

Paramedics Connecting Through Applied Research (Paramedics CARE) Conference Canada 2021

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Abstract

The Justice Institute of British Columbia convened its first annual Paramedics Connecting Through Applied Research (Paramedics CARE) between May 27 2021 and June 11 2021 over four morning sessions held online. The conference was co-sponsored by the CSA Group, the Justice Institute of British Columbia, and the University of Waterloo through a Connections grant from the Social Sciences and Humanities Research Council of Canada. The aim of the Paramedics CARE is to mobilise knowledge on the latest research in Canadian paramedicine and foster intersectoral and interdisciplinary collaboration between academic researchers, educators, provincial and municipal governments, private small and medium enterprises (SMEs) that support paramedic practice, and the public through patient advocacy groups. In this Conference Report, the authors share some featured presentations, discuss lessons learned and visions for the future of paramedicine.

Key words

● Paramedicine ● Paramedic practice ● Research methods ● COVID-19

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The 'Paramedics Connecting Through Applied Research' (Paramedics CARE) brought together industry leaders, practitioners, policymakers, educators, researchers, and students to discuss current trends in paramedic research and develop an applied research agenda to support the future of Canadian paramedicine. Paramedicine has evolved beyond the traditional role of transporting individuals to primary healthcare centres for

treatment. While paramedics have been acquiring new responsibilities and roles, research in paramedicine has also evolved, and is becoming increasingly intersectoral and transdisciplinary. Paramedics CARE connected leading experts in a four-morning virtual conference between May 27 and June 11 2021 to discuss paramedicine from their respective disciplines and perspectives, share current trends in research, initiate a conversation on how these initiatives will impact the lives of Canadians, and explore ways to mobilise research knowledge more effectively for an intersectoral and transdisciplinary audience.

The conference was divided into four morning sessions and held virtually due to the ongoing COVID-19 pandemic. Each day began with opening remarks delivered by Dr. Ron Bowles, Dean of the Office of Applied Research and Graduate Studies at the Justice Institute of British Columbia, followed by between three and five presentations. The presentation summaries written by the respective authors are presented herein. For the final morning of the conference, the presentations were followed by a breakout activity, concluding remarks and virtual happy hour for networking.

Over the four sessions, more than 20 authors presented interesting talks about their visions for the field of paramedicine, the research they'd been undertaking and the gaps in the system they were



working to address. In the following section, readers will find ten presentation summaries written by their respective authors that will be followed by a discussion, lessons learned, recommendations for future research, future events and a conclusion.

Canadian paramedicine as a complex system of systems

Dr. Ron Bowles of the Justice Institute of British Columbia opened the Conference by presenting a view of paramedicine in Canada as a complex 'system of systems'. Dr. Bowles noted that the Paramedics CARE sessions aimed to mobilise knowledge and foster intersectoral and transdisciplinary collaboration between academic researchers, educators, provincial and municipal governments, small and medium enterprises (SMEs), and patient advocacy groups that support paramedic practice. This goal demonstrates and highlights some of the dynamic systems, practitioners, organisations, and stakeholders, whose interactions constitute the profession of paramedicine. Dr. Bowles described the Canadian Paramedic Information System project, a 3-year project that analysed existing information and data systems, explored operational and academic literature, and gathered data from key informants with the goal of identifying data needs and core concepts that will support evidence-informed evolution and practice of Canadian paramedicine.

The resulting 'map', recently published as a National standard, describes a series of overlapping micro-to-macro 'systems', consisting of data describing patients and practitioners, patient encounter data, operational characteristics of paramedic service organisations, varied practice settings, professional organisations and stakeholders to broader healthcare, social and cultural considerations. Dr. Bowles noted that systems-of-systems conceptualisations are valuable metaphors that are becoming increasingly common in models and research exploring practice, occupational requirements, and the profession as a whole.

Stirred, not shaken

Canadian paramedicine's response to COVID-19

Dr. Ron Bowles described the initial findings of a study exploring the innovative responses of Canadian Paramedic Service Organizations (PSOs) to the COVID-19 pandemic. A key finding was the complexity of these challenges and the ubiquity of COVID's impact across all aspects of Canadian society. Thematic analysis situated these challenges

within an emergent framework:

- Maintaining safety
- Ensuring ongoing and COVID-related operations
- Providing safe and effective clinical care
- Addressing stresses on the overall healthcare and public safety systems.

Yet, neither challenges nor innovations were discrete; both issues and responses typically impacted multiple categories of this framework. For example, personal protective equipment (PPE) use was constrained by a lack of understanding of PPE requirements for COVID, differing—and often rapidly changing—guidance from multiple levels and sources of authority, stressed or broken supply chains, the need for rapid research, development of alternative practices and supplies, establishing effective training and procedures, and integration with PPE practices of related health and emergency services. Success factors in the innovative responses of Canadian PSOs included a focus on business continuity, nimbleness and adaptability, development and leveraging of interpersonal and interorganisational relationships, and effective information and decision-making and communication practices.

COVID-19 and paramedic practice

An interdisciplinary approach to qualitative research

Frontline professionals are experiencing numerous policy and protocol changes in addition to facing an enhanced risk of personal exposure during the COVID-19 pandemic. The COVID-19 outbreak offers an opportunity to capture their experiences during substantial and rapid changes to workplace policy, protocols, and professional roles. In this talk, Lindsey Boechler and Cheryl Cameron discussed overlapping findings from three recent research projects, written with colleagues Polly Ford-Jones, J Chris Smith and Patrick Suthers, which explored the lived experiences of Canadian paramedics, nurses, and police officers throughout the first wave of COVID-19. These studies highlighted the importance of employing interdisciplinary, qualitative research approaches to capture the perspectives of frontline professionals. An interdisciplinary approach led to learnings surrounding culture, equity, change management, and leadership that would not otherwise have been captured. Research findings also revealed that frontline professionals are encountering ethical dilemmas and suffering moral distress rooted in similar experiences. While historical systemic issues and inequities are being exacerbated by COVID-19, added stress and uncertainty have also led to

increased interprofessional conflict across paramedicine, nursing, and policing. Rapid knowledge mobilisation of early research findings was vital in diminishing tension and supporting frontline professionals through the continuing COVID-19 pandemic.

Caring for those who care for us

Prevention of musculoskeletal disorders among paramedics

Taking care of those who care for us is of utmost importance to maintaining public health and safety. On a daily basis, paramedics encounter numerous ergonomic hazards (e.g. high forces, awkward postures, repetitive movements), which put them at increased risk for musculoskeletal disorders (MSDs). The new Canadian Standard on the ergonomic design of ambulances sets out minimum requirements and provides guidance to support manufacturers and paramedic services in designing and procuring ambulances and its related equipment that are in accordance with research to maintain and enhance the safety, wellness, and performance of paramedics.

In this presentation, Dr. Amin Yazdani, Director of the Canadian Institute for Safety, Wellness, and Performance, School of Business, Conestoga College Institute of Technology and Advanced Learning, presented the new evidence-informed standard and discussed its research and development process. More specifically, Dr. Yazdani shared findings from three research studies to provide the audience with an understanding of the state of research related to ambulance design, the extent of ergonomic considerations found in existing Canadian provincial ambulance design standards and regulations, the application of standards in the ambulance design and procurement processes, and the barriers to integrating ergonomics into product design when standards do not adequately address ergonomic considerations. An overview of key areas found within the standard was also provided.

Gender and sex matters

Disrupting the paramedic work environment with gender-based analysis

The difference between sex and gender are important concepts to paramedicine evidence and practice. Sex is the biological profile that includes chromosomes, sex organs and particular groupings of hormones, whereas gender is a socially constructed stereotype that is culturally reinforced through roles defined as feminine or masculine. Knowing this difference helps paramedics to

develop a critical thinking approach and enables them to challenge both their own bias and the evidence that supports their clinical decisions. This presentation explored where the current approach of 'one-size-fits-all' clinical guidelines currently taught and used in practice, and a lack of addressing gender bias does not benefit all patients. Dr. Becky Donelon, Manager of Emergency Health Services, Alberta Health, brought forward the importance of paramedics being able to challenge their own clinical knowledge and bias in the following two key aspects:

- Recognising that the data provided as evidence in clinical protocols is, in most cases, only representative of white males
- Recognising the bias in interpreting patient presentations by relying on preconceived notions and expectations of gender stereotypes.

The discussion focus considered how clinical judgement underpinned by weak or lacking representative evidence is poor practice and that it matters to the patient how paramedics understand biological differences of sex and gender.

Ageing in place

Technology and innovation

Older adults (aged 65+ years) are the fastest growing demographic. It is estimated that by 2050, they will represent 25% of Canada's population. Recent studies have shown that over 90% of Canadians would prefer to stay in their own homes as they age. This will present new challenges to current social infrastructure and health professionals who provide medical, nursing, paramedicine and remote care across the country. In April 2021, the National Research Council of Canada (NRC) launched a 7-year 'Aging in Place Challenge Program' to address these challenges. In this talk, Dr. Amaya Arcelus, Programme Director, introduced the NRC and its mandate, along with the programme plan. She described the design approach and the extensive stakeholder engagement carried out during programme development. The programme is structured on the four main pillars of safety, health, connection and standards. It consists of collaborative projects between NRC researchers and partners from private and public sectors, who will develop novel technologies, applications, and recommendations to support aging in place. As older adults and caregivers are at the center of the programme's vision, it includes a community of 'Experts by Experience' (older adults and caregivers) who advise on programme direction and priorities, provide feedback on individual projects, and participate in research activities.



National standards for community paramedicine

Paramedicine is evolving into a health specialty that provides on-demand access to care and enables new care pathways that do not require or include traditional emergency department dispositions. Dr. Matthew Leyenaar, Director of Emergency Health Services at the Prince Edward Island Department of Health and Wellness, explained that the assessment approaches taught to paramedics for identifying and treating high-acuity patients follow a de facto standard but adaptation of assessment practices to low-acuity care not requiring emergency department care have not been established. Other parts of the healthcare continuum have implemented standardised multidimensional assessment instruments with demonstrated improvements, particularly with respect to patient needs in continuity of care and decision-support tools for clinicians.

The Common Assessments for Repeated Paramedic Encounters (CARPE) Study was a pragmatic cohort study that used a standardised multidimensional assessment instrument as a prototype in scheduled home visit community paramedicine programmes. The study demonstrated that patients seen in these programmes had higher levels of chronic disease comorbidities and mental health concerns. A standardised multidimensional assessment instrument has clinical utility to improve assessment practices when care planning is designed to support care-in-place and avoid transportation to emergency departments. The framework for evaluating assessment practices in clinical settings that implement standardised processes can be adapted to service delivery models, either within paramedicine or within other clinical settings.

Predictive modeling in paramedicine

Predictive modeling may help paramedic services and paramedics better plan for and deliver healthcare services. In this talk, Dr. Ian Blanchard, Adjunct Assistant Professor of Community Health Sciences at the University of Calgary, and Dr. Luc de Montigny, Research Coordinator (Urgences-santé) and Adjunct Professor at McGill University, compared prediction to other types of analyses, discussed the challenges and pitfalls of predictive modeling, and described ongoing work and potential applications for this technique in paramedic systems and care. Predictive modeling, or forecasting, is a technique where researchers attempt to predict future outcomes. It is different from explanatory modeling that explores what has happened in the past. One of the biggest challenges of any type of modeling is data quality, and avoidance of bias in the study

design. This is particularly important in predictive modeling where data limitations can be amplified. Two examples of ongoing predictive studies in Canadian paramedic systems were described:

- One with the aim of determining if supply-management based on 911 call demand forecasting can outperform current practice
- Another with the aim of developing prehospital risk estimation techniques for 911 call-taking.

The bottom line is that paramedics will play a critical role in the development and interpretation of these models to help inform their practice and the systems in which they work.

Post-traumatic stress injuries and paramedicine

Paramedicine is known to increase the risk of psychological work-related injuries. Occupational burnout and exhaustion result in reduced motivation and work performance. Occupational stress injuries (OSIs) are also common.

Ongoing work is needed to encourage a proactive approach to health and a holistic approach to care. Workplace stigma remains prevalent among other care and recovery barriers.

Given the high cost of mental health disability, the cost related to absenteeism and presenteeism, and the need to reduce psychological injuries and suicide, this session—presented by Dr. Katy Kamkar (PhD, CPsych), Assistant Professor of the Department of Psychiatry at the University of Toronto and Chair of the Canadian Psychological Association, Traumatic Stress Sector—focused on the emotional, cognitive/psychological and behavioural symptoms related to moral injury, compassion fatigue and burnout. It also covered ways of building individual and organisational protective factors and reducing modifiable risk factors as part of primary, secondary and tertiary prevention continuum of care, and discussed psychological health and safety implementation strategies to help reduce risk and promote individual and organisational resilience—in turn, optimising occupational health and safety.

The future of paramedicine Canadian vision

The Canadian Organization of Paramedic Regulators (COPR) was established in 2008 to address labour mobility challenges arising from amendments to Chapter 7 of the Agreement on Internal Trade. Jacqueline Messer-Lepage, Treasurer of COPR, outlined its mission and vision that supports a progressive approach to paramedic regulation across Canada.

In implementing its mandate, COPR members worked to increase harmonisation of regulatory activity across jurisdictions. To support regulatory alignment, COPR launched national examinations for Primary and Advanced Care Paramedics and Emergency Medical Responders. In 2019, COPR also launched a national portal to streamline international paramedic entry into Canada. The creation of this portal served to establish common criteria among COPR jurisdictions for pre-screening international applicants seeking licensure/registration/certification in Canada.

Most recently, COPR launched a national project to develop pan-Canadian Essential Regulatory Requirements (PERRs). The introduction of these competencies and standards will address key regulatory gaps and ensure that practitioners meet clinical and academic requirements necessary to support health systems nationwide.

Moving into the future, COPR members are developing immersive and virtual technology solutions to further enhance the evaluation of international and national practitioners. These adaptations in regulatory approach serve to advance safe and appropriate patient care within a forward-thinking regulatory environment.

Digital behavioural monitoring

Paramedics are often faced with extremely complex cases and have very little time to make informed decisions. Paramedics are becoming responsible for delivering home care to individuals in need. Still, they arrive at patients' homes with very little information about the health and behaviour of their patients. Yet they are asked to make complex informed decisions with a limited amount of information at their disposal.

In this talk, Dr. Plinio Morita, Director of the Ubiquitous Health Technology Lab (UbiLab) at the School of Public Health and Health Systems, University of Waterloo, discussed the future of remote patient monitoring (RPM) and the Internet of Things (IoT) as tools that will enable paramedics to remotely access the telemetry data of their patients, which could include vital signs (e.g. heart rate, blood pressure), as well as behavioural indicators (e.g. levels of physical activity, sleep patterns). Dr. Morita explored the integration of digital health technologies into paramedic practice, providing advanced situational awareness about their patients and as a mechanism to develop early warnings to triage homecare patients.

Digital health technologies are changing our healthcare landscape, and paramedics need to be prepared and equipped to use these technologies for improving their practice and patient care.

Discussion

The talks presented outline just some of the excellent research and efforts being made in the field of paramedicine across Canada. The talks fell into three major categories: work environment, technology and the future of paramedicine, each of which is summarised in this section.

Work environment

Three talks discussed the intricacies of the work environment. Dr. Amin Yazdani presented on the new Canadian standard on ergonomic ambulance design to maintain and enhance safety and wellness among paramedics. Dr. Becky Donelon discussed the importance of critical thinking and lack of understanding gender biases leading to poor practice and how awareness and support for evidence would support clinical decisions. Dr. Katy Kamkar presented on occupational burnout and the need to take a proactive approach to building individual and organisational protective factors for optimising occupational health and safety.

The COVID-19 pandemic has dramatically affected our lives and impacted every aspect of daily living. The work presented by Lindsey Boechler, Cheryl Cameron and written with colleagues Polly Ford-Jones, J Chris Smith and Patrick Suthers explores how paramedics, nurses and police officers experienced challenges with ethical dilemmas and suffered moral distress. Using qualitative methods, their work revealed how systemic issues were exacerbated by COVID-19, and how by sharing results through rapid knowledge mobilisation they were able to support frontline professionals.

Technology

The talks from Drs. Ian Blanchard and Luc de Montigny and Dr. Plinio Morita, demonstrated how data could be used to improve patient outcomes through predictive modeling and remote telemetry through integration of digital health tools. Both also highlighted how paramedics must be involved in the development of these tools and how they will be better equipped in the future. Dr. Amaya Arcelus discussed the Aging in Place Challenge Program's mandate and how it is geared towards finding novel solutions to support ageing in place.

Towards the future

Paramedicine, as Dr. Ron Bowles described in his talk, can be viewed as a 'system of systems'—an integral component of the Canadian healthcare landscape, best understood through intersectoral and transdisciplinary collaboration. Work such as the Canadian Paramedic Information System project provides a framework for exploring the various 'systems' or components of paramedicine, and their



relationships with each other and with broader health, community, and social-cultural systems. Initiatives, such as the work presented by Jacqueline Messer-Lepage and COPR, and harmonising regulations and standards of practices described by Dr. Matthew Leyenaar, further highlight the evolution of paramedicine in Canada and in meeting the healthcare needs of Canadians.

Lessons learned

The 1st annual Paramedics Connecting Through Applied Research (Paramedics CARE) brought together presenters of varied backgrounds and expertise—from those providing direct care in the community to visionaries who see transformative potential for technology in paramedicine. There were repeated calls for proactive, interdisciplinary research and approaches to ensure the progress of the field and development of robust programmes. As paramedicine continues to evolve as a profession, and as the practice of paramedicine increases in scope and complexity, research within and about the profession must similarly incorporate multiple perspectives and a variety of disciplinary approaches. Events such as the Paramedic CARE conference provide valuable opportunities for researchers and stakeholders in paramedicine to look through a variety of lenses, to see both new and familiar challenges in different ways.

In its first annual offering, this conference was held in virtual format. Split over several weeks, this allowed participants and presenters to make time in their busy schedules to attend rather than having to book an entire week off. The virtual sessions were kept shorter to minimise fatigue and scheduling during a mutually agreeable time ensured that global attendees could also participate. Additionally, as every session was a standalone event, participants were not forced to pick between concurrent sessions. Participants enjoyed the presentations, sharing their positive feedback via emails and comments.

Future research

A key message emerging from the presentations was the need for national structure(s) and events, such as Paramedic CARE, to connect and foster collaboration between various stakeholders in Canadian paramedicine. Without such structures,

innovation will continue to be driven by local and regional operational needs and opportunities. Bringing together a wide range of knowledge users from practitioners to suppliers of industry equipment will create opportunities to energise current, and innovate future, research ideas. Additionally, enabling participation of paramedicine students and early career paramedics will help to mobilise the results of this research, resulting in direct and lasting impacts for the health of Canadians. The intentional creation of a space for sharing and discussing current and emerging research methods will further help advance paramedicine and the science(s) supporting it.

Next events

Paramedic CARE was organised by the Ubiquitous Health Technology Lab at the University of Waterloo and the Justice Institute of British Columbia. Attendees tuned in from around the world, with attendance at individual sessions ranging from between 30 and 55 registrants. Following the success of this conference and the format, the next Paramedics CARE conference will be held in Ontario, Canada tentatively scheduled for June 2022. At present, the format will include four sessions and, depending on public health requirements, will include both virtual and in-person activities. The landscape of paramedicine has changed, and the themes of this conference highlight the importance of harnessing digital technology, both through research and practice.

Conclusion

The conference saw a range of presenters from various backgrounds and expertise, addressing a diverse set of social, health, and practice challenges. The knowledge and networking opportunities through the Paramedic CARE conference highlight the diverse, complex, and dynamic evolution of paramedic practice in Canada. **IPP**

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