

REVIEW

PREHOSPITAL STANDARDS FOR POINT-OF-CARE ULTRASOUND: A BRIEF NATIONAL REVIEW

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ABSTRACT

Background: Point-of-care ultrasound (POCUS) has become an increasingly recognized tool for the rapid bedside assessment of undifferentiated patients. With the advent of affordable portable devices, this tool has expanded to the prehospital world, offering an opportunity to improve patient care prior to arrival in the emergency department.

Methods: To assess how this tool has become incorporated into paramedical care in Canada, we conducted a cross-sectional survey of paramedical regulating bodies across nine of Canada's ten provinces to investigate POCUS accreditation, licensing, scope of practice, and quality assurance regulation for paramedics in Canada.

Results: Overall, few provincial paramedical licensing bodies include POCUS in the scope of practice for prehospital practitioners, and those who do are not involved with POCUS training, licensing, or quality assurance.

Conclusions: Our findings highlight the need for defined national competence standards and quality assurance metrics to ensure safe and effective use of POCUS in the prehospital environment.

INTRODUCTION

Prehospital medical care providers are tasked with the initial assessment and treatment of an extremely broad array of undifferentiated patient presentations, often in austere environments with limited diagnostic tools. In the hospital, point-of-care ultrasound (POCUS) has become an increasingly popular bedside tool for the assessment of similarly undifferentiated patients by emergency physicians, allowing for early and accurate diagnosis of life-threatening diagnoses such as ectopic pregnancy, abdominal aortic aneurysm, and cardiogenic shock (Lewis et al., 2019). Recent technological advances have allowed for the expansion of handheld POCUS to the prehospital environment, offering an innovative way for prehospital practitioners to improve their diagnostic accuracy (Hermann et al., 2022; Smallwood & Dachsels, 2018). Moreover, several studies have identified the feasibility

of POCUS by non-physicians (Amaral et al., 2020; Becker et al., 2018; Bøtker et al., 2018; Laursen et al., 2016; Nadim et al., 2021; Pietersen et al., 2021), with non-physician practitioners identifying conditions such as cardiogenic pulmonary edema and abdominal aortic aneurysm with high sensitivity and specificity (Laursen et al., 2016; Schoeneck et al., 2021). Furthermore, prehospital POCUS is used in Europe, Australia, and New Zealand and has been shown to change patient management when used in the setting of trauma, shortness of breath, and cardiac arrest (Bøtker et al., 2018).

However, the establishment of clearly defined standards of competence for prehospital practitioners appears to be lagging behind the needs of our healthcare system. The most recent Canadian national competency profile upon which many prehospital provincial standards are based was published over ten years ago, with no mention of POCUS (Canadian Organization of Paramedics, 2021; Paramedic Association of Canada, 2011). Additionally, the Canadian Association of Radiologists has identified several concerns regarding the expansion of POCUS from formal sonographers with radiologist-interpreted scans to the hands of bedside practitioners (Chawla et al., 2019). They argue that diagnostic US is implicitly dependent on operator training and experience, meaning all practitioners who include POCUS in their scope of practice should be subject to rigorous regulatory standards and quality assurance (Chawla et al., 2019).

In Canada, the main POCUS accrediting body is the Canadian Point of Care Ultrasound Society (CPoCUS), which provides practitioners with a title of “Independent Practitioner” once specific competencies have been demonstrated. Independent Practitioners are able to reliably generate and interpret images to guide patient management. There are also several accredited CPoCUS courses such as Emergency Department Echo (EDE) Courses 1 and 2, Echo Guided Life Support (EGLS), and Emergency and Critical Care Ultrasound (ECCU) offered to medical practitioners. To our knowledge, there has been no assessment of POCUS use, accreditation, or quality standards in the prehospital environment in Canada. This study sought to fill this gap in understanding using a cross-sectional survey-based design, serving as a first step to establishing a safe, clearly-defined role for POCUS use in the prehospital environment.

METHODS

We used a cross-sectional, interview-based survey to collect qualitative data on the current POCUS accreditation and quality assurance practices for paramedics in 9 Canadian provinces. Provincial paramedic governing bodies were contacted by telephone and email. Data was collected between May 2022 and July 2022. A short, structured interview, based on the framework outlined in Table 1, was performed over the phone, and the data was recorded and compiled using Microsoft Excel. Inter-

	Question
1	Do you recognize privileging/licensing for point-of-care ultrasound?
2	If yes, what is the criteria for point of care ultrasound privileges/licensing for paramedics?
3	How do practitioners maintain ongoing privileges/licensing, and how is quality assurance/improvement implemented?
4	What scope of practice is acceptable for practitioners with point-of-care ultrasound privileges/licensing (i.e. what specific scans can be practiced)?

Table 1. Qualitative interview framework questions assessing POCUS accreditation and quality assurance standards for prehospital practitioners across Canada.

views were held with at least one representative from the governing body from each province. Overall, information was gathered based on the interview framework from 9 provinces. Quebec was excluded due to language barriers, and the three Canadian territories were excluded as they are currently not formally regulated independently or by territorial governments; the territorial prehospital setting is predominantly managed by individual paramedic employers. All data collected is presented in this paper. Funding was provided from the University of Saskatchewan College of Medicine, Regina Campus, in the form of a \$5000 undergraduate and resident research support grant.

ETHICS

This project was exempt from ethics review from the Research Ethics Board of the University of Saskatchewan under article 2.5 of the Tri-Council Policy Statement (2018).

RESULTS

Our findings indicate that POCUS is recognized as being within the scope of practice only for advanced care paramedics (ACPs) and critical care paramedics (CCPs) in Manitoba, Saskatchewan, and Alberta (Table 2). Most representatives from the paramedical governing bodies in Canada identified the process of POCUS training, quality assurance, and accreditation as being the responsibility of paramedic employers in the province (Table 2).

Province	Regulating body	Presence of POCUS accreditation processes	Quality assurance and ongoing POCUS privileging	Scope of practice
Alberta	Alberta College of Paramedics	None	None	Not specified
British Columbia	Emergency Medical Assistants Licensing Board	None	None	Not specified
Manitoba	College of Paramedics Manitoba	Specific to employer, for ACPs and CCPs only	Additional training and quality assurance maintained by the employer	Within scope for ACPs and CCPs
New Brunswick	Paramedic Association of New Brunswick	None	None	Out of scope
Newfoundland and Labrador	Newfoundland and Labrador Paramedicine Regulator	None	None	None
Nova Scotia	College of Paramedics of Nova Scotia	College would verify additional employer-provided training is adequate to Accreditation Canada Standard	Accreditation Canada Standards	Employer specific
Ontario	Ontario Ministry of Health	None	None	None
Prince Edward Island (PEI)	Emergency Medical Services Board of PEI	None	None	None
Saskatchewan	Saskatchewan College of Paramedics	CCPs only, employer-specific	Set provincially, individual employer is responsible for annual evaluation and quality improvement	Focused Assessment with Sonography for Trauma (FAST) scans

Table 2. Summary of POCUS accreditation, quality assurance, and scope of practice standards for paramedics in Canadian provinces. ACP: advanced care paramedic; CCP: critical care paramedic.

DISCUSSION

Our data suggest that although point-of-care ultrasound (POCUS) may be expanding to the prehospital domain in Canada, the regulation, accreditation, and quality assurance infrastructure for the use of this tool in paramedicine is in its infancy in Canada. Most paramedical regulatory bodies and representative associations in Canada are not involved in regulating POCUS use by paramedics (Table 2). Additionally, POCUS is recognized as being within the scope of practice only for specially trained paramedics in Saskatchewan, Alberta, Manitoba, and British Columbia, and its training, quality assurance, and privileging is left to individual employers (Table 2). The structure of prehospital care in Canada provides a unique challenge to standardized regulation, as there is variation in the scopes of practice across classes of paramedic qualifications between and within provinces, and many provinces have a mix of public and private prehospital care providers. Within this structure, individual employers can dictate additional skills that are within the scope of practice of paramedics of various levels. For example, POCUS is used in prehospital care during air transport in Saskatchewan and Ontario, but only in the hands of advanced care flight paramedics who have additional training provided by their air medical transport employers.

Despite our results showing minimal standardization of POCUS training, accreditation, and quality assurance for prehospital practitioners in Canada, many provincial regulating bodies expressed interest in including POCUS training in the paramedic curriculum. In a recent survey similar to ours, providers in the UK identified lack of prehospital POCUS governance as a major barrier to the use of this tool, despite perceiving it as beneficial for patient care (Naeem et al., 2022); these findings suggest a standardized accreditation process could assist with rolling out of POCUS in the prehospital environment. Furthermore, given that current literature provides conflicting data on the efficacy of POCUS in the hands of paramedics specifically (Becker et al., 2018; Donovan et al., 2022; Nadim et al., 2021; Pietersen et al., 2021; Schoeneck et al., 2021), the current lack of standardization for prehospital POCUS represents a potential opportunity for improved patient care. Additionally, the actual use of POCUS by trained providers has been shown to increase as time spent training increases, underscoring the importance of supervised scanning to allow practitioners to become comfortable using this tool (Leschyna et al., 2019). Concerns regarding the accuracy of POCUS interpretation by prehospital providers could be mitigated by real-time interpretation of prehospital practitioner-generated images by a radiologist or other trained provider (Hermann et al., 2022).

Another challenge facing the expansion of POCUS to prehospital care in Canada and elsewhere in the world is a lack of literature on the subject (Naeem et al., 2022). While prehospital POCUS is known to change patient management in select circumstances, its effect on patient outcomes remains largely unknown, presenting an exciting area of future research (Amaral et al., 2020; Bøtker et al., 2018).

CONCLUSIONS

Overall, the findings outlined in our study demonstrate the need to develop a nation-wide set of competencies and quality assurance measures for prehospital POCUS

use. This study is merely the first step in determining how POCUS can be safely and effectively integrated into prehospital care in Canada; additional studies will be required to determine which scans are of greatest utility, how and if POCUS training for paramedical practitioners changes patient management and outcomes, and how quality assurance can be maintained across the country.

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