COMMENTARY

Critical Care Strategic Clinical Network: Information infrastructure ensures a learning health system

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Critical illness encompasses a range of life-threatening conditions, including sepsis, acute respiratory distress syndrome, trauma and multiorgan failure, among others.[1] These conditions are multifaceted and complex. Patients who are critically ill receive highly specialized and resource-intensive care. In 2018, in Alberta there were 92 473 intensive care unit (ICU) patient-days, with an average stay of 5.2 days and an ICU mortality of 10.3%. A single ICU day costs $3592, which extrapolates to about $377 million annually in expenditures for ICU services in the province.[1,2] As the population ages and medical care advances, demand for ICU care is expected to rise.

Recognizing the importance of this challenge to Alberta's health system, the Critical Care Strategic Clinical Network (CC SCN; www.ahs.ca/ccscn) was established in November 2013 to support the collective SCN mission of ensuring the best care for people with critical illness in Alberta through innovation and collaboration.[3] This is realized through fostering a learning health care system: one that leverages a unique provincial informatics infrastructure to drive innovation, implement evidence-informed practices and evaluate outcomes.

The CC SCN organizational structure includes all 20 provincial ICUs (14 adult medical surgical, 2 cardiothoracic surgical, 1 neuroscience and 3 pediatric) and comprises an interprofessional, multidisciplinary team of front-line professionals, physicians, operations leaders and decision-makers, along with researchers, patients and families, and partner organizations.[3] It is governed by a core committee with diverse representation from this stakeholder team, supported by a small leadership team, which includes the Scientific Office.

The CC SCN established 4 strategic priorities through engagement with stakeholders and that aligned with the priorities of Alberta Health Services (AHS).[4,5] These include appropriateness of care, research and innovation, emerging and partnered initiatives, and supporting decision-making (Appendix 1, available at www.cmaj.ca/lookup/suppl/doi:10.1503/cmaj.190578/-/DC1). To better engage the critical care community and build on the identified needs of patients and families, the CC SCN has hosted 3 public "Café Scientifiques" to facilitate a sharing of experiences aimed at setting further network priorities (https://theconversation.com/how-patient-stories-can-improve-intensive-care-88210).[4] The aim is to cultivate a community with a common purpose to identify priorities, develop and share knowledge, and implement evidence-informed strategies to improve quality, patient outcomes and sustainability of the health system.

KEY POINTS

- The Critical Care Strategic Clinical Network (CC SCN) focuses on ensuring the highest-quality evidence-based care for people with critical illness in Alberta.
- The CC SCN has 3 foundational guiding principles: Patient and Family-Centred Care, Evidence-Informed Decision-Making and Quality Improvement.
- The network leverages a provincial informatics infrastructure (eCritical Alberta) to drive innovation, knowledge translation and implement evidence-informed science.
- Ensuring that diverse interprofessional participation in all network activities drives strategic initiatives for improvement has been key to surmounting the challenge of province-wide engagement.

The CC SCN's 3 foundational guiding principles are Patient and Family-Centred Care, Evidence-Informed Decision-Making and Quality Improvement, as outlined in the Transformational Roadmap (Appendix 1).[3] The ICU Delirium Initiative,[3] the Evidence-Care Gaps Initiative[5] and the Strained ICU Capacity Initiative[4,6] are 3 key projects that aimed to address appropriateness of care.

The ICU Delirium Initiative implemented provincial standards, care pathways and evidence-informed practices for delirium care, and promoted a learning environment and culture of continuous quality improvement.[7] A Patient and Family Advisor Working Group co-designed patient and family resources to increase awareness about delirium. Patient and clinician experiences, including an exploration of barriers and facilitators to implementation, were shared during 5 learning collaborative sessions (www.albertahealthservices.ca/scns/Page13415.aspx). This initiative led to sustained improvements in screening and a measurable reduction in delirium-days,[7] and was honoured with a 2019 Alberta Health Services President's Excellence Award for

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Outstanding Achievement in Quality Improvement (https://ahspea2019.tumblr.com/post/184230485797/provincial-intensive-care-unit-icu-delirium).

The Scientific Office of the CC SCN facilitates research and innovation through the promotion, adoption and diffusion of evidence-based initiatives in critical care (https://criticalcareresearchscn.com/detail/posts/strategic-research-plan). Academic stakeholders include researchers from educational institutions throughout Alberta and partner organizations include the Alberta Society of Intensive Care Physicians, Canadian Critical Care Trials Group, Alberta Innovates, Canadian Institutes of Health Research, Canadian Frailty Network, and various charitable foundations and professional associations.

In 2014, the CC SCN was awarded 2 Partnership for Research and Innovation in the Health System grants from Alberta Innovates and Alberta Health Services. The ICU Capacity Strain program explored issues related to strained ICU capacity across Alberta, with the goal of improving access and efficiency in ICUs and ultimately quality of care and outcomes.[2,6] The Evidence-Care Gaps program aimed to improve patient care by closing measurable gaps in evidence-based care.[5,8,9] Researchers gathered patient, family and interprofessional feedback from across Alberta, and reconciled 5 priority areas, including delirium screening, early mobilization, family presence and effective communication, and transitions in care. The first 3 priority areas were bundled into the Provincial ICU Delirium Initiative,[7] and the other 2 priority areas have evolved into a priority initiative focused on Transitions in Care following critical illness.

The CC SCN aims to build capacity and foster partnerships with other SCNs, provincial programs, clinical operations, funding organizations and industry to explore opportunities for improvement in health systems in ICUs across Alberta. For example, the MEDEC Partnership – Sepsis was a 4-way partnership between Alberta Innovates, Alberta Health Services, Institute of Health Economics and bioMérieux to improve diagnosis and management of sepsis.

eCritical Alberta, a provincial ICU clinical information system (MetaVision) and comprehensive data repository and clinical analytics system (TRACER), that captures data on all patients admitted to ICUs in Alberta, is used by the CC SCN to empower front-line clinicians, operations leaders and stakeholders to make evidence-informed decisions for best practice. This informatics infrastructure is a unique system that supports patient care through the creation of customized reports and data extracts for quality improvement, clinical operations, education and research.[10] The network has championed a standardized suite of key performance indicators that align with best-practice recommendations and reflect the priorities of Alberta's critical care community, while also being leveraged to drive improvement in health systems and inform decision-making. Examples of Key Performance Indicators from eCritical TRACER web reports/dashboards include vital statistics, bed utilization, lengths of stay, acuity scoring and adherence to standard care practices (Appendix 2, available at www.cmaj.ca/lookup/suppl/doi:10.1503/cmaj.190578/-/DC1).

As the critical care community in Alberta is diverse and dispersed across a wide geographic region, there are unique challenges, particularly with engagement, logistics and understanding culture. These challenges have been mitigated by actively embedding broad representation of our community into leadership and all network activities. Because lack of engagement and understanding are barriers to sustainability of the SCN's work, the CC SCN actively works to cultivate a collaborative community, establishing a liaison committee of champions to provide regular dialogue with provincial operations and leadership, and "pushes and pulls" the community to engage in developing and steering strategic initiatives to improve health systems.

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