

Appendix B: 2017 Paramedic Community of Practice Priorities

The April 2017 Paramedic Community of Practice (CoP) meeting affirmed that the research priorities of the CoP would be re-established in conjunction with the Paramedic Chiefs of Canada (PCC) 2006 White Paper strategic goals¹; the Paramedic Association of Canada (PAC) 2016-2018 strategic goals²; the National Research Agenda for Emergency Services in Canada (2012)³; the National Gap Analysis for Emergency Medical Services (EMS) Science and Technology (S&T) research (2012); the 2013, 2014 and 2015 Paramedic Community of Practice priorities; and the Canadian Safety and Security Program's four focus areas.⁴ An upcoming need was observed to renew the 2006 PCC's White Paper strategic goals and 2012 National Research Agenda.

Through discussion at the 2017 CoP meeting, the following research priorities emerged:

RESEARCH PRIORITY 1: EMERGING TECHNOLOGIES

A high priority was placed by the 2017 CoP on the quickly evolving technological landscape, in keeping with the research gap into paramedic service science and technology identified in the 2012 EMS S&T gap analysis. A significant technology on the horizon is the Public Safety Broadband Network (PSBN), a band in the Long Term Evolution protocol for communication networks that will shortly be deployable by tri-service and other operators. PSBN will inform solutions for communication requirements in complex environments (Research Priority 2) by facilitating real-time connectivity between multiple responders and multiple environments.

Emerging applications based on PSBN include:

- Video applications for mass casualty care for transmitting videos taken onsite at events to command centers;
- Next Generation 911 using voice-to-text apps for digitally forwarding the content of audio and video 911 calls to dispatchers;

¹ The PCC 2006 White Paper strategic goals were: 1. define and embrace a clear core identity; 2. ensure the financial foundations for quality EMS; 3. ensure accountability and embrace systematic improvement to keep pace with an ever-changing, complex environment. 4. ensure that training and education will be robust to enable the 'paramedic of the future'; 5. ensure the development of EMS leadership capacity; and 6. ensure that EMS prepares for the complexities of tomorrow.

² The PAC's 2016-2018 high level strategic goals are: 1. providing member services; 2. improving professional practice; and 3. promoting the paramedic profession. See: <http://pac.in1touch.org/document/2346/2016%20Strategic%20Plan.pdf>

³ The National EMS Research Agenda identified 36 topics for ongoing research and 19 more general recommendations for EMS research. See: <http://www.paramedicchiefs.ca/docs/nra/jensen%20JEM%202013%20Cdn%20EMS%20Research%20Agenda%20-%20final%20results.pdf>

⁴ The current CSSP focus areas are: 1. operator capability; 2. seamless borders; 3. critical infrastructure; and 4. community resilience.

- Mobile-to-mobile connectivity using radio signals to alert drivers of approaching emergency vehicles;
- Major events applications allowing tri-services to maintain interoperable communication flow;
- Interoperable applications allowing paramedics who are first on the scene at a complex situation to communicate with other services in real time.

PSBN will underpin and influence design and deployment strategies for “Next Generation” technologies in development, which will support paramedicine decisions and operations by leveraging sensors and data sources distributed through the ‘Internet of Things.’ Relevant applications of ‘Next Generation’ technologies will include:

- speech-to-text applications converting verbal documentation and hospital notifications to data;
- radio frequency identification (RFID) applications maintaining inventories and displaying expiry dates of equipment and supplies while permitting GPS location tracking;
- smart glasses displaying hidden elements of buildings infrastructures;
- responder biometrics ensuring paramedic safety and security;
- surveillance technology providing instant updates of incidents such as bioterrorism (Biowatch);

Other new and emerging technologies also hold potential to enhance paramedicine capabilities, furthering the strategic goal outlined in the 2006 PAC White Paper to create the ‘paramedic of the future.’ These technologies include:

- unmanned aerial vehicles (UAVs) to augment situational awareness and improve patient care and medication and other types of drops in remote locations;
- autonomous vehicles that could, in some cases, stand in for operator-driven response vehicles;
- body worn cameras to inform operational improvements;
- artificial intelligence applications for enhancing decision-making;
- synthetic training environments, such as high fidelity simulations and gaming applications, allowing paramedic operators to train in new capabilities and maintain competencies for low incidence events (e.g. rapid sequence intubation).

The paramedic community is presently leading among the tri-services on leveraging technological innovation. However, awareness of technological innovation must continue to be spread through the paramedic community to ensure our requirements are integrated by technology developers, for instance through the creation of case scenarios that provide for exploration and specification of operator needs.

RESEARCH PRIORITY 2: COMPLEX OPERATING ENVIRONMENTS

As new technologies for enhancing paramedicine practice are emerging, so are complex new operating environments bearing on paramedic practice. The CoP meeting expressed a significant priority on researching the implications of these increasingly complex operational environments, in keeping with the PCC 2006 White Paper's strategic priority to "keep pace with an ever-changing, complex environment."

The operational environment for paramedicine is becoming more complex in part due to demanding new contexts for paramedic work. These contexts include major events such as the G8 as well as difficult and hostile environments such as multiple casualty incidents (MCI) with lock-downs and shelter-in-place orders and bioterrorism events requiring mass evacuations. Paramedics are increasingly implicated in these complex events due to the growth of 'specialty services,' which build upon paramedicine capabilities of emergency response to acute medical events with other capabilities and organizational capacity for mitigating emergencies. Specialty services for paramedicine include Chemical Biological Radiological Nuclear Explosion (CBRNE) response and Hazardous Materials (Hazmat) response.

Climate change is another trend complicating paramedicine operations due to its correlation with increasing incidence and severity of natural disasters and extreme weather. These extreme conditions impinge upon operational readiness and require the innovation of new protocols, tools, and vehicle retrofits. Natural disasters implicate vulnerable populations with particular severity, increasing paramedic demand for services in hard-to-operate milieus. Another implication of climate change is the mainstreaming of alternative energy vehicles that pose new accident rescue requirements requiring assessment.

Complex operational environments requires monitoring and enhancement of response protocols as well as comprehension of how emerging technologies (Research Priority 1) can enhance paramedic capabilities in these environments. Interoperability requirements among agencies and services are especially heightened in these contexts, demanding common and compatible understanding of roles, responsibilities and language along with interoperable technology and technology standards.

RESEARCH PRIORITY 3: COMMUNITY PARAMEDICINE

Community paramedicine, designated a research priority at the 2014 CoP, was reaffirmed by the 2017 CoP as a priority area for research. Community paramedicine shares in a holistic health care model in which paramedics support health promotion to ensure safer and healthier communities. Community paramedicine is also in keeping with the increasingly relevant health mandate of enabling aging-in-place through active assisted living.

As a new model of service delivery, community paramedicine requires ongoing research validating it vis-à-vis the economics of paramedicine. Community paramedicine also requires ongoing research and decision analysis to refine protocols such as those around Point of Care Treatment (PoCT). Analysis is required to assess outcomes of decisions made by community paramedics regarding treatment choices and redirections to appropriately resourced hospitals. The 2017 CoP emphasized that community paramedicine protocols need to be refined on a foundation of evidence and standards, as elaborated in Research Priority 4.

As well, research is required to understand how community paramedicine can increasingly integrate new technologies discussed in Research Priority 1, especially evolving communication technologies. Community paramedicine already incorporates remote monitoring capabilities of data from the 'Internet of Things, in keeping with the 'smart community' paradigm.' Video link via PSBN holds potential to further connect advanced care patients in rural areas and aboriginal communities with community paramedicine centers and medical practitioners.

RESEARCH PRIORITY 4: EVIDENCE-BASED PRACTICE

The research priority of evidence-based training and clinical protocols was emphasized in the 2013 National EMS Research Agenda and reiterated by the 2017 CoP. The CoP discussed several aspects of building and deploying a Canadian evidence base for paramedicine, including movement towards a national paramedic incident database; the creation of new operational standards; and strategies for monitoring paramedic operations to provide evidence on urgent issues.

Bringing together evidence to support paramedic decision-making and protocol development has been the underlying goal of a CSSP-supported project to build a national database of paramedic incidents in Canada. The 2017 CoP observed that designing this database will require further scoping among paramedics to insert their specifications, as well as the development of a common taxonomy in conjunction with Statistics Canada and Canadian Institute of Health Information (CIHI).

Creating new national standards for paramedic practices was identified as research priority in 2015, leading to the achievement in 2016 of the CSA Community Paramedicine standard. This standard is currently being reviewed for adoption by other countries and for internationalization under the International Standards Organization (ISO), leading to a discussion at the 2017 CoP of the prospect of initiating other bi-national standards with interested countries. The 2017 CoP also discussed the desirability of creating standards for aboriginal community medicine; paramedic psychological health and safety; and ambulance design.

The 2017 CoP also discussed how emerging technologies discussed in Research Priority One could be leveraged to enlarge the evidence base of paramedicine. New GIS-based network applications such as “Follow My People” could be used to track paramedic arrival, response, and offloading times, providing evidence to inform health and safety best practices research and deployment models called for in the 2012 EMS S&T gap analysis. Ongoing monitoring and evaluation of the outcomes of new tools and retrofits, such as fracture-boards and EMS stretchers with scales, was another research priority identified by the CoP.

RESEARCH PRIORITY 5: OCCUPATIONAL HEALTH AND SAFETY

Research to understand and mitigate ongoing and emerging occupational health and safety hazards for paramedics was identified by the CoP as a priority in 2015 and reaffirmed in 2017. The emergence of other new infectious agents and blood borne pathogens with potential to affect paramedics and patients, including antibiotic resistant strains such as MSRA, is a particularly concerning health hazard around which research is lacking. Selection and testing of personal protective equipment (PPE) that can help identify these pathogens, including uniforms with sensors, is especially called for in keeping with the research gap around personal protective equipment for paramedics identified in the 2012 EMS S&T gap analysis.

Other emerging hazards for paramedics relate to the presence in the community of intoxicants such as opioids, requiring research on specific measures and PPE, including sensors, for protecting operators from Fentanyl toxicity. Real-time tracking of Fentanyl incidents and Naloxone inventories were proposed as innovations that could help paramedics anticipate and prepare for incidents. Engagement with law enforcement is required to specify appropriate delivery method for Naloxone, i.e., intramuscularly or nasally, in different cases. Finally, the need was raised to study new health as well as mental health risks emerging with the legalization of cannabis, including risks from the public and paramedic use of cannabis, and possibly including intoxication of ambulance drivers.

Paramedic mental health is an ongoing issue in paramedicine health and safety with a paucity of dedicated research. Recommended measures derived at a recent Public Safety Canada committee for a national paramedic mental health strategy included:

- An action plan on mental health undertaken with the other tri-services (completed and in review),
- A learning program created in tandem with the creation of a national standard that would ensure pan-Canadian access to training around mental health issues;
- Adaption to the paramedicine domain of the mental health awareness “Guarding Minds” module developed at Simon Fraser University;

- A paramedic-specific initiative to support paramedic mental safety that elaborates understanding of Post-Traumatic Stress Disorder (PTSD) and other mental health issues in relation to paramedic work;
- A work disability prevention and management program spanning the phases of recruitment, retention, and return to work, and involving screening tools and indicators, pre-licensure requirements, and a fitness-for-work evaluation.

Finally, the 2017 CoP discussed how additional research is also needed into hazards associated with the physical demands of paramedic work, along the lines of the Paramedic Physical Demands Analysis produced for CSSP in 2014 (DRDC-RDDC-2014-C158).

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