

2020-21 IMPACT REPORT

Professorship in Perioperative Sciences

Prepared for: The Sunnybrook Anesthesia Academic Partnership



TEMERTY FACULTY OF MEDICINE
UNIVERSITY OF TORONTO

COVER ART

Sharing Bioethics by **Lisa Boivin**, a member of the Deninu Kue First Nation, interdisciplinary artist and PhD student at the Rehabilitation Sciences Institute at University of Toronto's Temerty Faculty of Medicine.

ARTIST'S STATEMENT

Sharing Bioethics came about when my Mother asked me, 'Lisa, what do you do? How do I explain it?' My Mother knows what bioethics is and she understands aspects of my Dene culture, but she wasn't sure how I marry the two academically. I told her I would paint her an image-based story so she could understand. The painting is overflowing with bioethical, medical, familial and Dene stories. My Mother is connected to all of them. In the painting I am sharing bioethics with a clinician; in real life I am sharing bioethics with my Mother. *Sharing Bioethics* is an honour song that I painted for my Mother.

FROM THE TEMERTY FACULTY OF MEDICINE

Ethics guide us when the right path is not necessarily clear. The art selected for the cover inspires reflection about the many considerations and tensions that health care professionals must weigh when faced with hard choices. It is an apt image at this time of global pandemic, when difficult decisions are made on a daily basis. The artwork's origins following a conversation between Lisa and her mother also speak to another guiding force in our lives: our families, friendships and communities. In a time of crisis, our relationships and connections to one another are more valuable than ever. We are grateful to Lisa for sharing her work and story with us, and are delighted to share it with our community of Temerty Faculty of Medicine supporters.



PROFESSORSHIP IN PERIOPERATIVE SCIENCES AT THE TEMERTY FACULTY OF MEDICINE



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EXECUTIVE SUMMARY

There has been an interesting duality to the past two years. There was an auspicious start to 2019 coinciding with the beginning of this Professorship. This included welcoming my first graduate student to the Perioperative Brain Health Centre and receiving the prestigious Dana Foundation Clinical Neuroscience Research Grant. On the other hand, 2020 presented several challenges as all ongoing clinical research activity was temporarily halted for a period of six months due to the COVID-19 pandemic. Despite restarting our program, changes to clinical practice and workflow have reduced our capacity to conduct clinical research by approximately 75%. Despite these challenges, we have continued to be productive. In the last two years, I have submitted four publications as principal/senior author and co-authored another twelve. There are another three manuscripts under review of which I am senior author. I anticipate these challenges to abate and expect that, with modifications, we will be able to return to near normality within the next six months.

As Director of Clinical Research in the Department of Anesthesia at Sunnybrook Health Sciences Centre, I have also overseen the initiation of multiple collaborative projects both within our department and with others (surgery, psychiatry, radiation oncology, and geriatrics). These are national and international efforts that will increase the profile of the Department of Anesthesia at SHSC and U of T.

My lab currently consists of five full-time research staff including one manager, one deputy manager, and three research coordinators. The Sunnybrook Health Sciences Centre is also in the process of recruiting new clinician-scientists to the Department of Anesthesia.

Thank you to the Sunnybrook Anesthesia Academic Partnership for your generous contribution to establish the Professorship in Perioperative Sciences. It has been an honour to be the inaugural incumbent.



RESEARCH ACTIVITY

1. **COGNIGRAM** – This is a large (600 person) prospective, observational cohort study funded by the Academic Health Sciences Centre AFP Innovation Fund that is aiming to establish cognitive trajectories after major joint arthroplasty, among the most common major surgeries performed. It has nearly completed recruitment with the 4.5-month follow-up of participants ongoing. Hip and knee replacements are common major surgical procedures performed on elderly individuals (~1 million yearly) and expected to increase. Risk stratification is paramount, and this study will assist in decision making.
2. **CODEX** – Cognitive Outcomes after Dexmedetomidine Sedation in Cardiac Surgery Patients. This is a large (2400 participant) randomized trial that I am coordinating. It has received significant funding from the Dana Foundation and is recruiting at four centres with national expansion in the future. The aim is to determine if cognitive decline associated with cardiac surgery can be reduced.
3. We are also planning to create an online platform for pre-operative screening of patients who are at a high risk for perioperative cognitive changes. This would be a pilot program in the Anesthesia Preoperative Clinic and would work in conjunction with the Seniors' Friendly Program at Sunnybrook Health Sciences Centre to create postoperative preventative measures.

COLLABORATIVE RESEARCH ACTIVITY

Multiple collaborative projects have been initiated with CIHR funded research programs including: PLAN (PI: J. Khan, Department of Anesthesiology and Pain Medicine, University of Toronto), FIT after surgery (PI: D. Wijesundera, Department of Anesthesiology and Pain Medicine, University of Toronto), PREPARE (PI: D. McIsaac, Department of Anesthesiology, University of Ottawa), SELF- BAT (PI: M. Scholzberg, Division of Hematology, University of Toronto), VISION-Cardiac (PI: PJ Devereaux, PHRI, McMaster University).

TEACHING

The first graduate student, admitted through the Institute of Medical Science at U of T, was welcomed to the Perioperative Brain Centre. Amara Singh, MSc (candidate), is expected to graduate in June 2021. She is currently developing a project off of the main CODEX study. Additionally, two medical students in my lab are also identifying novel findings from preliminary data as part of this study. One of which will be applying to the Clinician Investigator Program Anesthesiology Residency at the University of Toronto.

I believe there has been a tremendous positive impact not only on learning, but on career progression of the trainees after being involved in our program.



LOOKING AHEAD

The major goal in the coming future is to successfully compete for national level funding for my research program (either CIHR or NIH). This will provide long-term, sustainable funding to comprehensively investigate postoperative neurocognitive disorders.

Perioperative medicine has made great strides in stratifying patients with regards to cardiac risk and mortality. We have become adept at minimizing perioperative morbidity from a physical perspective. Sadly, our understating of basic anesthetic mechanisms that provide unconsciousness and allow patients to tolerate invasive procedures is nowhere near elucidated as well. That there may be persisting cognitive effects on the brain after surgery is a hidden pandemic.

I hope that in the years ahead, my research will make a great impact on preserving what makes us who we are, our brains. From establishing screening, to investigating therapeutic interventions of which there are none to date, the future has yet to be charted. Thank you again for your support.

FUNDING AND GRANTS

PRINCIPAL INVESTIGATOR

1. **University of Toronto Mentorship Merit Award 2021-2023: \$20,000 CAD**
This award is intended to support graduate trainees under the supervision of faculty.
2. **Dana Foundation Clinical Neuroscience Research Grant 2019-2021. \$300,000 USD**
In support of "CODEX - Dexmedetomidine Sedation to Reduce the Incidence of Cognitive Dysfunction After Open Cardiac Surgery: A Randomized Controlled Trial."

CO-INVESTIGATOR

1. **2020/09 – 2024/09. CIHR Project Grant. \$1,285,000. PI: Khan, JS.**
Prevention of persistent pain with Lidocaine Infusions in breast cancer surgery (PLAN) a multicentre randomized controlled trial.
2. **2020/07 – 2023/06. Physicians' Services Incorporated Foundation, Health Services Research Grant. \$250,000. Co-PIs: Alam F, Giacobbe P.**
Virtual reality as a tool to reduce pre-procedure anxiety prior to ECT via enhancing patient education (PERFECT-VR).
3. **2020/04 – 2022/03. Canada's Academic Health Sciences Centres (AHSC) AFP Innovation Award. \$91,500. Co-PIs: Rogers A, Alam F.**
BURN 360: Reducing pain and anxiety during dressing changes after burn surgery using Virtual Reality.
4. **2020/01 – 2021/12. CIHR Project Grant. \$534,389. Co-PIs: Whitlock R, Cote E.**
Vision Cardiac Surgery – ECG Evaluation Sub-study.



PUBLICATIONS AND INVITED PRESENTATIONS

FIRST OR SENIOR AUTHOR

1. Brenna CTA, Orser BA, Avramescu S, Fleet A, Kaustov L, Choi S. Cognitive decline among older adults: A hidden preexisting condition and its role in 'brain-at-risk' surgical patients. *Brain Behav.* 2021 Mar 4:e02095. doi: 10.1002/brb3.2095. Epub ahead of print. PMID: 33662186.
2. Safa B, Flynn B, McHardy PG, Kiss A, Haslam L, Henry PDG, Kaustov L, Choi S. Comparison of the Analgesia Duration of 0.5% bupivacaine with epinephrine v. 0.5% ropivacaine v. 1% ropivacaine for low volume ultrasound-guided interscalene brachial plexus block: A randomized controlled trial. *Anes Analg.* 2021 Jan 15. Online ahead of print. doi: 10.1213/ANE.0000000000005373. PMID 33464760.
3. McHardy PG, Singer O, Awad IT, Safa B, Henry PD, Kiss A, Au SK, Kaustov L, Choi S. Comparison of the effects of perineural versus systemic dexamethasone on low volume Interscalene Brachial Plexus Block: A randomized equivalence trial. *Br J Anaes.* 2020; 124(1):84-91. SRA
4. Choi S, Avramescu S, Orser BA, Au S. Protocol for a Prospective Cohort Study Assessing Post-operative Cognitive Changes After Total Hip or Knee Arthroplasty. *BMJ Open.* 2019 Feb 24;9(2):e024259 PA.

CO-AUTHOR

1. Dimick MK, Omrin D, MacIntish BJ, Mitchell RHB, Riegert D, Levitt A, Schaffer A, Belo S, Iazzetta J, Detzler G, Choi M, Choi S, Orser BA, Goldstein BI. Nitrous oxide as a putative dual-mechanism treatment for bipolar depression: Proof-of-concept study design and methodology. *Contemp Clin Trials Commun.* 2020; 19:100600.
2. Wijesundera, Beattie WS, Hillis GS, Abbott TEF, Shulman MA, Ackland GL et al. Integration of the Duke Activity Status Index into preoperative risk evaluation: a multicenter prospective cohort study. *Br J Anaes.* 2020; 124(3):261-70.
3. HIP ATTACK Investigators. Accelerated surgery versus standard care in hip fracture (HIP ATTACK): an international randomized controlled trial. *Lancet.* 2020; 395 (10225): 698-708.
4. Taam J, Yang QJ, Pang KS, Karanickolas P, Choi S, Wasowicz M, Jerath A. Current Evidence and Future Directions of Tranexamic Use, Efficacy, and Dosing for Major Surgical Procedures. *J Cardiothorac Vasc Anesth.* 2020; 34(3):782-90.
5. Locke G, Mendez LC, Taggar A, Barnes E, Choi S, D'Alimonte L, Leung EW. Opioid Consumption and Pain in Gynecological Cancer Patients the Underwent Spinal Anesthesia for Interstitial Brachytherapy. *Int J Rad Oncol Bio Phys.* 2019; 105(1) Supplement: E328.
6. Desmarais P, Hermann N, Alam F, Choi S, Avramescu S. Future directions in Geriatric Anesthesiology. *Anesth Clin.* 2019 Sep; 37(3): 581-92.
7. Bartoszko J, Thorpe KE, Laupacis A, et al. METS Investigators. Association of preoperative anaemia with cardiopulmonary exercise capacity and postoperative outcomes in noncardiac surgery: a substudy of the Measurement of Exercise Tolerance before Surgery (METS) Study. *Br J Anaesth.* 2019 Aug; 123(2):161-169.
8. Khan JS, Hodgson N, Choi S, Reid S, Paul JE, Hong NJL, Holloway C, Busse JW, Gilron I, Buckley DN, McGillion M, Clarke H, Katz J, Mackey S, Avram R, Pohl K, Rao-Melanchi P, Devereaux PJ.



- Perioperative pregabalin and Intraoperative Lidocaine Infusion to Reduce Persistent Neuropathic Pain After Breast Cancer Surgery: A Multicenter, Factorial, Randomized Controlled Pilot Trial. *J Pain*. 2019 Aug; 20(8): 980-93.
9. Khan JS, Jibb LA, Busse JW, Gilron I, Choi S, Paul JE, McGillion M, Mackey S, Buckley DN, Lee SF, Devereaux PJ. Electronic versus traditional data collection: a multicenter randomized controlled perioperative pain trial. *Can J Pain*. 2019 Jul; 3(2): 16-25.
 10. Ravi B, Pincus D, Choi S, Jenkinson R, Wasserstein DN, Redelmeier DA. Association of Duration of Surgery with Postoperative Delirium Among Patients Receiving Hip Fracture Repair. *JAMA Netw Open*. 2019; 2(2): e190111.
 11. Shulman MA, Cuthbertson BH, Wijesundera DN et al. METS Investigators. Using the 6-minute walk test to predict disability-free survival after major surgery. *Brit J Anaesth*. 2019; 122(1): 111-119.
 12. ISOS Investigators Study Group. Prospective observational cohort study on grading the severity of postoperative complications in global surgery research. *Br J Surg*. 2019 Jan; 106(2):e73-e80. Doi: 10.1002/bjs. 11025.

INVITED PRESENTATIONS

1. 2020 - Penn State College of Medicine Eighth Annual Ultrasound-Guided Cadaver Course for Regional Anesthesia and Point-of-Care Ultrasound. Hershey, Pennsylvania, USA (Cancelled – COVID-19)
2. 2019 - Regional Anesthesia and Pain Medicine Conference, University of Toronto. Toronto, Canada
3. 2019 - Penn State College of Medicine Eighth Annual Ultrasound-Guided Cadaver Course for Regional Anesthesia and Point-of-Care Ultrasound. Hershey, Pennsylvania, USA

