BC EMERGENCY MEDICINE NETWORK

IMPACT REPORT 2017-2022

Submitted by: Elizabeth Stacy, Jason Lau, Chantel Archibald, Jim Christenson

June 6, 2022

The BC Emergency Medicine Network (BCEMN) launched in September 2017 with the vision of "Exceptional Emergency Care: Everywhere" and a mission of "Supporting, sharing, and innovating to improve patient care."

Over the past five years, the BCEMN engaged in core programs and innovative initiatives to:

+ Create a vibrant and robust network for emergency practitioners, policymakers, provincial and local emergency care leaders, researchers, quality care experts, educators, and patients.
+ Use expertise from across the province to effectively develop and share point-of-care clinical resources to support best practice and system solutions.
+ Evaluate BCEMN and its initiatives continuously to improve its impact and functionality.
+ Promote development of more robust provincial emergency data.
+ Support and evaluate real-time virtual support in rural and remote settings.
+ Support innovation programs to improve patients care, prevent emergencies and improve systems of care.
+ Enhance simulation programs for continuous experience-based learning.

While no single physician in BC can know everything about emergency medicine, as a community we do. Imagine one emergency department with 108 rooms — BCEMN brings us all together to share knowledge and support each other. As the only platform for emergency practitioners from across BC to connect and communicate, BCEMN continues its steady growth in membership, creation of quality resources, and engagement of the emergency care community.

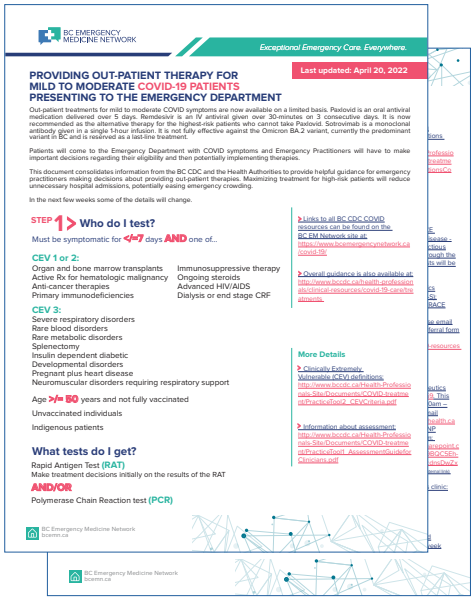
This Impact Report highlights some of BCEMN's key impacts to the BC health system, support for practitioners to deliver quality care, and continued engagement of patient partners.

From left: Dr. Jim Christenson, Advisory Committee Retreat 2019, BCEMN team at BCPSQC 2020 event, BCEMN team discovery site visit 2017

BC Emergency Medicine Network Highlights

BCEMN'S HEALTH SYSTEM IMPACTS

+ Created a province-wide, emergency-based Learning Health System (LHS) driven by patient and healthcare provider needs to ensure more efficient and effective knowledge mobilization.
+ Partnered with the Rural Coordination Center of BC (RCCbc) to implement, build, and evaluate an effective Real-time Virtual Support system (RTVS) for practitioners in rural and remote settings.
+ Developed and evaluated a system of physician support for the 8-1-1 Nurse information line as a pre-triage system that safely averted thousands of emergency visits.
+ Consolidated Patient Discharge Summaries (PDS) and engaged patients in editing, approving and distributing best discharge practices to all emergency departments in BC.
+ Rapidly responded to the COVID-19 pandemic in a leadership role by addressing the evolving needs of healthcare providers and patients across the various stages of the pandemic, from developing and disseminating best practices on protecting healthcare workers, to guidelines for clarifying out-patient anti-viral therapies.
+ Supported Innovation Leaders to build effective, externally-funded programs in:
    - Development of adverse drug event diagnosis and prevention
    - Improved medical care on-site at mass gatherings
    - National COVID-19 data collection and evaluation
    - Impacts of drugs and speed limit policies on road trauma
    - Better pain control practices for emergency departments and paramedics
    - Better resuscitation practices
    - Innovations in digital emergency care
    - Efficient evaluation of patients with chest pain
    - Early management of sepsis, and
    - Better management of opioid addictions and overdose.
+ Strengthened emergency care in remote Nuu-chah-nulth communities on the west coast of Vancouver Island, which will ultimately provide a framework for improving emergency care in other remote communities.
+ Effectively facilitated cross-Health Authority crisis physician staffing (e.g., locums) in sites otherwise at risk of closure.


BC EMERGENCY MEDICINE NETWORK

Exceptional Emergency Care. Everywhere.

Last updated: April 20, 2022

PROVIDING OUT-PATIENT THERAPY FOR MILD TO MODERATE COVID-19 PATIENTS PRESENTING TO THE EMERGENCY DEPARTMENT

Out-patient treatments for mild to moderate COVID symptoms are now available on a limited basis. Paxlovid is an oral antiviral medication delivered over 5 days. Remdesivir is an IV antiviral given over 30-minutes on 3 consecutive days. It is now recommended as the alternative therapy for the highest-risk patients who cannot take Paxlovid. Sotrovimab is a monoclonal antibody given in a single 1-hour infusion. It is not fully effective against the Omicron BA.2 variant, currently the predominant variant in BC and is reserved as a last-line treatment.

Patients will come to the Emergency Department with COVID symptoms and Emergency Practitioners will have to make important decisions regarding their eligibility and then potentially implementing therapies.

This document consolidates information from the BC CDC and the Health Authorities to provide helpful guidance for emergency practitioners making decisions about providing out-patient therapies. Maximizing treatment for high-risk patients will reduce unnecessary hospital admissions, potentially easing emergency crowding.

In the next few weeks some of the details will change.

STEP 1 > Who do I test?

Must be symptomatic for <=7 days AND one of...

CEV 1 or 2:

Organ and bone marrow transplants
Active Rx for hematologic malignancy
Anti-cancer therapies
Primary immunodeficiencies
Immunosuppressive therapy
Ongoing steroids
Advanced HIV/AIDS
Dialysis or end stage CRF

CEV 3:

Severe respiratory disorders
Rare blood disorders
Rare metabolic disorders
Splenectomy
Insulin dependent diabetic
Developmental disorders
Pregnant plus heart disease
Neuromuscular disorders requiring respiratory support

Age >= 50 years and not fully vaccinated

Unvaccinated individuals

Indigenous patients

What tests do I get?

Rapid Antigen Test (RAT)
Make treatment decisions initially on the results of the RAT

AND/OR

Polymerase Chain Reaction test (PCR)

> Links to all BC CDC COVID resources can be found on the BC EM Network site at: https://www.bcemergencynetwork.ca/covid-19/

> Overall guidance is also available at: http://www.bccdc.ca/health-professionals/clinical-resources/covid-19-care/treatments

More Details

> Clinically Extremely Vulnerable (CEV) definitions: http://www.bccdc.ca/Health-Professionals-Site/Documents/COVID-treatment/PracticeTool2_CEVCriteria.pdf

> Information about assessment: http://www.bccdc.ca/Health-Professionals-Site/Documents/COVID-treatment/PracticeTool1_AssessmentGuideforClinicians.pdf

BC Emergency Medicine Network
bcemn.ca

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BCEMN Out-Patient Therapy Guide for Mild-to-Moderate COVID-19 Patients

CONTRIBUTIONS TO THE SCIENCE OF IMPLEMENTING A NETWORK

+ Engaged BCEMN members in two evaluation cycles (2018 and 2021) to understand Network progress, growth and development, what worked and what did not, and outcomes of course corrections made as a result of member feedback.
+ Succeeded in building an exemplar of clinical network development, based on evaluation findings and known network gold standards. Key success criteria are being met from theoretical and practice perspectives: specifically, there is strong executive and operational leadership in place, and trust is strong.

+ Identified consistent and high-level of overall trust throughout the three-year period (trust scores: 80%-81%).
+ Measured an increase in members' perception of BCEMN's value over the three-year period (61%-72%).
+ Gathered member-suggested actions to grow and improve BCEMN, including:
  - Improving website access
  - Developing a mobile app
  - Building more awareness of BCEMN
  - Hosting 'roadshows' in smaller communities (introductory sessions, highlighting BCEMN's activities)
  - Hosting conferences
  - Undertaking a province-wide needs assessment.
+ The BCEMN leadership published 5 peer-reviewed articles on its progress, development and evaluation (See Appendix for list of publications).

PATIENT ENGAGEMENT IN THE BCEMN

+ Integrated deep patient engagement throughout all management teams and governance structures within BCEMN, including Advisory and Management Committees.
+ Formed a patient-led and -driven Patient Council, which provides strategic guidance and advocacy to the Management and Advisory Committees, and undertakes Council-led initiatives relevant to the patient experience.
+ Developed a 'Patient Stamp of Approval' to signify documents that have been reviewed, edited and approved by patients.
+ Hosted patient-led workshops to review, improve, and mark nearly 75 PDS with the 'Patient Stamp of Approval', which are accessible through the BCEMN website via download, email or text message.
+ Patient-led development and dissemination of patient discharge information posters to all EDs in BC to increase transparency and improve discharge practices.

USER ENGAGEMENT & COMMUNICATION

User engagement & communication statistics as of April 29, 2022:

1,219
Members

Now welcoming emergency nurses!

83%
Members are active in 90/108 ED sites in BC

MEMBER ENGAGEMENT

12,500+
Website Page Views Per Month

56%
Canadian Users

67%
% Canadian Users from BC

SOCIAL MEDIA

TWITTER **1,587 followers**

FACEBOOK **285 follows**

YOUTUBE **3,423 subscribers**

Pillar Program Highlights

The primary purpose of the BC Emergency Medicine Network is to support emergency practitioners, by connecting them with each other and with current, practical resources via four core programs. BCEMN connects academics, policy makers, administrators, managers, and patients with front-line clinicians, bringing them together to ask questions and discuss current issues, and share and improve care.

Clinical Resources

CPD & Simulation

Indigenous Community Engagement – Kwiis hen niip (Change)

Real-Time Virtual Support

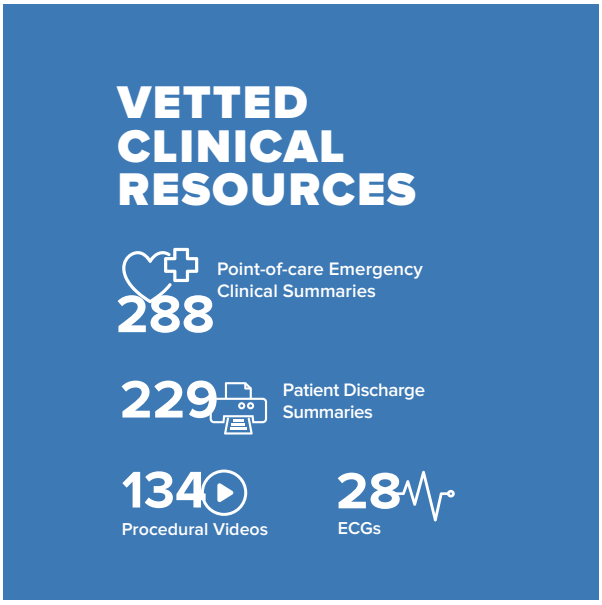
Scientific Innovation

CLINICAL RESOURCES

Lead: Julian Marsden & Chantel Archibald
Vision: Supporting emergency medicine practitioners and improving health outcomes across BC through member-driven current knowledge.

KEY HEALTH SYSTEM IMPACTS

+ Established a strong foundation of clinical resources, relevant to the BC environment and accessible during an emergency shift, expressed as a need by BC emergency practitioners.
+ Curated and shared COVID-19 clinical resources at start of the pandemic and maintained ongoing surveillance and updates.
+ Engaged Emergency Nurses in BC.
+ Engaged patient partners in Patient Discharge Summaries workshops and Clinical Resources Committee.
+ Collaborated with partners across the province such as Foundry BC, to better address patient and practitioner needs.
+ Partnered with with the BC Patient Safety and Quality Council (BCPSQC) to promote the release of updated Sepsis treatment guidelines.
+ Developed guidelines and resources to respond to MoH Technology Assessment to ensure that CT Scans for possible pulmonary embolus were evidence-based.



KEY OTHER ACHIEVEMENTS

+ Evaluated one 'Best Practice' to understand the impact of change in practice through database linkages on the topic of Low Risk Chest Pain.
+ Actively engaged 32 medical students over the past three years to continuously develop and review clinical resources. Students participated through the UBC Flexible and Enhanced Learning Program (FLEX), and were supervised by 24 emergency physician preceptors from across BC in collaboration with the BCEMN team.

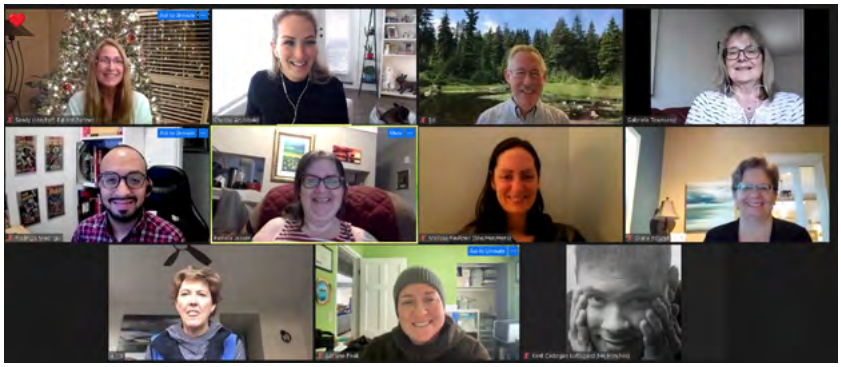
> *"I also wanted to take the opportunity to thank you both for having me on board as a FLEX student with the BC EM Network this year. This was a fantastic learning experience for me in many ways and I feel that I am coming away with much more insight and knowledge of not only the specific topics of my PECS, but also the scope of emergency and rural medicine. I appreciated the on-going mentorship and support that both of you offered along the way and felt lucky to be a part of this type of meaningful project. The process of creating these summaries felt very relevant to my medical training and I'm looking forward to referring to the BC EM Network website for resources as I head into clerkship in just under 2 weeks."*
>
> – FLEX student participant

PATIENT ENGAGEMENT ACTIVITIES & THEIR VALUE

+ Held patient workshops to review Patient Discharge Summaries (PDS), which are then marked as 'Patient Approved' using a unique, patient-developed graphic to indicate this additional layer of review and approval.
+ Supported and facilitated the development of a Patient Council, co-chaired by a Patient and BCEMN team member, to more comprehensively contribute to BCEMN.
+ Collaborated with the Patient Council to distribute posters to ED's across BC to promote use of Patient Discharge Summaries and additional discharge best practices.

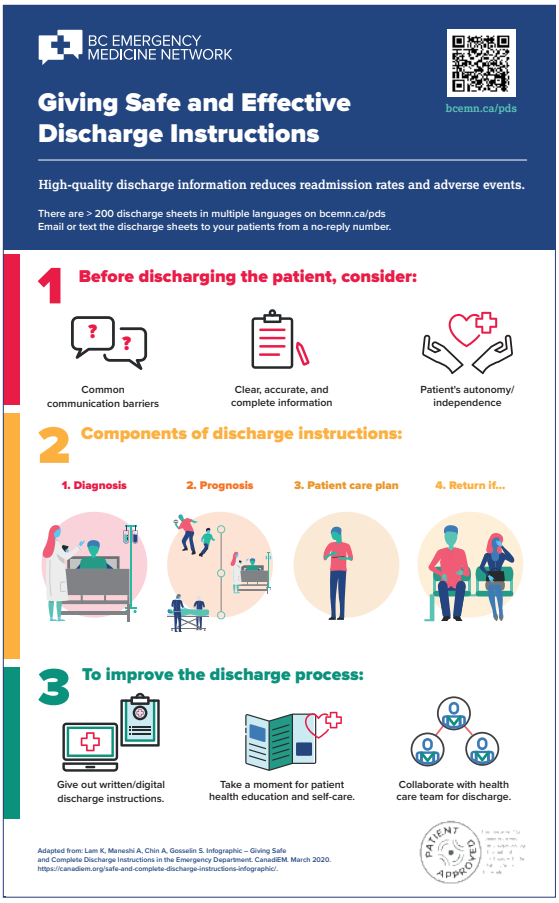
PATIENT APPROVED

This material has been reviewed and approved by the patient partners with the Patient Voices Network.



Virtual Patient Workshop, December 2021

> *"The Network can and will help everyone. Be it the physician find information they need at a key moment, or a patient who doesn't have to take a long drive someplace else since information was available and their needs could be taken care of in their home community."*
>
> – BCEMN Patient Partner



Patient Discharge Summary Poster

CPD and Simulation

Leads: Jeanne Macleod, Wesley Jang, Afshin Khazei
Vision: SIM cases provide shared materials for emergency care providers to review and practice essential skills.

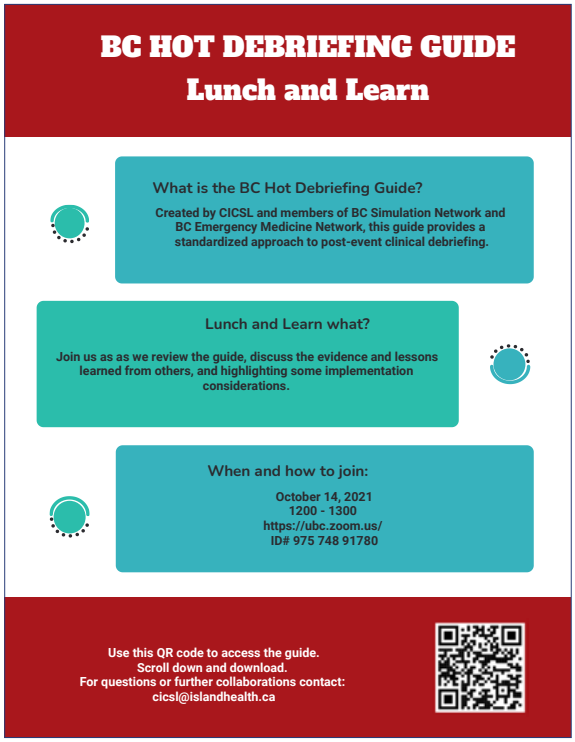
KEY HEALTH SYSTEM IMPACTS

+ Established a province-wide collaboration and expansion of Medical Simulation in BC to support deliberate practice of simple and complex skills. Better trained health practitioners provide better care to patients. Medical simulation allows the emergency medicine provider to adequately prepare for infrequent but complex and critical events.
+ Prepared practitioner groups across the province to create and maintain their own local simulation programs. The program supports tools to support large and small healthcare facilities to incorporate medical simulation into group education.
+ Established bank of simulation scenarios relevant to the specialty of emergency medicine. Peer-reviewed and periodically updated: 35 SIM cases for emergency medicine.

KEY OTHER ACHIEVEMENTS

+ Provided website links to external simulation resources and information on courses and how to run simulations.
+ Created course on how to debrief a simulation, in collaboration with UBC faculty development.
+ Performed outreach for rural providers: 3 rural-focused cases, 2 RTVS-focused cases (including Real-Time Virtual simulation pilot case).
+ Created 3 COVID-19 pandemic-specific resources: COVID-19-specific SIM case, Corona Wars EM SIM game, scenario and guide for hospital preparedness.
+ Collaborated with the BC Simulation Network in creation of a Hot Debrief Guide.

Debrief Workshop PowerPoint slides



BC Hot Debrief Guide

See Appendix for a list of program publications.

Indigenous Community Engagement – Kwiis hen niip (Change)

Lead: Dr. Jim Christenson, Jeffrey Reading, Jeannette Watts, Lynnette Lucas, Nicole Malcomson, Alex Kent, Megan Muller, Sharla Drebit, Rebecca Lee.
Vision: The Kwiis hen niip (Change) research study is a Nation-led partnership with Nuu-chah-nulth Tribal Council, First Nations Health Authority, Island Health, BCEMN, UBC Department of Emergency Medicine, and BC Emergency Health Services. The aim of this partnership is to co-design, implement and evaluate a community-driven change in emergency and primary care in four Nuu-chah-nulth Nations: Kyuquot/ Checleseht, Hesquiaht, Ahousaht and Tla-o-qui-aht. This study addresses persisting gaps and fragmentation of emergency medicine and first responder care in remote First Nations communities, who have been excluded from the urban-centralized design of health systems.

KEY HEALTH SYSTEM IMPACTS

+ Recruited and hired first responder coordinators in Kyuquot/ Checleseht, Hesquiaht, Ahousaht and Tla-o-qui-aht to track community call-outs, identify key training, equipment needs and be a community voice for Kwiis hen niip project priorities.
+ Facilitated a partnership with RTVS to make RUDi available to first responders in Kyuquot/Checleseht, Hesquiaht, Ahousaht and Tla-o-qui-aht, in direct response to a community-identified need for support for first responders in Nuu-chah-nulth Nations.
+ Contributed to incremental health system impacts by strengthening capacity within Nuu-chah-nulth Nations to continue advancing innovative change in first responder care in the community-identified priority areas of first responder support, patient transport, communications and community readiness.
+ Engaged four Nuu-chah-nulth communities in a discovery project to understand current state and needs.

Indigenous community engagement workshop - Tofino 2018

KEY OTHER ACHIEVEMENTS

+ Developed a first responders programming guide and a template for first responder case reporting for Nuu-chah-nulth first responders.
+ Delivered an iPad with RTVS/RUDi programming to Kyuquot/Checleseht Health Center and Hesquiaht.
+ Collaborated with First Nations Health Authority and North Island College to coordinate first responder training in Campbell River, Port Hardy and Tofino.
+ `Partnered with BCEHS and Telus to enhance first responder support, transport and telecommunications.
+ Integrated a vibrant group of indigenous medical students from across the country into Kwiis hen niip workgroups and activities.
+ Created a CPR training video with Indigenous actors, in an Indigenous environment and with leadership from Indigenous medical students.

See Appendix for a list of program publications.

PATIENT ENGAGEMENT ACTIVITIES & THEIR VALUE

+ Conducted a needs assessment that involved an in-depth consultation process with Nuu-chah-nulth community members, local first responders, community leaders, nurses, physicians, Elders, traditional healers and external agencies.
+ Travelled to Kyuquot/Checleseht, Hesquiaht, Ahousaht and Tla-o-qui-aht to meet with first responders and community partners to document local emergency care needs as well as existing capacity and processes for first responders.
+ Formalized a partnership and memorandum of understanding with Uut Uustukyuu (Nuu-chah-nulth Traditional Healers) to advise on traditional healing and culturally safe approaches to inform first responder programming, training and support services in Nuu-chah-nulth Nations.
+ Connected first responders from across Kyuquot/Checleseht, Hesquiaht, Ahousaht and Tla-o-qui-aht with RUDi doctors through monthly virtual dialogue sessions and asynchronous Facebook engagement.
+ Established a community of practice with other Nuu-chah-nulth health research teams to share common questions and solutions around Nation-led research and data sovereignty.

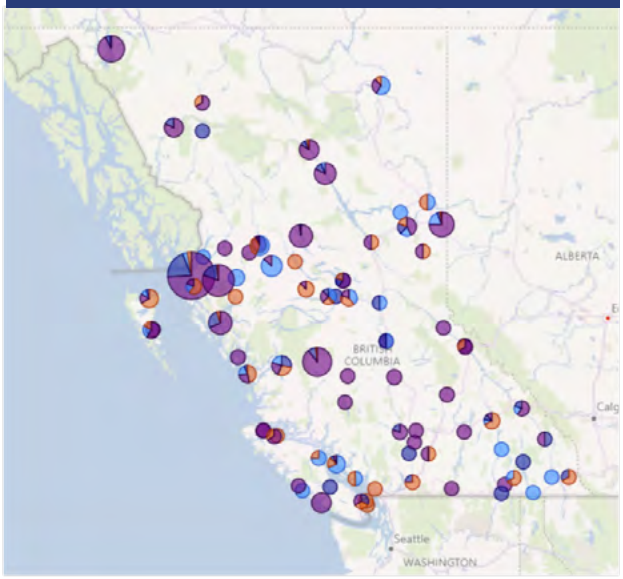
Real-Time Virtual Support

Leads: Kendall Ho, Helen Novak Lauscher, Joan Assali, Michael Lim
Vision: Establishing an effective and enduring LHS to support continuous learning and improvement of the RTVS network of virtual care pathways to serve all citizens in BC equitably, effectively, and cost-effectively.

KEY HEALTH SYSTEM IMPACTS

+ Implemented patient-oriented pan-provincial services by providing medical leadership in standing up HealthLink Emergency iDoctor in-assistance (HEiDi) in April 2020 and COVID Anti-viral Therapeutics e-team (CATe) in February 2022, in collaboration with HealthLink BC (HLBC).
+ Partnered with peer-to-peer pathways to document collective impact of Rural Urgent Doctors in-aid (RUDi) to provide RTVS rural generalist and ER support and its evolution to be the virtual emergency department first call, and pediatric and maternity lines to provide additional support.
+ Partnered with First Nations Health Authority on RTVS evaluation of patient-facing pathways, including First Nations Virtual Doctor of Day (FNvDoD) and Substance Use and Psychiatry Services (FNvSUPS).
+ Established the HEiDi Outcomes Evaluation partnership, with Michael Smith Health Research BC, to leverage BC Ministry of Health Data Platform and showcase how to evaluate HEiDi performance metrics and continuously improve this program.
+ Developed and launched the RTVS Dashboard proof-of-concept in March 2022, a monitoring and evaluation tool for RTVS pathways that will inform about gaps and interventions required to reduce inequities in rural, remote and Indigenous communities.

RTVS SUPPORT FOR BC



Peer-to-peer RTVS Pathways

4,935 hours of clinical support provided

4,744 cases of varying complexity handled

113 unique BC communities accessing RTVS

Patient-facing Pathways: First Nations Virtual Care

13,175 FNvDoD encounters since 04/2021

1,841 FNvSUPS encounters since 04/2021

+95% clients recommend to family/friends

Patient-facing Pathways: HEiDi

45,836 HLBC encounters served by HEiDi virtual physicians since 04/2021

70% HEiDi patients diverted from ED visits

16% accelerated to ED visits

RTVS 2021-2022 Advancing Equity and Access in BC Highlights

See Appendix for a list of program publications.

KEY OTHER ACHIEVEMENTS

+ Development of LHS Evaluation Framework and Metrics. Initial Plan-Do-Study-Act cycle through reflections and dialogues with all RTVS partners to assess how each organization and individual can optimize their own learning and contribute collectively to success in integrating RTVS into primary care services in BC.
+ Initiated a RTVS network analysis evaluation in early 2022 to assess the Pentagram Partnership plus relationships in RTVS and their various influences in ensuring the growth, well-being and sustainability of RTVS through collaboration and simultaneity of actions and mutual understanding in a complex adaptive healthcare system in BC, to enhance impact through strengthening of relationships.
+ Collaborated with partners to successfully obtain grant funding for the new CIHR catalyst grant focused on developing a learning toolkit to implement the LHS.
+ Ongoing recruitment and support of virtual physicians (VP), communities of practice, and integration of shared platforms/technologies, including longitudinal EMR (~175 VPs recruited and trained across 4 peer-to-peer pathways and HEiDi).

PATIENT ENGAGEMENT ACTIVITIES & THEIR VALUE

+ Patient partners are members of the HEiDi outcomes evaluation tables, including as key contributors to the Steering Committee, Implementation Committee and Evaluation Advisory table.
+ Patient surveys – data collection from patients who use the various patient-facing pathways (e.g. cultural safety, satisfaction data). Data is integrated into the evaluation framework and is visualized on the interactive dashboard.
+ Ongoing evaluation of patients after they access the HEiDi pathway, to capture their feedback to support improvements.
+ Established a patient advisory committee for the implementation of the CIHR catalyst grant to establish the LHS toolkit.

Scientific Innovation

Leads: Riyad Abu-Laban, Ross Duncan
Vision: Data access, linkage and quality that optimizes the BCEMN's ability to evaluate the system and patient care impacts of its activities and function as a true LHS.

KEY HEALTH SYSTEM IMPACTS

+ Documented the nature and limitations of current databases relevant to emergency care in BC for better understanding by healthcare researchers.
+ Established experience with the new MoH Health Data Platform to advance efforts to improve data quality, linkage and access relevant to emergency care in BC.
+ Use-case demonstration of the BC Health Data Platform's ability to support data driven learning through proof of safety and efficacy of layering virtual physicians on the BC 8-1-1 Line (HEiDi Program).
+ Determined that implementation of a provincial chest pain protocol provided on the BCEMN website was associated with a decrease in hospitalizations.

Factors associated with concordance between Virtual Physician advice and caller service utilization for urgently triaged callers to a nurse-managed provincial health information telephone service

Ross Duncan[1,2,3]; Kurtis Stewart[3]; Frank Scheuermeyer[2,3]; Jim Christenson[2,3]; Riyad B. Abu-Laban[2,3]; Lindsay Hedden[1,5]

1: Michael Smith Health Research BC, Vancouver, BC
2: BC Emergency Medicine Network (BC EMN), Vancouver, BC
3: Department of Emergency Medicine, Faculty of Medicine, UBC
4: Faculty of Health Sciences, Simon Fraser University

Table 1. Summary of Red-MD and Yellow call characteristics.

	HEiDi VP Disposition			
	Go to ED now (N=2880)	See primary care MD now (N=1515)	Schedule an MD/HCP appointment (N=6607)	Home treatment (N=6126)
Calls concordant with Advice	1883 (65.2%)	349 (23.0%)	3842 (57.5%)	3013 (48.8%)
Sex, female	1832 (63.4%)	1007 (66.3%)	4368 (65.3%)	3884 (63.0%)
Age (years), mean (SD)	42.1 (25.3)	39.2 (23.7)	38.8 (24.2)	35.7 (24.4)
Child (0-17)	536 (18.6%)	274 (18.1%)	1310 (19.6%)	1543 (25.0%)
Adult (18-64)	1701 (58.9%)	998 (65.7%)	4236 (63.4%)	3756 (60.9%)
Senior (>64)	651 (22.5%)	246 (16.2%)	1139 (17.0%)	870 (14.1%)
Attached to FP or practice	2450 (84.8%)	1261 (83.1%)	5612 (83.9%)	5192 (84.2%)
Economic dependency, quintile				
1: least deprived	723 (25.0%)	413 (27.2%)	1759 (26.3%)	1689 (27.4%)
2	586 (20.3%)	315 (20.8%)	1380 (20.6%)	1310 (21.2%)
3	498 (17.2%)	279 (18.4%)	1257 (18.8%)	1152 (18.7%)
4	512 (17.7%)	270 (17.8%)	1173 (17.5%)	1052 (17.1%)
5: most deprived	569 (19.7%)	241 (15.9%)	1116 (16.7%)	966 (15.7%)
Health Authority				
Interior	510 (17.7%)	211 (13.9%)	1078 (16.1%)	941 (15.3%)
Fraser	1069 (37.0%)	543 (35.8%)	2405 (36.0%)	2530 (41.0%)
Vancouver Coastal	613 (21.2%)	349 (23.0%)	1464 (21.9%)	1376 (22.3%)
Vancouver Island	526 (18.2%)	346 (22.8%)	1377 (20.6%)	1045 (16.9%)
Northern	170 (5.9%)	69 (4.5%)	361 (5.4%)	277 (4.5%)
Rural location	493 (17.1%)	205 (13.5%)	1012 (15.1%)	891 (14.4%)

Background:
BCs provincial health information telephone service (8-1-1) connects callers with registered nurses (RNs) for healthcare advice. Since November 16, 2020 callers advised by an RN to seek urgent medical care can be subsequently referred to "HealthLink BC Emergency iDoctor-in-assistance" (HEiDi) virtual physicians (VPs) for supplemental assessment. Prior research has revealed that assigned VP dispositions and subsequent caller health service utilization differs in a proportion of cases.

Methods:
- VPs assign callers to 1 of 4 triage dispositions:
  1) "Go to ED Now" (<=24 hour ED visit); 2) "See Primary Care MD Now" (<=24 hour primary care billing), 3) "Schedule an MD/HCP appointment" (HCP billing within 1 week); 4) "Home Treatment" (No services for one week post-call)
- We linked relevant provincial administrative databases to ascertain service utilization.
- Multivariate logistic regression model with odds-ratios reflect relative odds of concordance given characteristics

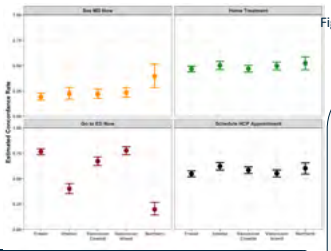


Figure 1: Concordance rate by VP disposition and HA

Discussion:
- There is a clear relationship between geography and concordance; meso-level analysis is needed to explore the drivers.
- The same variable may be positively or negatively associated with concordance across different VP dispositions.
- Limitation: Self-reported ethnicity, immigration status or language spoken by callers may impact concordance and are not available in our data

Key Results:
- Concordance varied by health authority and rurality
- Senior age associated with higher odds of concordance, except for home treatment disposition
- Economic deprivation associated with concordance, with differing relationships across disposition
- 65% of "Go to ED now", 23% of "See Primary Care MD now", 39% of "Schedule an MD/HCP appointment, and 36% of "Home treatment" calls were concordant

Table 2. Summary of logistic regression model statistics and coefficients (odds ratios and 95% CIs) predicting HEiDi caller concordance for each disposition.

Variable	Go to ED now	See primary care MD now	Schedule an MD/HCP appointment	Home treatment
Age: Adult (ref)	--	--	--	--
Age: Child	0.996 (0.79, 1.258)	1.147 (0.819, 1.595),	0.901 (0.791, 1.026)	1.839 (1.621, 2.088)
Age: Senior	1.263 (1.013, 1.578)	1.176 (0.831, 1.651)	1.266 (1.1, 1.459)	0.643 (0.548, 0.753)
Sex: Female (ref)	--	--	--	--
Sex: Male	1.157 (0.966, 1.388)	0.925 (0.708, 1.204)	0.851 (0.766, 0.945)	0.984 (0.883, 1.096)
Economic dependency: 1 (ref)	--	--	--	--
Economic dependency: 2	1.579 (1.211, 2.064)	1.644 (1.137, 2.38)	1.081 (0.936, 1.248)	0.88 (0.758, 1.02)
Economic dependency: 3	1.113 (0.85, 1.46)	1.36 (0.923, 2.002)	1.141 (0.984, 1.324)	0.964 (0.827, 1.125)
Economic dependency: 4	0.842 (0.647, 1.097)	1.772 (1.213, 2.592)	1.097 (0.941, 1.28)	0.957 (0.816, 1.122)
Economic dependency: 5 (most deprived)	0.789 (0.602, 1.033)	1.138 (0.744, 1.732)	1.18 (1.002, 1.39)	0.943 (0.793, 1.121)
Health Authority: Fraser (ref)	--	--	--	--
Health Authority: Interior	0.302 (0.236, 0.385)	0.987 (0.649, 1.484)	1.159 (0.99, 1.358)	1.128 (0.956, 1.332)
Health Authority: Vancouver Coastal	0.684 (0.545, 0.86)	1.177 (0.838, 1.649)	1.147 (1.004, 1.312)	0.979 (0.856, 1.121)
Health Authority: Vancouver Island	1.528 (1.168, 2.009)	1.082 (0.761, 1.534)	0.916 (0.796, 1.054)	1.125 (0.966, 1.311)
Health Authority: Northern	0.107 (0.069, 0.161)	2.364 (1.349, 4.095)	1.101 (0.871, 1.395)	1.143 (0.88, 1.485)
Rurality: Urban (ref)	--	--	--	--
Rurality: Rural	0.286 (0.226, 0.362)	1.823 (1.277, 2.59)	1.416 (1.217, 1.65)	1.116 (0.952, 1.309)
Health concern: Other (ref)	--	--	--	--
Health concern: Gastroenterology	1.167 (0.922, 1.481)	0.866 (0.584, 1.267)	0.904 (0.783, 1.043)	0.94 (0.808, 1.093)
Health concern: Musculoskeletal	1.065 (0.81, 1.406)	0.904 (0.616, 1.312)	0.909 (0.778, 1.062)	1.498 (1.27, 1.767)
Health concern: Dermatology	1.236 (0.935, 1.64)	1.127 (0.739, 1.695)	1.024 (0.863, 1.217)	1.213 (1.02, 1.444)
Health concern: Neurology	0.841 (0.575, 1.238)	1.546 (1.019, 2.322)	1.021 (0.856, 1.218)	1.281 (1.079, 1.521)
Health concern: Respiratory	0.973 (0.725, 1.312)	0.606 (0.359, 0.983)	1.295 (1.078, 1.559)	0.73 (0.603, 0.883)
Attached: Yes (ref)	--	--	--	--
Attached: No	0.981 (0.773, 1.249)	1.044 (0.741, 1.455)	0.72 (0.63, 0.823)	1.251 (1.087, 1.441)
Weekend: No (ref)	--	--	--	--
Weekend: Yes	1.074 (0.851, 1.358)	0.627 (0.45, 0.863)	0.988 (0.856, 1.141)	0.993 (0.862, 1.143)
Time of call: Day (ref)	--	--	--	--
Time of call: Evening	1.242 (0.999, 1.546)	0.744 (0.488, 1.108)	0.833 (0.738, 0.94)	0.809 (0.711, 0.92)
Time of call: Off-hours	1.097 (0.628, 1.966)	1.519 (0.845, 2.661)	1.066 (0.75, 1.525)	1.248 (0.908, 1.719)
*Others (Not Significant)	Nursing Triage Disposition (Yellow vs Red Caller), Interaction Terms for Weekend*Time of Day			

See Appendix for a list of program publications.

Implementation of a provincial chest pain protocol is associated with a decrease in hospitalizations

Ross Duncan[1,2,3]; Frank Scheuermeyer[2,3]; Riyad B. Abu-Laban[2,3]; Jim Christenson[2,3]

1: Michael Smith Health Research BC, Vancouver, BC
2: BC Emergency Medicine Network (BC EMN), Vancouver, BC
3: Department of Emergency Medicine, Faculty of Medicine, UBC

Table 1. Characteristics of "Chest Pain" patients

	PRE	POST
Total Unique Patients	85,015	81,894
Index Encoutners	94,058	90,170
Median age (IQR)	56 (40 - 70)	56 (39 - 70)
Female (%)	46,649 (49.60%)	45,317 (50.26%)
EMS arrival (%)	22,821 (24.26%)	20,855 (23.13%)
Median LOS (IQR)	4 (2-7)	4 (2-7)
Presentation		
Presenting Compliant, Most Frequent	51,347 (54.59%). CEDIS "003", Chest pain — cardiac features	48,519 (53.81%). CEDIS "003", Chest pain — cardiac features
Presenting Compliant 2nd Most Frequent	39,386 (41.88%), CEDIS "004", Chest pain — non-cardiac features	39,386 (41.88%), CEDIS "004", Chest pain — non-cardiac features
Presenting Compliant 3rd Most Frequent	580 (0.60%), CEDIS "651", Shortness of breath	522 (0.58%), CEDIS "651", Shortness of breath

Background: Emergency department (ED) patients with potential ischemic chest pain often require extensive workup and admission to rule out acute coronary syndromes (ACS). We implemented provincial recommendations via the BC Emergency Medicine network to reduce hospitalizations and outpatient testing.

Methods:

- We developed an algorithm using a published clinical prediction and disseminated to BC EM practitioners via the BC Emergency Medicine Network (EMN) from its inception in September 1st 2017.
- Using NACRS, DAD, and MSP datasets from September 1st 2016 to August 31st 2019, we collected consecutive adult ED patients with a presentation of CEDIS code "003" and "004" (chest pain) one year prior to and one year after the EMN's rollout.
- Proportions of common tests, consults, and adverse events related to the chest pain index visit were computed for pre and post period.

Key Results and discussion:

- Patient characteristics stable
- Testing appears to have increased overall, except IM consults
- All adverse events have decreased, notably readmissions and MACE
- Benefits of a time-series model?
- How to demonstrate linkage to EMN dissemination?

Table 2: Testing and Consultation for Chest Pain patients 1 year prior to and 1 year after the introduction of the BC EMN and novel protocol

	PRE		POST		DIFF
	Count	%	Count	%	% (95% CI)
Index Encounters	94,058	-	90,170	-	-
Cardio Consult	14,391	15.30%	16,591	18.40%	3.1% (2.76-3.44)
Internal Medicine Consult	6,490	6.90%	2,074	2.30%	-4.6% (-4.79, -4.41)
Nuclear Medicine Scan	2,540	2.70%	2,795	3.10%	0.4% (0.25, 0.55)
Echocardiogram	113	0.12%	189	0.21%	0.09% (0.05, 0.13)
Exercise Stress Test	17,213	18.30%	18,575	20.60%	2.3% (1.94-2.66)
GP Consult	1,599	1.70%	2,074	2.30%	0.6% (0.47-0.73)
GP Other	35,930	38.20%	39,404	43.70%	5.5% (5.05-5.95)

"Access to data provided by the Data Steward(s) is subject to approval, but can be requested for research projects through the Data Steward(s) or their designated service providers. All inferences, opinions, and conclusions drawn in this publication are those of the author(s), and do not reflect the opinions or policies of the Data Steward(s)."

Table 3: Adverse Cardiac Events 1 year prior to and 1 year after introduction

		PRE		POST		DIFF
		Count	%	Count	%	% (95% CI)
Encounters		94,058	-	90,170	-	-
Hospital Readmission	<=30day	20,234	21.51%	14,287	15.84%	-5.67% (-6.02,-5.31)
PCI	Index	1,855	1.97%	1,193	1.32%	-0.65% (-0.77,-0.53)
	<=30day	1,694	1.80%	1,257	1.39%	-0.41% (-0.52,-0.29)
	Total	3,549	3.77%	2,450	2.72%	-1.06% (-1.22,-0.89)
CABG	Index	285	0.30%	186	0.21%	-0.10% (-0.14,-0.05)
	<=30day	484	0.51%	296	0.33%	-0.19% (-0.25,-0.13)
	Total	769	0.82%	482	0.53%	-0.29% (-0.36,-0.21)
Death	Index	<5	0.00%	<5	0.00%	0% (-0.01, 0)
	<=30day	580	0.62%	532	0.59%	-0.03% (-0.1,0.04)
	Total	~580	0.62%	~530	0.59%	-0.03% (-0.1,0.04)
MACE	Total	4,820	5.12%	3,399	3.77%	-1.36% (-1.54,-1.17)

BC EMERGENCY MEDICINE NETWORK

Michael Smith Health Research BC

populationdata BC

UBC

KEY OTHER ACHIEVEMENTS

+ Established a broadly representative BCEMN "Data Strategy and Access Committee" (DSAC) with representation from BCEMN, UBC, Health Authorities, and patient partners, to provide strategic guidance and advocacy on initiatives related to EM relevant data in BC and its access by researchers and policy makers.
+ Published a comprehensive international review of Emergency Care Networks with the North American Observatory.
+ Authored and disseminated a White Paper on the National Ambulatory Care Reporting System (NACRS) in BC that included a proposal for improvement of relevant emergency patient date in BC.

PATIENT ENGAGEMENT ACTIVITIES & THEIR VALUE

+ Participated in a comprehensive evaluation of patient engagement in BCEMN, published in the Journal of Patient Experience in 2020, thus supporting other networks to carry out similar activities.
+ Secured a Patient Partner on DSAC through the Patient Voices Network, ensuring public representation and participation.
+ In partnership with the Patient Centered Measurement office, designed and launched a patient-oriented research project on the experiences of patients in BC Emergency Departments, ensuring research questions relevant to the BCEMN and important to the public are addressed.
+ Presented engagement and collaboration process of developing research questions with the patient council of above project at "Putting Patients First 2022", ensuring wider awareness of how patient partners prioritized "Equity, Diversity, and Inclusion" (EDI), in part as a result of the "In Plain Sight" report.
+ Continued to partner with and support BC Patient Centered Measurement and their ongoing surveys of patient experiences of care in BC Emergency Departments, ensuring this important work helps advance BCEMN's vision of "Exceptional Emergency Care. Everywhere."

Scientific Innovation Initiatives

Innovation and research are the foundations for the continual improvement of emergency care. BCEMN, in close partnership with the UBC Department of Emergency Medicine, ensures that high quality research leaders are supported to run externally funded programs on a range of clinically relevant innovation initiatives.

CARDIOVASCULAR EMERGENCIES

Lead: Frank Scheuermeyer
Vision: To assist British Columbia emergency care providers in safely treating patients with acute chest pain and irregular heartbeats.

KEY HEALTH SYSTEM IMPACTS

+ Demonstrated safe 7.5-year outcomes for chest pain patients with minimally obstructive disease on coronary computed tomography angiography, potentially leading to decreased testing for any downstream medical encounters.
+ Demonstrated that cardiac computed tomography angiography leads to fewer follow-up investigations than traditional diagnostics, such as treadmill testing or nuclear medicine scans.
+ Participated as Writing Committee member of the Canadian Association of Emergency Physicians' Atrial Fibrillation and Flutter checklist, which nationally standardizes ED atrial fibrillation and flutter care, including stroke prevention. Also member of the Writing Committee of the revised version.
+ Principal investigator in multi-center trial demonstrating that initial use of electrical cardioversion results in a far shorter ED length of stay than initial use of chemical cardioversion for patients with acute atrial fibrillation.
+ Demonstrated that dissemination of BCEMN guidelines on management of acute chest pain appears to be associated with a decreased hospitalization for chest pain patients, but with similar overall outcomes.

KEY OTHER ACHIEVEMENTS

+ Co-principal investigator on Canada-wide study to ascertain if female chest pain patients should have a lower threshold of high sensitivity Troponin for hospital admissions.
+ Demonstrated that patients with renal impairment who present with atrial fibrillation or flutter are at high risk of adverse outcomes with conventional therapies.
+ Demonstrated that ED patients with long QT (up to 30% of patients having an EKG have long QT) have similar outcomes to patients without long QT, thus decreasing need for unnecessary investigations and treatments.

See Appendix for a list of program publications.

ED Response to the Opioid Overdose Crisis

Leads: Jessica Moe, Andrew Kestler
Vision: To improve the emergency department (ED) care and health outcomes of people who use opioids.

KEY HEALTH SYSTEM IMPACTS

+ Implemented paper and electronic order sets for ED buprenorphine/naloxone initiation.
+ Created VCH ED Addictions Working Group and collaborated with health authorities across BC.
+ Led LOUD in the ED, a provincial quality improvement initiative for ED care for opioid use disorder (OUD).
+ Implemented safer consumptions supply distribution in EDs.

KEY OTHER ACHIEVEMENTS

+ Led provincial webinar series on ED care of OUD
+ Launched EMED study, first randomized, controlled study of buprenorphine/naloxone micro-dosing.
+ Mentored 15 trainees, leading to abstract presentations and publications.
+ OUD-related KT content generation for BCEMN.
+ Contribution to BC Center for Substance Use provincial guidelines and curricula related to ED care of OUD.

PATIENT ENGAGEMENT ACTIVITIES & THEIR VALUE

+ Engaged patient partners as BCEMN content co-authors.
+ Engaged patient partners on QI teams and initiatives.
+ Engaged patient partners as research advisors and active participating researchers.
+ Engaged patient partners as faculty for webinars and other educational initiatives.

See Appendix for a list of program publications.

Mass Gathering and Event Medicine

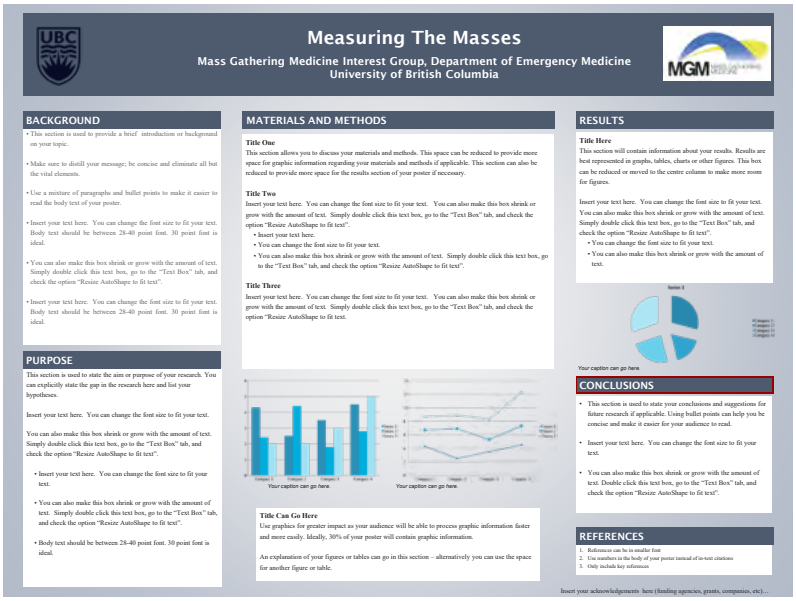
Lead: Adam Lund
Vision: To improve public safety at mass gatherings and special events and to reduce the burden these events create on health infrastructure.

KEY HEALTH SYSTEM IMPACTS

+ Completed analysis and prediction for patient presentation rates at mass gatherings and major planned events:
  - Analysis of factors influencing patient presentation rates,
  - Mathematical modeling for patient presentation rates at mass gatherings.
+ Proposed international template (DREAM Model) for systematic reporting on event characteristics and health outcomes.
  - Culmination of a series of 5, inter-related papers.
+ Development of a comprehensive set of protocols and policies for multi-disciplinary teams supporting out-of-hospital care during mass gatherings.

KEY OTHER ACHIEVEMENTS

+ Created a comprehensive, supported approach to harm reduction programming for music festivals.
+ Collaboration with multiple stakeholders in Edmonton, Alberta (Alberta Health Services, City of Edmonton) regarding improving safety for attendees of music festivals.
+ Partnerships with existing Canadian harm reduction teams (Indigo, Karmic).
+ Media interviews on the topic of safety at music festivals.
+ Research partnerships with an international group of researchers with expertise in mass gatherings (Flinders and Griffiths Universities, Australia).
+ Invited scholars to Toronto (2019), Saudi Arabia (2019), South Korea (2018), Brisbane (2019).



Measuring the Masses poster presentation

See Appendix for a list of program publications.

Preventing Adverse Drug Events (ADE) & COVID-Related Research

Lead: Corinne Hohl
Vision: To reduce adverse drug events using novel information technology and evidence-based interventions. To increase research capacity in COVID-19 through harmonized national data collection and collaboration to inform the pandemic response.

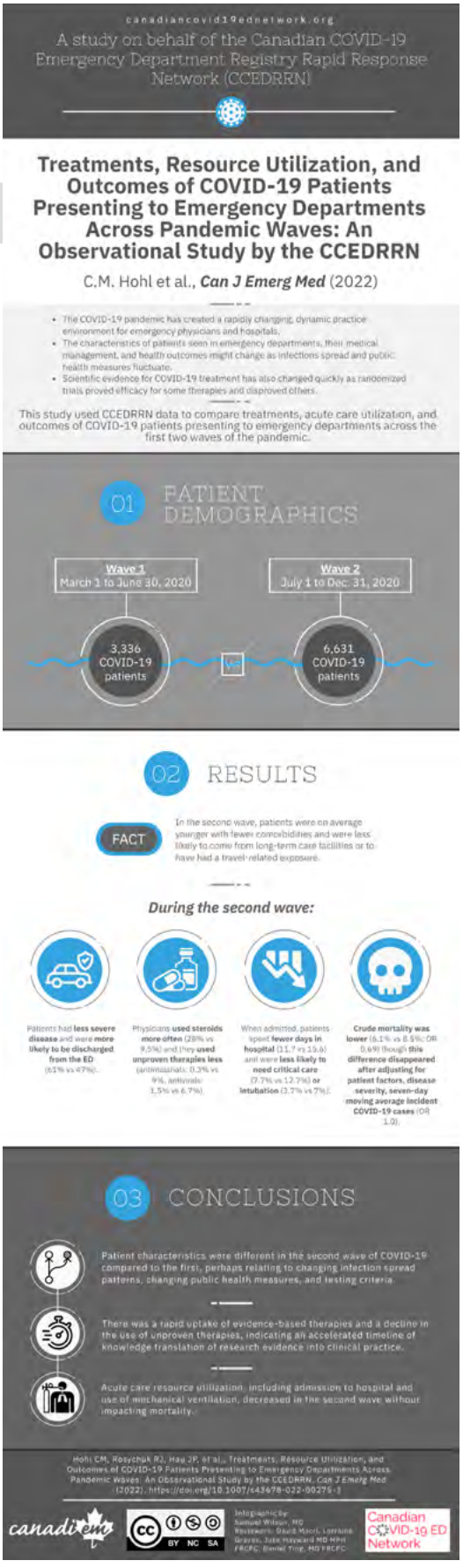
KEY HEALTH SYSTEM IMPACTS

ADE

+ Demonstrated that ED-based, pharmacist-led medication review of high-risk patients reduces hospital length of stay by 10%.
+ Demonstrated that repeat adverse drug events account for >30% of all medication-related problems causing Emergency Department visits and admissions in BC, representing the largest proportion of preventable adverse drug events that are 100-fold more common than errors, warranting a paradigm shift in our approach to adverse drug event prevention.
+ Designed, programed and piloted a novel user-friendly web-based software application, called ActionADE that allows healthcare providers to rapidly document adverse drug events.
+ Implemented ActionADE in 9 acute care hospitals in VCH/ Providence, and increased adverse drug event reporting 100-fold at those sites.
+ Reduced re-dispensing of culprit medications by 17% in sites where ActionADE is implemented.

COVID

+ Launched the largest collaborating research network in emergency medicine, and second largest COVID-19 registry listed with the World Health Organization.
+ Developed a robust governance structure including the ability of patients to engage at all levels of the scientific process, from study idea and grant writing to end-of-grant knowledge translations.
+ Described and compared treatments and outcomes of COVID-19 patients in Canada across pandemic waves.
+ Derived and validated the Canadian COVID-19 Emergency Department Rapid Response Network (CCEDRRN) COVID-19 Infection Score to risk stratify ED patients for the diagnosis of COVID-19 at triage.
+ Derived and validated the CCEDRRN COVID-19 Mortality Score to risk stratify COVID-19 patients for mortality on arrival.



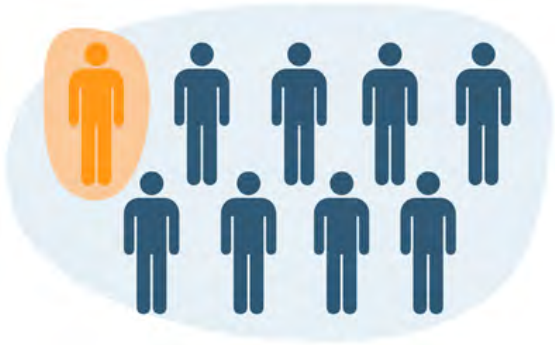
See Appendix for a list of program publications.

KEY OTHER ACHIEVEMENTS

ADE

+ Validated and implemented clinical decision rules that identify patients at high risk for adverse drug events, enabling standardized referral for pharmacist-led medication review.
+ Evaluated different data standards for adverse drug events, to ensure implementation of a data standard that works for clinicians and enable inter-operability of health information systems.
+ Evaluated methods for assessing the preventability of adverse drug events.
+ Integrated ActionADE with PharmaNet, enabling care providers to send adverse drug event information from hospitals to community pharmacies for the first time in the history of PharmaNet to prevent repeat adverse drug events.
+ Launched a randomized, controlled trial to evaluate the clinical and cost effectiveness of implementing ActionADE.

ONE IN 9 ED VISITS ARE CAUSED BY AN ADVERSE DRUG EVENT



>30% OF ADVERSE DRUG EVENTS ARE REPEAT EVENTS, CAUSED BY UNINTENTIONAL RE-EXPOSURES TO CULPRIT MEDICATIONS

75% OF REPEAT ADVERSE DRUG EVENTS ARE PREVENTABLE:

PATIENT ENGAGEMENT ACTIVITIES & THEIR VALUE

+ Both the ADE and CCEDRRN research programs have formal patient engagement processes, and multiple patient partners.
+ Patients have been instrumental in both research programs and have participated in different roles, spanning from advocacy to idea generation, to assistance with interpreting study results.
+ Our patient engagement committee re-wrote consent forms for our COVID-19 studies, from institutional legal language that was poorly assessable to the public, to lay language that patients can understand.

Procedural Sedation and Analgesia

Lead: Gary Andolfatto
Vision: Safe, effective, timely, efficient, equitable, evidence-informed and patient-centred procedural sedation and analgesia.

KEY HEALTH SYSTEM IMPACTS

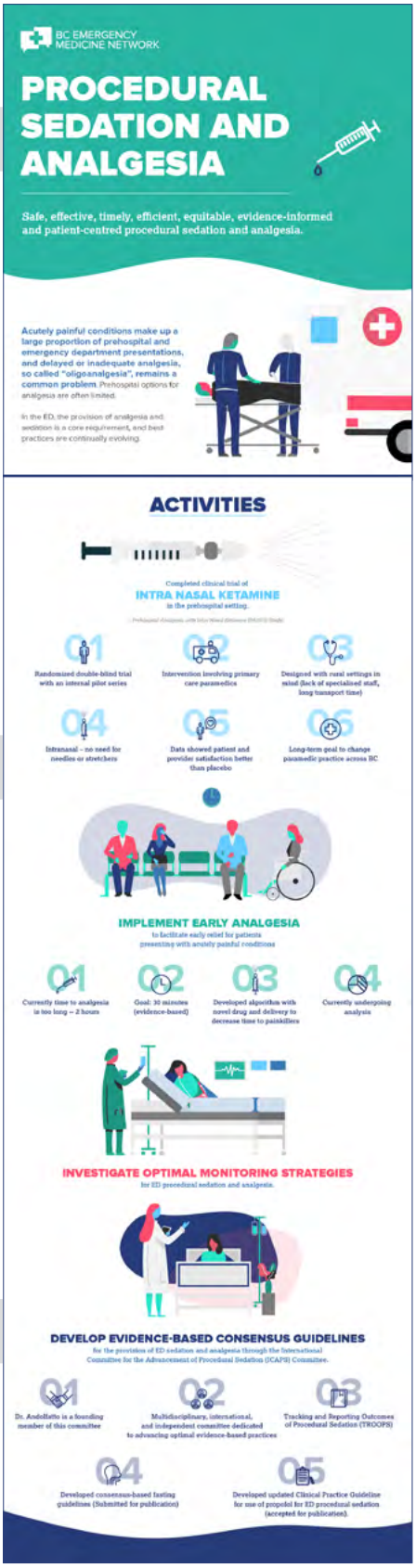
+ Developed multi-modal analgesia regimens in the ED to facilitate early adequate analgesia for patients in pain.
+ Developed and promoted safe and effective procedural sedation practices in the ED setting, including medication use, clinical assessment, staff and patient safety enhancement.
+ Completed high-quality prospective randomized double-blind trial that showed the efficacy and effectiveness of intra-nasal ketamine in the pre-hospital setting for the early treatment of pain by primary care paramedics.
+ Developed algorithms for the use of ketamine for various pre-hospital settings by advanced care paramedics, in conjunction with BCEHS.
+ Developed and initiated a randomized trial on the use of intravenous ketamine infusion for neuroprotection in cardiac arrest survivors requiring ICU admission to help produce improved neurological outcomes in cardiac arrest survivors.

KEY OTHER ACHIEVEMENTS

+ Completed randomized trial on the use of ketamine for safe and effective rapid control of severe agitation in the emergency department.
+ Developed internationally-accepted consensus definition of the practice of procedural sedation through the International Committee on the Advancement of Procedural Sedation (ICAPS), an international multi-disciplinary collaboration.
+ Developed internationally-accepted procedural sedation study endpoint definitions through ICAPS to facilitate consistency in future research.
+ Developed internationally-accepted guidelines through ICAPS for fasting prior to procedural sedation.
+ Implemented evidence-based fasting/non-fasting practices in the emergency department to improve patient comfort and health.

PATIENT ENGAGEMENT ACTIVITIES & THEIR VALUE

+ Created patient centered survey on attitudes and understanding of COVID isolation guidelines, finding streamlining of discharge instructions and multi-modal encouragements to staff improved instruction delivery rate, and on-going follow-up coaching with patients appeared useful to improve self-isolation understanding.



See Appendix for a list of program publications.

Reversing Sudden Unexpected Death (Out-of-Hospital Cardiac Arrest)

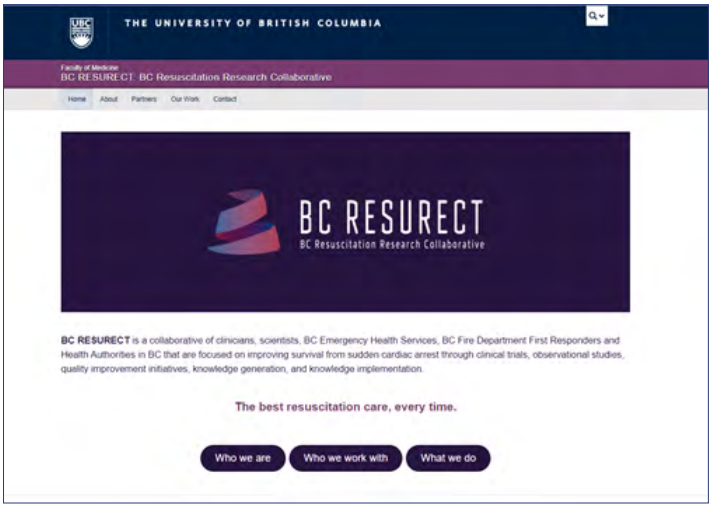
Leads: Brian Grunau, Jim Christenson
Vision: The best survival rates in the world for out-of-hospital, sudden, unexpected death.

KEY HEALTH SYSTEM IMPACTS

+ Increased survival to hospital discharge rates from 6.6% to 15%, among the highest in the world.
+ Partnered with BCEHS to contribute to provincial cardiac arrest guidelines and quality improvement. This included research to define Quality CPR, through the North American Resuscitation Outcomes Consortium, which has led to on-going monitoring to ensure high quality care delivery.
+ Engaged BCEHS in a randomized controlled trial of an investigational new neuroprotective drug in acute severe stroke.
+ Integrated and evaluated state-of-the-art Extracorporeal CPR therapies into the regional cardiac arrest treatment algorithm (involving hospital and pre-hospital providers) in greater Vancouver.
+ Developed a BC Cardiac Arrest Registry to track quality of care, neurologic outcomes and study contributions of the opioid crisis and COVID-19 on sudden death.
+ Built a sustainable Canadian Resuscitation Outcomes Consortium national sudden cardiac arrest (SCA) registry in partnership with the Heart and Stroke Foundation and other funding partners as a foundation for research in all provinces.
+ Contributed as a section lead on a Canadian Cardiovascular Society position statement on neuroprognostication after sudden cardiac arrest.

KEY OTHER ACHIEVEMENTS

+ Strengthened and branded the BC Resuscitation Research Collaborative (RESURECT), a provincial collaborative of clinicians and scientists focused on improving survival from sudden cardiac arrest through research, quality improvement, knowledge generation and knowledge implementation.
+ Led the development of a national research collaboration (CanSAVE) to transform the response to SCA.
+ Led a nationally-funded study to measure COVID-19-related occupational risks to paramedics, specifically looking at resuscitation-based procedures and SARS-CoV-2 immunity.
+ Chaired the Resuscitation Advisory Committee for Heart and Stroke Foundation of Canada.



BC RESURECT website

PATIENT ENGAGEMENT ACTIVITIES & THEIR VALUE

+ Scott Kline (survivor) and Dr. Christenson presented Community Good Samaritanism in SCA at the Compassion and Social Justice Series for Providence Health and St. Mark's College.
+ Tony Fagan and Chelsie Thurlow (survivors) attended the CanROC annual assembly in Vancouver and Toronto.
+ Phil Nicholson (survivor) worked on a national team to redefine a transformative research program for SCA.

See Appendix for a list of program publications.

Road Safety

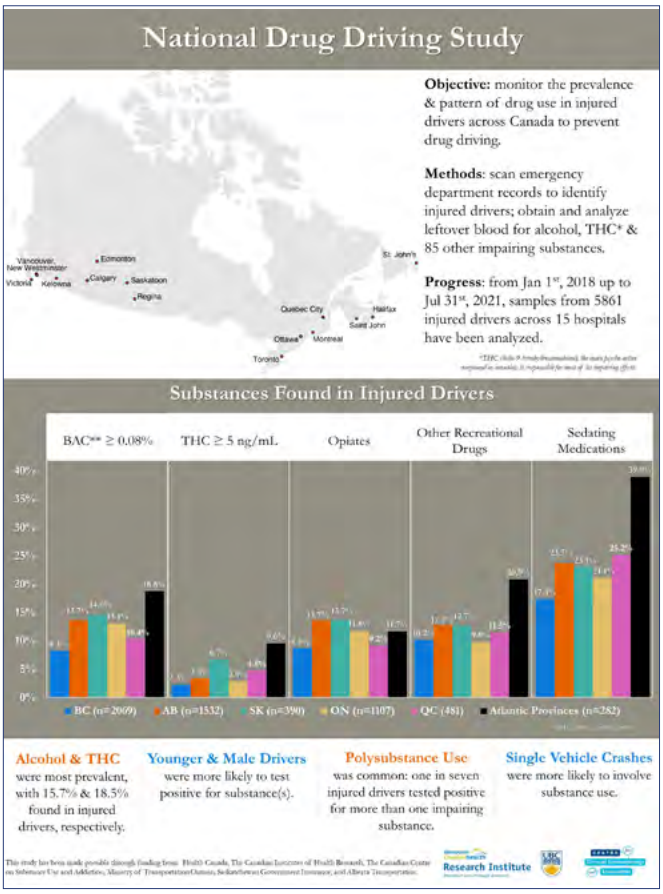
Lead: Jeff Brubacher
Vision: To inform policy to make BC's roads the safest in the world and to provide the best post-road trauma care in the country.

KEY HEALTH SYSTEM IMPACTS

+ Improved road safety and promoted the health of all British Columbians by monitoring impaired driving, providing insights on the impacts of cannabis legalization on road safety and informing traffic policies with scientific data.
+ Improve quality of care, using a patient-centred approach, by providing evidence on road trauma recovery and outcomes of care to healthcare professionals and relevant policy makers.
+ Helped develop clinical strategies to improve road trauma recovery and reduce avoidable hospital visits and healthcare spending for road trauma survivors.
+ Promoted safe and inclusive active transportation by understanding on the circumstances and trauma outcomes of injured vulnerable road users (e.g. pedestrians, cyclists and users of micro-mobility devices such as e-scooters).
+ Informing road safety policies. Stakeholders from both federal and provincial levels are using data generated from National Impaired Driving Study in their annual reports on impaired driving. Our research findings have influenced traffic policy (e.g. roll back of speed limit increases on some rural highways after our research found that higher speed limits on rural highways in BC resulted in more traffic fatalities.)

KEY OTHER ACHIEVEMENTS

+ Project sustainability. In the past five years, our road safety research program has received over $8 million in research funding from provincial and federal partners including CIHR, Health Canada, and Transport Canada. We currently employ over a dozen highly qualified BC residents.
+ Standardize drug-impaired driving study protocol. Our drug driving study monitors the prevalence of drug use in injured drivers following road trauma. This protocol has been implemented in British Columbia (four trauma centres, with plans for a fifth) and in seven other provinces, so it now provides national data on the prevalence of, and trends in, impaired driving.
+ Academic influence. Over the past five years, our research group published over thirty scientific articles on road safety issues in peer-reviewed journals. Over 20 students were supervised by Dr. Jeff Brubacher.



See Appendix for a list of program publications.

PATIENT ENGAGEMENT ACTIVITIES & THEIR VALUE

+ Two studies engaged road trauma patients to identify circumstances of road traffic injury events and their recovery through in-depth interview. These two studies allow us to develop evidence-informed recommendations to healthcare professionals and policy makers, with an aim to improve quality of care and trauma recovery.
+ A patient partner was recruited to our research advisory committee for the Active Transport Injury Circumstances and Outcomes Study. Engaging patient partner in our research activities allows for meaningful and active collaboration on understanding injury prevention and factors related to recovery, as well as conducting effective knowledge translation activities.
+ Over the past five years, Dr. Jeff Brubacher has been interviewed by over 30 media outlets on impaired driving and road safety in BC. In addition to lectures at academic venues, Dr. Brubacher has shared research findings on road safety to the BC Chiefs of Police Traffic Safety Committee, Canadian Chiefs of Police, BC and Canadian Crown Counsel, Public Safety Canada, ICBC, Road Safety BC and MADD Canada.

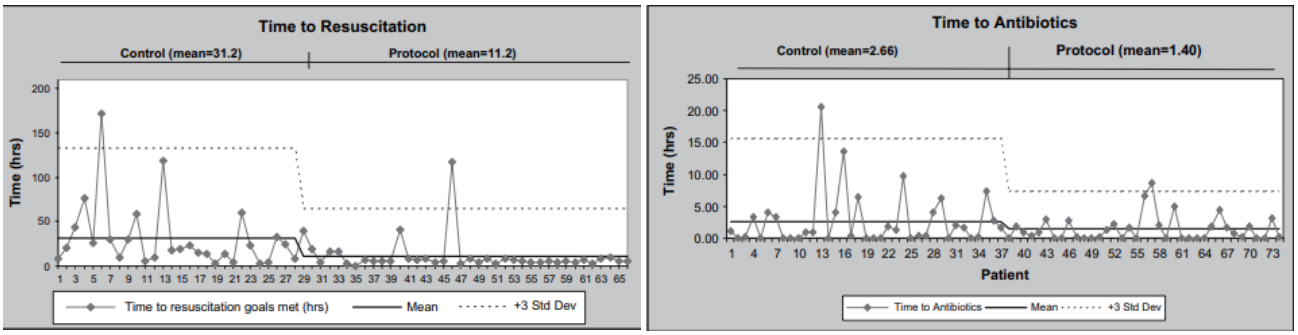
Sepsis and Infections in the ED

Lead: Rob Stenstrom
Vision: To ensure that all emergency department patients affected by infections and/or sepsis receive the same high quality, evidence-based care across the province.

KEY HEALTH SYSTEM IMPACTS

+ Improved time to treatment metrics and decrease in treatment variability for emergency department patients with sepsis.
+ Completed pivotal trial demonstrating that blood cultures are required before antibiotic administration in patients with severe sepsis.
+ Implemented universal screening for HIV in emergency department patients at Providence Health Care.
+ Developed algorithm for the appropriate use of blood cultures, based on biomarkers in patients with sepsis.
+ Identified risk factors and prevalence patterns of methicillin resistant staphylococcus aureus infections in emergency department patients.

Decreased variability and decreased time to resuscitation and antibiotics following the implementation of our sepsis protocol at Providence Health Care.



KEY OTHER ACHIEVEMENTS

+ Developed evidence-based approach to the provision of intravenous versus oral antibiotics for skin and soft tissue infections.
+ Member of British Columbia COVID Therapeutics Committee for the evidence-based review of all therapeutic interventions for COVID.
+ Involved in Sepsis Canada For the Canadian Sepsis Research Network project “Improving Care Before, During and After Sepsis”.
+ Leading the BC site in PITSOP randomized trial assessing the administration of pre-hospital antibiotics and fluids in patients with sepsis.
+ Identified patients with high-risk HIV exposures and ensure that they receive appropriate post-exposure prophylaxis.

PATIENT ENGAGEMENT ACTIVITIES & THEIR VALUE

+ A key study assessing the prevalence of HIV in emergency department patients, using point of care HIV antibody testing evaluated patient experience and acceptability of this approach. Based on patient opinion, this practice was found to be both feasible and acceptable and, based on patient endorsement, is the standard of care Providence Health Care emergency departments.

See Appendix for a list of program publications.

System Response to Toxicological Emergencies

Lead: Roy Purssell
Vision: To significantly reduce death and disability due to poisoning and drug overdose in BC through intervention in the ED and community.

KEY HEALTH SYSTEM IMPACTS

+ Increased awareness of opioid overdose best practices for Emergency Department treatment.
+ Supported the development of National Toxicology Surveillance System.
+ Overdose Crisis: Investigating emerging drug combinations, drug contaminants, and pearls for identifying/managing.
+ Developed local surveillance system using BC Drug and Poison Information Centre data for opioids, ecstasy, shellfish and mushroom exposures.

KEY OTHER ACHIEVEMENTS

+ Better understanding of drug overdose morbidity and mortality in BC.
+ Completed Toxicology Best Practice Guidelines for BCEMN.
+ CIHR Grant: Systemic Review of Naloxone Interventions in Opioid Overdose: publications reviewed, CIHR Knowledge Synthesis Report completed.
+ Clinical Toxicology Manuscript Published: Emergency Department Opioid Overdose Treatment Study.

Appendices

Appendix A: Publications & Grants

BC EMERGENCY MEDICINE NETWORK

Roerig, M, Carbone, S, Lynch, M, Abu-Laban, R, Duncan, R, Marchildon, G, & Allin, S. An International Review of Emergency Care Clinical Networks. Toronto: North American Observatory on Health Systems and Policies. Rapid Review. 2021, Report no.31. Available from: https://ihpme.utoronto.ca/wp-content/uploads/2021/03/NAO-Rapid-Review-31_EN.pdf

Drebit S, Eggers K, Archibald C, Abu-Laban RB, Ho K, Khazei A, Lindstrom R, Marsden J, Martin E, Christenson J. Evaluation of patient engagement in a clinical emergency care network: Findings from the BC Emergency Medicine Network. J. Patient Exp. 2020 May. DOI 10.1177/2374373520925721.

Abu-Laban RB, Drebit S, Svendson B, Chan N, Ho K, Khazei A, Lindstrom RR, Lund A, Marsden J, Christenson J. Process and findings informing the development of a provincial emergency medicine network. Healthc Manage Forum. 2019 Jun 9:840470419844276. doi: 10.1177/0840470419844276.

Marsden J, Drebit S, Lindstrom R, MacKinnon C, Archibald C, Abu-Laban R, Eggers K, Ho K, Khazei A, Lund A, Martin E, Christenson J. The BC Emergency Medicine Network: Evaluation approach and early findings. 2019 May; 61(4):164-171.

Abu-Laban RB, Drebit S, Lindstrom RR, Archibald C, Eggers K, Ho K, Khazei A, Lund A, MacKinnon C, Markham R, Marsden J, Martin E, Christenson J. The British Columbia Emergency Medicine Network: A paradigm shift in a provincial system of emergency care. Cureus. 2018 Jan 4;10(1):e2022. doi: 10.7759/cureus.2022.

FUNDED GRANTS AND CONTRACTS AND CLINICAL TRIALS

Co-investigator. CIHR Team Grant. $725,000. Evaluating the psychometric properties and help-seeking impact of HEARTSMAP-U: a digital psychosocial self-assessment and navigational support application for post-secondary students. Dr. Q Doan. Co-Is: Dr. S. Barbic Dr. A. Gadermann Dr. M. Nelson Dr. R. Stenstrom Mr. P. Virk

Co-investigator. CIHR Team Grant funding $1.14 million. For the Canadian Sepsis Research Network project “Improving Care Before, During and After Sepsis”. PI. Dr A. Fox-Robichaud (McMaster University). UBC Co-Is: Drs Dave Sweet, John Tallon, Rob Stenstrom, Tex Kissoon.

Co-investigator. Emergency Department Opioid Overdose Treatment Study: Comparison of the safety and efficacy of different naloxone dosing regimens in patients with opioid overdoses. PI: Roy Purssell; Co-Investigators: Jesse Godwin, Andrew Kestler, Rob Stenstrom, Chris DeWitt, Frank Scheuermeyer, Jeffrey Brubacher Michael Smith Foundation for Health Research $98,500

Co-Investigator. Evaluation of My-HEARTSMAP, a self-reporting youth mental health assessment & management tool. Funded – CIHR $589,049

Principal Investigator. A randomized controlled trial of oral cephalexin versus intravenous cefazolin for moderate to severe skin and soft tissue infections – PHC Antibiotic Stewardship committee $10,000.00

KWIIS HEN NIIP

Public Relations

Laskaris, S. An emergency care program is coming to Nuu-chah-nulth communities, but its start is delayed by the pandemic. Ha-Shilth-Sa. 20202. Available from https://hashilthsa.com/news/2020-05-07/emergency-care-program-coming-nuu-chah-nulth-communities-its-start-delayed-pandemic

Conference Presentations and Posters - Completed

Muller da Silva, M, Kent, A, Malcomson, N, Ho, K, Watts, J, Lucas, L, Reading, J, Christenson, J, on behalf of the Kwiis-hen-niip team. (March 10-11, 2022). Kwiis-hen-niip (change): Studying community-driven interventions to support emergency care in remote Indigenous communities. Oral Presentation. BC SUPPORT Unit Putting Patients First 2022. Vancouver, BC.

Christenson S, Drebit S & Christenson J. (November 19, 2019). Kwiis hen niip – Change: Change for emergency care services in remote British Columbia Indigenous communities. Poster. BC SUPPORT Unit Putting Patients First 2019. Vancouver, BC. Available from: https://doi.org/10.26226/morressier.5d9e3dea740457b65481ac8b

Conference Abstracts - Accepted

Kent A, Malcomson N, Watts J, Lucas L, Ho K, Reading J, Christenson J, on behalf of the Kwiis-hen-niip team. (May 31-June 2, 2022). Kwiis-hen-niip (change): Sharing promising practices for co-designing and implementing community-driven first responder care improvements in remote Indigenous communities. Oral Presentation. BC Patient Safety and Quality Council, Quality Forum 2022. Vancouver, BC.

Kent A, Malcomson N, Watt J, Lucas L, Ho K, Reading J, Christenson J, on behalf of the Kwiis-hen-niip team. (May 26-29, 2022). Kwiis-hen-niip (change): A nation-led partnership to improve emergency care in remote First Nations communities. Oral Presentation. Community Engaged Research Initiative (CERi) Horizons Conference. Vancouver, BC.

Forward L, Latsky J, Kent A, Drebit S, Malcomson N, Muller da Silva M, Ho K, Lee R, Watts J, Reading J, Lucas L, Christenson J, on behalf of the Kwiis-hen-niip team. (April 21st – 23rd, 2022). Kwiis-hen-niip (change): Practices for co-designing and implementing community-driven emergency care improvements in remote Indigenous communities. Oral Presentation. Society of Rural Physicians of Canada, Rural & Remote, 2022. Ottawa, ON.

Grants Awarded

Muller da Silva M. (September 2021- August 2024). Building on the strengths of first responders as a critical first point of contact: Improving emergency care in remote Indigenous communities. Michael Smith Health Research BC Research Trainee Award. $148,500 CAD.

Douglas S, Marchand K, Chem K, Sommers J. (June 2021- May 2022). Indigenous video-based CPR training tool for NTC rural communities. 2021 UBC Chapman and Innovation Grant. $10,000.00 CAD.

Latsky J, Forward L, Chem N, Marchand K, Dougla, S. (March 2021- February 2022). Indigenous video-based CPR training tool for Nuu-Chah-Nulth rural communities. Canadian Federation of Medical Students (CFMS) Student Initiative Grant. $3,000.00 CAD.

Christenson J, Ho K, McDonald S, Reading J, Stelkia, K, Watts J, Borque Bearskin L, Drebit S, Kent A, Latsky J, Liu J, Lucas L, McFetridge C, Pawlovich J, Atleo J, Charleson R, Christiansen S, Duperreault, M, Lee R, Sommer, J, Wallace E, Wiggins B (January 2020- December 2023). Kwiis hen niip – Change: Change for emergency care services in rural and remote Indigenous communities in British Columbia. Canadian Institutes of Health Research (CIHR)- Project Grant. $1,172,436 CAD.

REAL-TIME VIRTUAL SUPPORT

Publications

Ho K, Lauscher HN, Stewart K, Abu-Laban RB, Scheuermeyer F, Grafstein E, Christenson J, Sundhu S. Integration of virtual physician visits into a provincial 8-1-1 health information telephone service during the COVID-19 pandemic: a descriptive study of HealthLink BC Emergency iDoctor-in-assistance (HEiDi). CMAJ Open. 2021 Jun 15;9(2):E635-E641. doi: 10.9778/cmajo.20200265. Print 2021 Apr-Jun. PMID: 34131026

Presentations and Abstracts

Real-Time Virtual Supports (RTVS) for BC
- BC Quality Forum 2021
- CAEP 2021

Implementing HealthLinkBC 8-1-1 Nurse-Physician Virtual Care: Early Findings from a Developmental Evaluation
- UBC DEM Research Day 2021
- BC Quality Forum 2021

BC's Health Data Platform: Supporting a HealthLinkBC-8-1-1 learning health system
- E-health 2021

Real-time virtual support in BC: Evaluating an equity-focused provincial initiative
- E-health 2021

RTVS: Evaluating a collaborative, partnership advancing health equity in BC
- E-health 2022
- BC Quality Forum 2022

Grants

CIHR Catalyst Grant (2021): Development of a toolkit to inform implementation of the Learning Health System

SCIENTIFIC PROGRAM

Ho, Kendall. Abu-Laban R, Stewart K., Duncan R., Scheuermeyer F., Hedden L., Novak-Laucscher H., Sundhu S. Chadha R., Christenson J., Grafstein E. Lavallee D., Purssell R, Tallon J.M., Wood N, Bryan S. Health system utilization and outcomes of urgently triaged callers to a nurse-managed provincial health information telephone service after initiation of supplemental virtual physician assessment. (submitted for publication in 2022 and under review)

Duncan R, Stewart K, Scheuermeyer F, Christenson J, Abu-Laban R, Hedden L. Factors associated with concordance between Virtual Physician advice and caller service utilization for urgently triaged callers to a nurse-managed provincial health information telephone service. Presentation at Centre for Health Services and Policy Research Conference, March 2022.

Duncan R, Scheuermeyer F, Abu-Laban R, Christenson J. Implementation of a provincial chest pain protocol is associated with a decrease in hospitalizations. Research presentation at Centre for Health Services and Policy Research Conference, March 2022.

Abu-Laban R, Duncan R. NACRS in British Columbia: History, Current Status & Its Impact, and Proposal for Improvement, Scientific Program BC Emergency Medicine Network. November 2021

Julian Marsden, MD Sharla Drebit, MSc, MBA Ronald R. Lindstrom, MSc, PhD Carolyn MacKinnon, BA Chantel Archibald Riyad B. Abu-Laban, MD, MHSc Kim Eggers Kendall Ho, MD, FRCPC Afshin Khazei, MD Adam Lund, MD, MEd Ed Martin, BA Jim Christenson, MD. The BC Emergency Medicine Network: Evaluation Approach and Early Findings. BCMJ, Vol. 61, No.4, May 2019 Pages 164-171.

Lindstrom, R. and Noseworthy, T. (2019). Evidence Brief #219: Network science & clinical networks in BC – A perspective. Vancouver: BC Academic Health Science Network.

Abu-Laban RB, Drebit S, Lindstrom RR, Archibald C, Eggers K, Ho K, Khazei A, Lund A, MacKinnon C, Markham R, Marsden J, Martin E, Christenson JM. The BC Emergency Medicine Network: A Paradigm Shift in the Provincial Emergency Care System. Cureus 10(1):1-10, 2018.

Abu-Laban RB, Christenson J, Drebit S. Launch of the BC Emergency Medicine Network. BC Med Journal. 59(10, 531, Dec 2017.

Christenson J. A network to improve emergency patient care by facilitating practitioners to effectively support practitioners. Healthc Manage Forum 2014; 27:132-135.

CARDIOVASCULAR PROGRAM

Yap J, Scheuermeyer FX, van Diepen S, Barbic D, Straight R, Wall N, Asamoah-Boaheng M, Christenson J, Grunau B. Temporal trends of suicide-related non-traumatic out-of-hospital cardiac arrest characteristics and outcomes with the COVID-19 pandemic. Resuscitation plus 2022.

Lane DJ, Grunau B, Kudenchuk P, Dorian P, Wang H, Daya MR, Lupton J, Vaillancourt C, Okubo M, Davis D, Rea T, Yannopolous D, Christenson J, Scheuermeyer FX. Bayesian Analysis of Amiodarone or Lidocaine vs Placebo for Out-of-Hospital Cardiac Arrest. Heart. 2022. In press.

Hutton G, Kawano T, Panchal A, Scheuermeyer FX, Asamoah-Boaheng, Christenson J, Grunau B. Out of hospital cardiac arrests terminated without full resuscitation attempts: characteristics and regional variability. Resuscitation. 2022. In press.

Liang D, Scheuermeyer FX, Grunau B. Utilization and cost effectiveness of school and community center AED deployment models in Canadian cities. Resuscitation. 2022. In press.

Scheuermeyer FX. Man with chest pain. Ann Emerg Med. 2021. In press.

Yap J, Haines M, Nowroozpoor A, Armour R, Luongo A, Sidhu G, Scheuermeyer FX, Hutton J, Helmer J, Bolster J, Puyat J, Christenson J, Grunau B. Rationale for withholding professional resuscitation in emergency medical system-attended out of hospital cardiac arrest. Resuscitation. 2021. In press.

Scheuermeyer FX, Hague C, Ellis J, Grafstein E, Christenson J, Grunau B, Innes G, Leipsic J. Prognostic long-term value of nonobstructive disease in emergency department chest pain patients who undergo CCTA. J Comput Cardiovasc Tomogr. 2021. In press.

Scheuermeyer FX, Yoo J, Greene M, O'Donnell S. Atrial fibrillation as a precursor of mRNA-1273 SARS-CoV-2 vaccine-induced pericarditis. CJEM. 2021. In press.

Grunau B, Kawano T, Rea TD, Okubo M, Scheuermeyer FX, Reynolds JC, Heidet M, Drennan IR, Cheskes S, Fordyce CB, Twaites B, Christenson J. Emergency medical services employing intra-arrest transport less frequently for out-of-hospital cardiac arrest have higher survival and favorable neurological outcomes. Resuscitation. 2021; 168: 27 – 34.

Gan WQ, Buxton JA, Palis H, Scheuermeyer FX, Desai R, Janjua N, Zhao B, Slaunwhite A. Risk of Cardiovascular Diseases in Relation to Substance Use Disorders. Drug Alcohol Dep. In press. 2021.

Gan WQ, Buxton JA, Palis A, Janjua NZ, Scheuermeyer FX, Xavier CG, Zhao B, Desai R, Slaunwhite AK. Drug overdose and the risk of cardiovascular disease: a nested case control study. Clin Res Cardiol. In press. 2021.

Besserer F, Kawano T, Dirk J, Meckler G, Tijssen JA, DeCaen A, Scheuermeyer FX, Beno S, Christenson J, Grunau B. The association of intraosseous vascular access and survival among pediatric patients with out of hospital cardiac arrest. Resuscitation. In press. 2021.

Grunau B, Bashir J, Cheung A, Boone R, McDonald K, Scheuermeyer FX, Singer J, Jenneson S, Straight R, Twaites B, Harris L, Haig S, Harris D, Vandegriend R, Kanji H, Christenson J. A pragmatic parallel group implementation study of a prehospital-activated ECPR protocol for refractor out-of-hospital cardiac arrest. Resuscitation. in Press 2021.

Stiell IG, Eagles D, Nemnom I-J, Brown E, Taljaard M, Archambault P, Birnie D, Borgundvaag, B, Clark G, Davis P, Godlin D, Hohl C, Mathieu B, McRae AD, Mercier E, Morris J, Parkash R, Perry JJ, Rowe BH, Thiruganasambandamoorthy V, Scheuermeyer FX, Sivilotti M, Vadebonceour A. Adverse events associated with electrical cardioversion in patients with acute atrial fibrillation and atrial flutter. Can J Cardiol. 2021. In press.

Stiell IG, Archambault, PM, Morris J, Mercier E, Eagles D, Perry JJ, Scheuermeyer FX, Clark G, Gosselin S, Vadeboncoeur A, Parkash R, de Wit K, Patey A, Thiruganasambandamoorthy, Taljaard M for the RAFF3 Study investigators. RAFF3 Trial: A stepped-wedge cluster randomized trial to improve care of acute atrial fibrillation and flutter in the emergency department. Can J. Cardiol. 2021. In press.

Stiell IG, de Wit K, Scheuermeyer FX, Vadeboncouer A, Angaran P, Eagles D, Graham ID, Atzema CL, Archambault PM, Tebenham T, McRae AD, Cheung WJ, Parkash R, Deyell MW, Baril G, Mann R, Sahsi R, Upadhye S, Brown E, Brinkhurst J, Chabot C, Skanes A. 2021 CAEP acute atrial fibrillation / flutter best practices checklist. CJEM. 2021. In press.

Scheuermeyer FX, Atzema C. Converting emergency physician management of patients with atrial fibrillation or flutter. CJEM. 2021. In press.

Hawkins N, Ezekowitz J, Kaul P, Sandhu RK, Youngson E, Scheuermeyer FX, McAllister FA. Impact of Atrial Fibrillation Case Volume in the Emergency Department on Early and Late Outcomes of Patients with New Atrial Fibrillation. Ann Emerg Med. 2021. In press.

Scheuermeyer FX, Targonsky E, Stiell I. Just the facts 1: Atrial fibrillation or flutter in patients who are candidates for rate control. CJEM. 2021. In press.

Stiell I, Targonsky E, Scheuermeyer F. Just the facts: 2 - Atrial fibrillation or flutter in patients who are candidates for rhythm control. CJEM. 2021. In press.

Al Assil R, Singer J, Heidet M, Fordyce CB, Scheuermeyer FX, van Diepen S, Sekhon M, Leung KHB, Stenstrom R, Christenson J, Grunau B. The association of pH values during the first 24h with neurological status at hospital discharge and futility among patients with out-of-hospital cardiac arrest. Resuscitation. 2020. In press.

Grunau B, Bal J, Scheuermeyer FX, Guh D, Dainty K, Helmer J, Saini S, Chakrabarti A, Brar N, Sidhu N, Barbic D, Christenson J, Chakrabarti S. Bystanders are less willing to resuscitate patients with out of hospital cardiac arrest during the Covid-19 pandemic. Resuscitation Plus. 2020. In press.

Humphries K, Zhao Y, Lee MK. Izadnegahdar M, Norris C, Lyon A, Toleva O, Udell J, Hassan A, Cox J, Pilote L, Singer J, Scheuermeyer FX, Mills N, Robinson S, Tychtera A, Johnson D, Kavsak P, Christenson J. High-sensitivity cardiac troponin – Optimizing the diagnosis of acute myocardial infarction / injury in women (CODE – MI): Rational and design for a multi-center stepped-wedge cluster randomized trial. Am Heart J. 2020. In press.

Sinden S, Heidet H, Scheuermeyer FX, Kawano T, Helmer JS, Christenson J, Grunau B. The association of scene-access delay and survival with favorable neurologic status in patients with out-of-hospital cardiac arrest. Resuscitation. 2020. In press.

Guy A, Kawano T, Besserer F, Scheuermeyer FX, Kanji HD, Christenson J, Grunau B. The relationship between no-flow interval and survival with favorable neurological outcome in out-of-hospital cardiac arrest: Implications for outcomes and ECPR eligibility. Resuscitation 2020. In press.

Grunau B, Humphries K, Stenstrom R, Pennington S, Scheuermeyer FX, van Diepen S, Awad E, Al Assil R, Kawano T, Brooks S, Gu B, Christenson J. Public access defibrillators: gender-based inequities in access and application. Resuscitation. 2020. In press.

Barbic D, Duncan K, Trainor R, Ertel EA, Enos MK, Philips H, Besserer F, Grunau B, Kestler AK, Christenson J, Scheuermeyer FX. A survey of the public's ability to recognize and willingness to intervene in out-of-hospital cardiac arrest and opioid overdose. Acad Emerg Med. 2020. In press.

Scheuermeyer FX, Norena M, Innes, G, Grafstein E, Grunau B, Christenson J, Barbic D, Barrett T. A decision aid for early identification of acute underlying illness in emergency department patients with atrial fibrillation or flutter. CJEM 2019. In press.

Hawkins N, Scheuermeyer FX, Youngson E, Sandhu RK, Ezekowitz, Kaul P, McAlister FA. Impact of cardiology follow-up care on treatment and outcomes of patients with new atrial fibrillation discharged from the emergency department. Europace. 2019. In press.

Stiell IG, McMurtry MS, McRae A, Parkash R, Scheuermeyer FX, Atzema CL, Skanes A. The Canadian Cardiovascular Society 2018 guidelines update for atrial fibrillation—a different perspective. CJEM. 2019; 21: 572 - 75.

Stiell IG, McMurtry MS, McRae A, Parkash R, Scheuermeyer FX, Atzema CL, Skanes A. Safe cardioversion for patients with acute-onset atrial fibrillation and flutter: practical concerns and considerations. Can J Cardiol. 2019. In press.

McRae A, Andruchow J, Scheuermeyer FX, Christenson J, Atkinson P. CJEM Debate: #TropandGo – Negative high sensitivity troponin testing is safe as a final test for most emergency department patients with chest pain. CJEM. 2019. In press.

Grunau B, Scheuermeyer FX, Kawano T, Drennan I, Fordyce C, Reynolds J, Lin S, Christenson J. The Association of the Average Epinephrine Dosing Interval and Survival with Favorable Neurological Status at Hospital Discharge in Out-of-Hospital Cardiac Arrest. Ann Emerg Med. 2019. In press.

Scheuermeyer FX, Innes G, Grafstein E, Chard R, Vanderberg S, Cheyne J, Cheyne R, Christenson J, Grunau B, Barbic D, Smith S. Emergency department patients with a prolonged corrected QT interval do not have increased thirty-day mortality. Acad Emerg Med. 2019; 26: 818 - 822.

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Grunau B, Kawano T, Scheuermeyer FX, Tallon J, Reynolds J, Besserer F, Barbic D, Brooks S, Christenson J. Early advanced life support attendance is associated with improved survival and neurologic outcomes after non-traumatic out-of-hospital cardiac arrest in a tiered prehospital response system. Resuscitation. 2019; 135: 137 - 44.

Scheuermeyer FX, Andolfatto G, Christenson J, Villa-Roel C, Rowe B. A multicenter randomized trial to evaluate a chemical-first or electrical-first cardioversion strategy for patients with uncomplicated acute atrial fibrillation. Acad Emerg Med. 2019; 26: 969 - 81.

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Okubo M, Callaway C, Schmicker R, Idris A, Nicol G, Austin M, Wallace D, Grunau B, Richmond M, Morrison L, Kurz M, Cheskes S, Kudenchuk P, Wang HE, Aufderheide T, Herren H, Vaillancourt C, Davis D, Scheuermeyer FX, Vilke G, Elmer J. Variation in Survival after Out-of-hospital Cardiac Arrest between Emergency Medical Services Agencies. JAMA Cardiol. 2018; 3: 989 – 999.

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Scheuermeyer FX. New frontiers in Canadian atrial fibrillation research. CJEM. 2018; 20: 323 - 24.

Hansen M, Schmicker RH, Newgard CD, Grunau B, Scheuermeyer FX, Cheskes S, Vithalani V, Alnaji F, Rea T, Idris AH, Herren H, Hutchison J, Austin M, Egan D, Daya M, for the Resuscitation Outcomes Consortium Investigators. Time to Epinephrine Administration and Survival from Non-Shockable Out-of-Hospital Cardiac Arrest Among Children and Adults. Circulation. 2018. 137; 2032 - 2040.

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Grunau B, Kawano T, Dick W, Straight R, Connolley H, Schlamp R, Scheuermeyer FX, Fordyce C, Barbic D, Tallon J, Christenson J. Trends in care processes and survival following prehospital resuscitation improvement initiatives for out-of-hospital cardiac arrest in British Columbia, 2006 – 2016. Resuscitation. 2018. 125: 118 - 125.

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Al-Mohassain MA, Carere R, Mancini J, Humphries K, Whalen B, Lee T, Scheuermeyer FX, Ignaszewski A. A Plaque Disruption Index Identifies Patients with Non-STE-Type 1 Myocardial Infarction within 24 Hours of Troponin Positivity. PLOS One. 2016 Oct 6;11(10):e0164315.

Grants

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McRae AD, Andruchow J, De Konig A, Innes G, Kavsak P, Lang E, Sajobi P, Scheuermeyer FX, Worster A. Development of a novel risk prediction score for emergency department patients with suspected coronary artery disease. Canadian Institutes of Health Research (2019 – 2020; $123 166)

ED RESPONSE TO THE OPIOID OVERDOSE CRISIS

Moe J, Chong M, Zhao B, Scheuermeyer FX, Purssell R, Slaunwhite A. Death after emergency department visits for opioid overdose in British Columbia: a retrospective cohort analysis. CMAJ Open. 2021 Mar 17;9(1):E242-E251. doi: 10.9778/cmajo.20200169. PMID: 33731425; PMCID: PMC8096380.

Galarneau LR, Hilburt J, O'Neill ZR, Buxton JA, Scheuermeyer FX, Dong K, Kaczorowski J, Orkin AM, Barbic SP, Bath M, Moe J, Miles I, Tobin D, Grier S, Garrod E, Kestler A. Experiences of people with opioid use disorder during the COVID-19 pandemic: A qualitative study. PLoS One. 2021 Jul 29;16:e0255396. doi: 10.1371/journal.pone.0255396. PMID: 34324589; PMCID: PMC8320992.

Kestler A, Kaczorowski J, Dong K, Orkin AM, Daoust R, Moe J, Van Pelt K, Andolfatto G, Klaiman M, Yan J, Koh JJ, Crowder K, Webster D, Atkinson P, Savage D, Stempien J, Besserer F, Wale J, Lam A, Scheueremeyer F. A cross-sectional survey on buprenorphine-naloxone practice and attitudes in 22 Canadian emergency physician groups. 2021 Sep 21;9(3):E864-E873. doi: 10.9778/cmajo.20200190. Erratum in: CMAJ Open. 2021 Oct 5;9(4):E928. PMID: 34548331; PMCID: PMC8476213.

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