Halifax NS, January 2023.

Dr. Weise. Exploring the Latest Parkinson's Research. Parkinson's IQ & You. Dartmouth NS, October 2023.

Dr. Weise. Brain Radar and Digital Twins: Advances in Neuromodulation. 75th Anniversary of Neurosurgery in Halifax. Halifax NS, September 2023.

Dr. Weise. Experience and Challenges with DRG Stimulation. Annual Meeting of the Canadian Neuromodulation Society and the Neuromodulation Society of the UK and Ireland. Niagara ON, September 2023.

Dr. Weise. Awake Versus Asleep Subthalamic Nucleus Deep Brain Stimulation in Parkinson's Disease: Comparison of Normalized Target Accuracy. 74th Annual Meeting of the German Society for Neurosurgery. Stuttgart, Germany, June 2023.

Dr. Weise. Correlation of Tractography and Motor Evoked Potentials in Deep Brain Stimulation. QEII Foundation. Halifax NS, May 2023.Anesthesiologists' Society Annual Meeting, June 2022.

Awards and Recognition

W.J Howes Neurosurgery Teaching Award:
Dr. Gwynedd Pickett

This award acknowledges excellence in neurosurgery teaching by a resident, fellow or attending neurosurgeon. Dr. W.J. Howes is a neurosurgeon who had a distinguished career in Halifax from 1973-2008.

WD Stevenson Research Award:
Dr. Mark MacLean

The WD Stevenson Research award is presented annually to a Neurosurgery Resident for outstanding contributions in basic and clinical research in Neurosurgery.
Study: NMDA-Receptor Antagonism for the Prevention of Neurological Dysfunction in Traumatic Brain Injury: Results of a Randomized Pre-Clinical Trial

Clinical Neuroscience Resident Research Day Awards - Top Overall Presentation:
Dr. Mark MacLean

Study: NMDA-Receptor Antagonism for the Prevention of Neurological Dysfunction in Traumatic Brain Injury: Results of a Randomized Pre-Clinical Trial

Clinical Neuroscience Resident Research Day Awards - Top Neurosurgery Resident Presentation:
Dr. Jae Han

Study: Identification of plasma derived extracellular vesicle small RNA biomarkers for the non-invasive diagnosis and monitoring of high-grade gliomas

75th Anniversary of Neurosurgery in Halifax (1948-2023):

September 28-30. Celebration included a 2-day Symposium featuring local faculty and residents, national/international faculty, and graduates of our Residency Program.

ACADEMIC ACCOLADES:

Dr. Pickett - first female to be promoted to Professor in the history of the Department of Surgery

SIGNIFICANT PUBLICATION:

Dr. Alon Friedman (PI) Dr. Mark Maclean, Jamil Mura, Ryan Greene, Dr. Gerben van Hameren, Jens Dreier, Dr. David Okonkwo, and Dr. David B. Clarke as co-investigators. Memantine for the Treatment of Complicated Mild Traumatic Brain Injury: Proposal for a Randomized Trial – accepted in Science Advances.

TEACHING NOTABLES:

Dr. Weeks and Dr. Lownie: perfect score of 5/5 for their teaching from Dalhousie's Undergraduate Medical Education office in Halifax and Dalhousie Medicine for the 2022/2023 academic year, placing them in the top 10% of Skilled Clinician 2 tutors.

NATIONAL/INTERNATIONAL OUTREACH:

- Dr. McNeely - visiting pediatric neurosurgeon/associate professor (Jaber al Ahmad Hospital, Kuwait) Sept 17-21, 2023.
- Dr. Weise – became secretary of the Canadian Neuromodulation Society (September, 2023)

NEW PROGRAM:

- **Dr. Christie** - Spearheaded the launch of the Nova Scotia Health Spine Assessment Clinic, a new provincially funded program to facilitate early spine patient assessment, therapy and surgical referral.
- **Dr. Christie** - Moderated and co-organized the inaugural Dr. Tarunendu Ghose lecture on Global Health
- **Dr. Pickett** - Dalhousie neurosurgery residency, the first in the country to attain gender parity

Guest Speakers

Dr. Joseph Saade

Topic: "Updates in Parkinson's Disease: prediction, classifications and treatments"
June 21, 2023

Dr. Joseph Saade graduated with his MD from the University of Balamand, Lebanon. He began a neurology residency at Saint Georges Hospital University Medical Centre, Beirut, Lebanon and completed his residency at Soissons Medical Centre in France. He worked in France for six months while completing a Diploma in Movement Disorders and Parkinson's Disease. He came to Canada in 2021 for a two-year Movement Disorder Fellowship at the Ottawa Hospital. He has been involved in several research project including iCare PD, a project aimed at optimizing PD care delivery by bridging the gap between patients and their healthcare providers, and PREDICT, a study aimed at developing a PD prediction tool. His goals are to destigmatize movement disorders, empower patients' self-care, and provide the best care possible wherever he ends up working.

Dr. Alex Medina Escobar

Topic: "Beyond Torsion: non-motor features of idiopathic dystonia"
September 6, 2023

Dr. Alex Escobar obtained his MD and completed his neurology residency training at the Autonomous University of Honduras. He completed an Adult Clinical and Research Movement Disorders Fellowship at the Neurological Institute of Buenos Aires, Argentina, through a training grant from the Movement Disorders Society. He did an Adult and Pediatric Movement Disorders Fellowship at the University of Calgary (Foothills Medical Center and Alberta Children's Hospital) followed by a Postdoctoral Research Fellowship at the Mathison Center for Brain Research from the University of Calgary focusing on epidemiological aspects of movement disorders. He completed the academic peer review training program of the Movement Disorders Society. His lines of research include non-motor aspects of adult-onset idiopathic dystonia, genetic mutations in Parkinson's Disease in Latin America (LARGE-PD consortium), epidemiological aspects of Huntington's Disease and pharmacotherapies for Tourette Syndrome.

Dr. Shelagh B. Coutts

Topic: "Management of suspected TIA and minor stroke patients"
November 1, 2023

Dr. Coutts obtained her Undergraduate Medical Degree from the University of Edinburgh in 1997. In 2001 she moved to Calgary to complete a Fellowship in Stroke Neurology with Dr. Alastair Buchan and completed her Neurology Residency Training, receiving her FRCPC (Neurology) in 2006. During her stroke neurology training, she completed a postgraduate research degree on "Modern imaging: its role in prediction of outcome after stroke and TIA" and she received her MD (PhD equivalent) for this from the University of Edinburgh in 2005. Her research interests include the use of acute imaging in triage and treatment of stroke and TIA patients in the Emergency Department. Her research interests include better diagnosis, triage and treatment of TIA and minor stroke patients. She designs therapeutic trials in high-risk TIA and minor stroke using imaging to identify patients. She is the PI of the TEMPO-2 study which is a multi centre, international randomized controlled trial assessing the use of TNK in minor stroke with intracranial occlusion. This study is running in Canada, Europe, Asia, and Australia/New Zealand. Dr. Coutts has received a number of awards for her work, including the "Siekert New Investigator Award" from the American Stroke Association and the "Michael J. Pessin award" in stroke leadership from the American Academy of Neurology

Cross-Appointed Faculty

Department of Anaesthesia
- Dr. Ian Beauprie, MD, FRCPC
- Dr. Orlando Hung, MD, FRCPC
- Dr. Carlo Mariotti, MD, FRCPC
- Dr. Karim Mukhida, MD, FRCPC
- Dr. Angela Builes, MD, FRCPC
- Dr. Ibukunoluwa Adedugbe, MBBS
- Dr. Arnim Vlatten, MD FRCPC
- Dr. Catherine Delbridge, MD, FRCPC
- Dr. Ntsiki Manitshana, MD, FRCPC

Department of Diagnostic Radiology (Neuroradiology)
- Dr. Robert Vandorpe, MD, FRCPC
- Dr. Matthias Schmidt, MD, FRCPC

Department of Medicine (Endocrinology & Metabolism)
- Dr. Ali Imran, MBBS, MRCP, FRCPC

Department of Medicine (Physical Medicine & Rehabilitation)
- Dr. Christine Short, MD, FRCPC
- Dr. Sonya McVeigh, MD, FRCPC

Department of Pathology
- Dr. Alex Easton, MD FRCPC
- Dr. Sidney E. Croul, MD, FRCPC

Department of Radiation Oncology
- Dr. Liam Mulroy, MD, FRCPC
- Dr. Dorianne Rheaume, MD, FRCPC

Department of Surgery (Orthopedics)
- Dr. Bill Oxner, MD, FRCSC
- Ron El-Hawary, MD, FRCSC
- Andrew Glennie, MD, MSc, FRCSC

Department of Surgery (Otolaryngology)
- Dr. Emad Massoud, MD, FRCSC
- Dr. David Morris, MD, FRCS (ORL-HNS)
- Dr. Jonathon Trites, MD, FRCSC

Department of Medical Neuroscience
- Dr. Alon Friedman, MD,PhD

Affiliated Faculty

Department of Neurosurgery, The Moncton Hospital South East Regional Health Authority, Moncton, NB

- Dr. Robert Adams
- Dr. Dhany Charest
- Dr. Charbel Fawaz
- Dr. Antonios El Helou

Department of Neurosurgery, Saint John Regional Hospital South East Regional Health Authority, Saint John, NB

- Dr. Najmeeden Attabib
- Dr. George Kolyvas
- Dr. Andre le Roux
- Dr. Aaron Robichaud

Department of Neurosurgery, Health Sciences Center Eastern Health, St. John's, NL

- Dr. Andre Engelbrecht
- Dr. Greg Jenkins
- Dr. Roger Avery
- Dr. John Adams

HALIFAX NEUROSURGERY 2023 ANNUAL REPORT

DIVISION OF NEUROSURGERY

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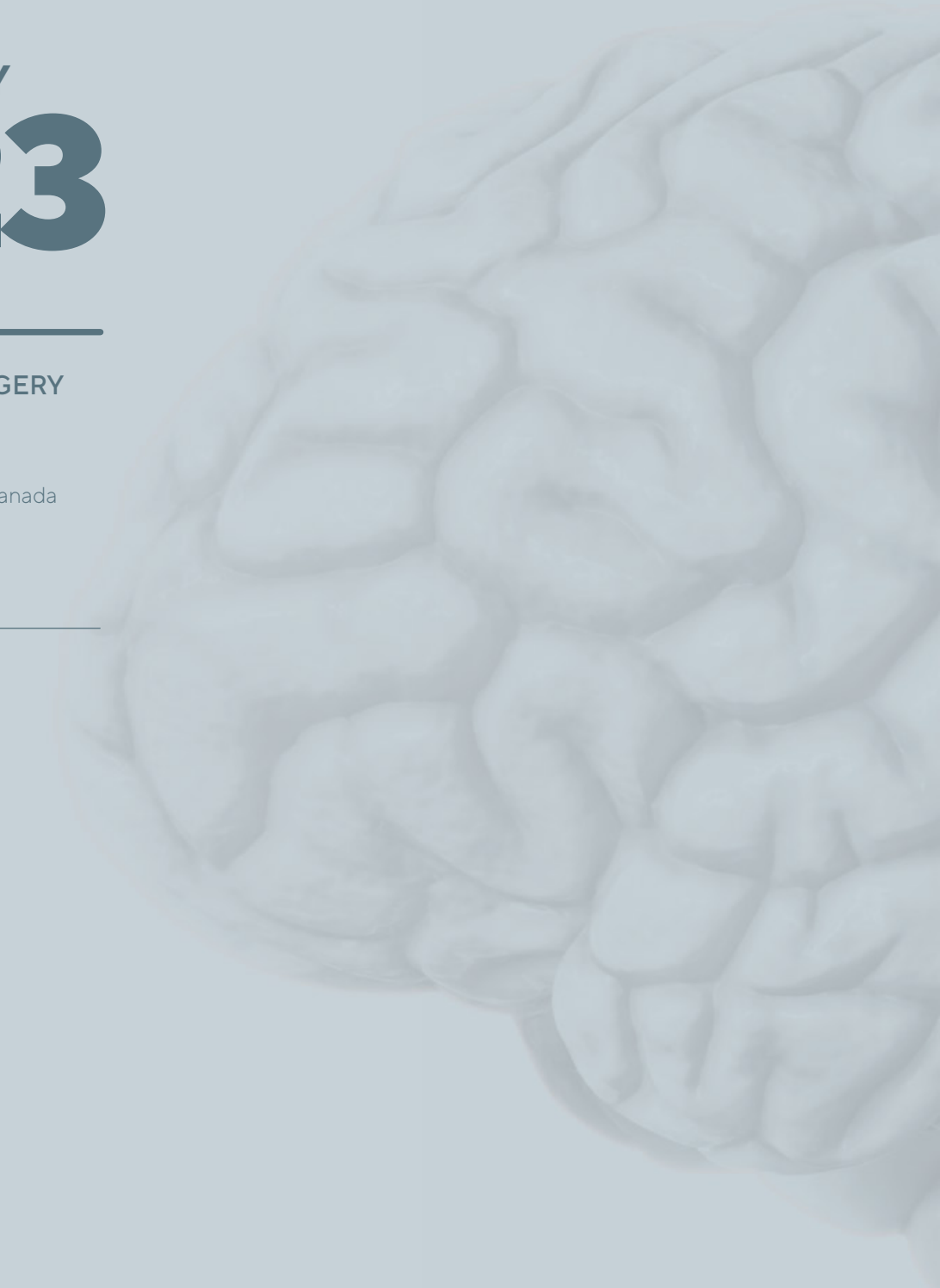

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