



Implementing digital emergency medicine: a call to action

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Received: 20 April 2023 / Accepted: 7 November 2023 / Published online: 25 November 2023

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Abstract

As digital technologies continue to impact medicine, emergency medicine providers have an opportunity to work together to harness these technologies and shape their implementation within our healthcare system. COVID-19 and the rapid scaling of virtual care provide an example of how profoundly emergency medicine can be affected by digital technology, both positively and negatively. This example also strengthens the case for why EM providers can help lead the integration of digital technologies within our broader healthcare system. As virtual care becomes a permanent fixture of our system, and other technologies such as AI and wearables break into Canadian healthcare, more advocacy, research, and health system leadership will be required to best leverage these tools. This paper outlines the purpose and outputs of the newly founded CAEP Digital Emergency Medicine (DigEM) Committee, with the hope of inspiring further interest amongst CAEP members and creating opportunities to collaborate with other organizations within CAEP and across EM groups nationwide.

Keywords Digital technology · Virtual care · Artificial intelligence

Background

Emergency medicine (EM) has been chronically challenged by several perpetual issues, and the COVID-19 pandemic has worsened their deleterious effects. The long-standing problems of ED overcrowding have escalated into a critical crisis by the pandemic. While ED crowding is certainly multifactorial and involving many parts of the overall health system, COVID-19 provided an example of an edge-case with how ED volumes would be effected by a substantial deficit of in-person community-based care, including but not limited to shortages in primary care physicians, home care, wound care, and social services [1, 2]. COVID-19 also precipitated a debilitating loss in healthcare providers across the system, exacerbating pre-existing health human resource

challenges. This was most dramatically seen in rural settings, where some rural and remote EDs have been forced to close, leaving some communities with no point of access for acute care [3]. EDs need to urgently identify both conventional and innovative approaches to address ED safety and improve quality of care, including accessibility. Solving this problem by increasing funding for human resource retention and replenishment alone is not enough due to the critical shortage of skilled professionals. A priority should be creating efficiencies by supporting our health professionals to work smarter to serve our patients. Other industries have leveraged technology to this end, with online banking, e-commerce, and ride-sharing all examples of providing more services to more people with existing physical infrastructure and human resources. This position statement aims to highlight the opportunity available to emergency medicine in a similar fashion by judiciously implementing and evaluating digital technologies such as virtual care in EM, while advocating for knowledge-sharing and health services transformation through partnerships with health professionals, patients and health policy makers.

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Digital technologies in EM

Globally, COVID-19 accelerated the adoption of virtual solutions in all industries, and healthcare is also significantly influenced in its digital transformation, albeit adoption may not be as rapid compared to other sectors [5]. During the COVID-19 pandemic, virtual care (VC) was rapidly introduced and scaled out of necessity. Examples of virtual care in EM contexts (e.g., triage, treatment, consultations, or discharge) are continuing to increase in practice and in literature [4]. Beyond VC, strategic use of digital technologies such as remote home monitoring or data analytics has the potential to improve provider and patient experiences, optimize human resource allocation, facilitate cost-savings, and more [4]. Many promising studies on predictive AI modelling and wearable technology to improve patient care in general and EM settings are also surfacing in the literature [6]. It is becoming evident that VC and digital health is here to stay, and will continue to be commonly used in Canada. Digital EM is a viable and timely option for our discipline to consider.

Several obstacles impeding digital innovation in Canadian healthcare systems

Despite growth of virtual care in all health sectors, digital EM is yet to become mainstream in the Canadian public healthcare system due to several reasons. With insufficient capacity in the publicly funded primary care services to meet the public's demand during the COVID-19 pandemic, Canada saw a rapid rise of private sector virtual care services, such as Maple and RocketDoctor. Many of these services are not connected with the publicly funded primary care system, resulting in a lack of continuity of care of patients, fragmentation of primary care, duplication of services, and referral back to public system for more complicated cases such as emergencies. These private sector services received criticism on further exacerbating the fragmented nature of healthcare delivery in Canada, contributing to more inequity in access to care, questionable referrals to Emergency Departments, and increasing healthcare spending due to service duplication [7]. Secondly, even amongst the publicly funded virtual care services in primary and specialty care, their utility is limited by the inability to physically examine the patient. This is supported by anecdotal instances of ED providers seeing patients who have first been seen through virtual care, thereby generating negative impression of virtual care in the EM circle. Additionally, a lack of evidence and evaluation criteria to establish and validate best practice models

of digital health in the ED, which limits the scalability of these technologies within the Canadian healthcare system [8]. In contrast to the rapid expansion of the privately funded virtual care industry, unclear funding models and incentives to support sustainability of digital emergency medicine in the public system stunt digital innovation [9]. As such, it behooves us to ensure there is good evidence to substantiate the change to avoid diverting resources from in-person emergency care. Thus, perceptions of digital EM have been mixed, thereby dampening the interest of the public sector and certain quarters of the EM discipline in scaling of this digital approach in our discipline.

EDs can and should lead the digital transformation in healthcare

Emergency physicians and EDs are uniquely positioned to lead digital transformation in providing innovative, digital solutions and virtual care services for patients with undifferentiated and urgent health problems. EDs are the first points of in-person contact for most of these patients, and the virtual extension of this service naturally position EDs as community, regional or even province-wide points of access, as well as sentinel systems for patients with chronic diseases in decompensation such as heart failure or COPD. EDs also serve as the last line of defence in an increasingly stressed healthcare system, and the resulting strain placed on EDs. This creates a strong impetus to working harder to increase resources so as to improve existing service approaches, and work smarter by introducing novel technologies that could provide relief to current ED health professionals. Examples include virtual triage before patients arrive in EDs, sensors and wearables to monitor patients in ED to increase vigilance and prevent unwitnessed deterioration, and AI predictive modelling to accelerate safe and effective patient disposition. Emergency physicians themselves also embody adaptive and improvisational traits amenable to leading such a transformation. In addition, our clinical expertise in managing undifferentiated patients lends itself perfectly to virtual care, our specialty has also culturally learned for a long time to manage uncertainty and be creative and open-mindedness in problem solving.

A recent example is the rapid implementation of ED-led virtual care programs during COVID-19 in different provinces in Canada. Many such programs were created in a manner of weeks and optimized in real time. They modelled in-person care with nurse triage and emergency physicians providing care, and leveraged publicly available technology (e.g., Zoom). Even with this rapidity, lack of purpose-built technology, or the opportunity to full integrate into the health system, early evidence to date suggests these programs are both safe and cost effective [10]. The way EDs

implemented and evaluated virtual care will not only determine how best to integrate it into our existing health system long-term, but also serves as a model for how EM clinicians and researchers can play a vital role in the implementation of other technologies moving forward.

Next steps

Thanks to the support of CAEP Board, the CAEP Digital Emergency Medicine (DigEM) Committee was created in September 2021 to establish a community of practice of like-minded colleagues keen to understand and explore how digital technologies and virtual care practices can be best scaled to support front line healthcare delivery in Canada.

Since its inception, DigEM Committee established its terms of reference and created a steering committee comprised of staff, resident, and medical student CAEP members. We then liaised with other CAEP Committees such as the Steering committee, Future of EM Task Force, and Rural and Remote EM Committee to align our activities with CAEP and our membership.

A part of the primary deliverable of the first year of the committee is a comprehensive inventory of ED-led virtual care programs across Canada. This inventory was built by distributing a survey through CAEP and conducting follow-up interviews with many of the individuals involved in building out these virtual care programs. Our goal was to understand how these programs work, including who staffed them, who they served, and how they were funded, and what the outcomes of the programs were. Despite not all programs have detailed outcomes data, excellent research in BC and AB demonstrates that these programs can be both safe for patients and net cost savers for the health system. Moving forward, we plan to leverage the results of the virtual care inventory to make specific recommendations to ED providers, healthcare leaders, and provincial ministries regarding how best to integrate virtual care into the Canadian health system at scale long term. Critically, we will be able to use lessons learned from the implementations of the existing programs to judiciously advocate for investment in supporting providers in integrating technology into their workflow, and avoid frivolous virtual care to prevent unnecessary resource consumption.

This inventory project serves as a model for how we endeavor to work as a committee. We plan to use research projects like the aforementioned virtual care inventory to provide evidence on emerging digital EM technologies, and to help establish consistent evaluation metrics. To advocate for the scaling of promising technologies within our healthcare system, this committee will support key stakeholders such as hospital networks and provincial governments in technology implementation and evaluation, such as trialling

predictive AI modelling, and facilitate appropriate symbiotic private–public partnerships. Finally, we aspire to work with EM clinicians and trainees to pilot and put digital EM in practice, address clinical challenges, and build capacity through education and continuous practice improvement to support frontline emergency care of patients.

We welcome interested readers and colleagues to contact kendall.ho@ubc.ca for further information and join our committee to advance this exciting domain together.

Declarations

Conflict of interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

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