

A Global Survey of Emergency Care Clinical Networks: Discussion and Implications for Canadian Learning Health Systems

Enquête mondiale sur les réseaux cliniques de soins d'urgence : discussion et répercussions sur les systèmes de santé apprenants au Canada



ROSS DUNCAN, MSc

Learning Health Systems Data Analyst

BC Support Unit

Michael Smith Health Research BC

Adjunct Professor

Department of Emergency Medicine

Faculty of Medicine

University of British Columbia

Vancouver, BC

MONIKA ROERIG, MA

Research Coordinator

North American Observatory on

Health Systems and Policies

Institute of Health Policy, Management and Evaluation

Dalla Lana School of Public Health

University of Toronto

Toronto, ON

SARA ALLIN, PhD

Associate Professor

North American Observatory on

Health Systems and Policies

Institute of Health Policy, Management and Evaluation

Dalla Lana School of Public Health

University of Toronto

Toronto, ON

GREG MARCHILDON, PhD, JD

Professor Emeritus

North American Observatory on

Health Systems and Policies

Institute of Health Policy, Management and Evaluation

Dalla Lana School of Public Health

University of Toronto

Toronto, ON

JIM CHRISTENSON, MD, FRCPC

Professor

Department of Emergency Medicine

Faculty of Medicine

University of British Columbia

Senior Medical Advisor

Emergency Care BC

Vancouver, BC

RIYAD B. ABU-LABAN, MD, MHS

Professor

Department of Emergency Medicine

Faculty of Medicine

University of British Columbia

Interim Scientific Director,

Emergency Care BC

Vancouver, BC

Abstract

Clinical networks (CNs) can promote innovation and collaboration across providers and stakeholders. However, little is known about the structure and operations of CNs, particularly in emergency care. As Canada advances learning health systems (LHSs), foundational research is essential to enable future comparisons across CNs to identify those that contribute to positive system change. Drawing from the results of our international survey, we provide a description of 32 emergency care CNs worldwide, including their structure, operations and sustainability. Future research should consider the context of such networks, how they may contribute to an LHS and how they impact patient outcomes.

Résumé

Les réseaux cliniques (RC) peuvent favoriser l'innovation et la collaboration entre les fournisseurs et les intervenants. Cependant, on en sait peu sur la structure et le fonctionnement des RC, en particulier dans les soins d'urgence. Alors que le Canada s'intéresse aux systèmes de santé apprenants (SSA), la recherche fondamentale est essentielle pour permettre d'éventuelles comparaisons entre les RC afin de déterminer ceux qui contribuent au changement positif dans un système. À partir des résultats de notre enquête internationale, nous fournissons une description de 32 RC de soins d'urgence dans le monde, y compris leur structure, leurs activités et leur durabilité. Les recherches futures devraient tenir compte des contextes de ces réseaux, de la façon dont ils peuvent contribuer à un SSA et de leur incidence sur les résultats pour les patients.

Introduction

Clinical networks (CNs) are voluntary groupings that use a collegial approach to identify and implement a range of strategies to improve clinical care and service delivery (Haines et al. 2012). Specific definitions, features and nomenclature vary but include interorganizational liaison, significant clinical input, “bottom-up” perspectives, multidisciplinary, patient inclusion and evidence-based care (McInnes et al. 2012). CNs provide a potential means to improve care delivery by developing systems that convert key processes and outcomes into data and subsequently use the knowledge gained from analyzing that data to improve practice. An operational definition is provided in Box 1.

There are numerous challenges to CNs achieving optimal performance. Research and improvement initiatives, even within the same health system, can be uncoordinated and run in parallel silos, leading to duplication and fragmentation of work (Lamontagne et al. 2021). Although CNs have the potential to bridge clinical care, quality improvement and research cultures, their formal integration into the healthcare delivery system varies. To understand best practices, more detail is required on the operations, structure, sustainability and impact of existing networks.

Health system “embedded” CNs are ideally situated to operate in a learning health system (LHS) framework (see Box 1) (Institute of Medicine [US] et al. 2011). This is of

BOX 1. Operational definitions

Learning health system:

A framework “designed to generate and apply the best evidence for the collaborative healthcare choices of each patient and provider; to drive the process of discovery as a natural outgrowth of patient care; and to ensure innovation, quality, safety, and value in health care” (Institute of Medicine [US] et al. 2011: 1).

Emergency care: An urgent health service that “cross-cuts traditional disease-focused disciplines and provides prompt interventions for many disease-specific emergencies. However, well-organized emergency care appropriately distributed across a country allows for timely coordination of services and resources and optimum efficiency and efficacy in treating a range of acute conditions, from out-of-hospital care at the scene of an injury or illness to treatment and stabilization in the emergency unit and early operative and intensive care” (Burkholder et al. 2019: 1).

Clinical network: “A structure for liaising across institutions, allowing greater clinical input into models of service delivery; provide ‘bottom up’ views on the best ways of tackling complex healthcare problems and are usually multidisciplinary involving doctors, nurses, allied health professionals, scientists, managers, and consumers” (McInnes et al. 2012: 1).

increasing relevance as the Institute of Health Services and Policy Research at the Canadian Institutes for Health Research has identified the need to establish and accelerate the LHS as a strategic priority (CIHR 2021). At the time of the survey, there were two emergency care clinical networks (ECCNs) in Canada – the BC Emergency Medicine Network (BC EMN) and the Emergency Strategic Clinical Network in Alberta – that conducted similar activities (Manns and Wasylak 2019; McLane et al. 2019) and sought to function as LHSs (Abu-Laban et al. 2018, 2019; Christenson 2014; Drebit et al. 2020; Ho et al. 2021).

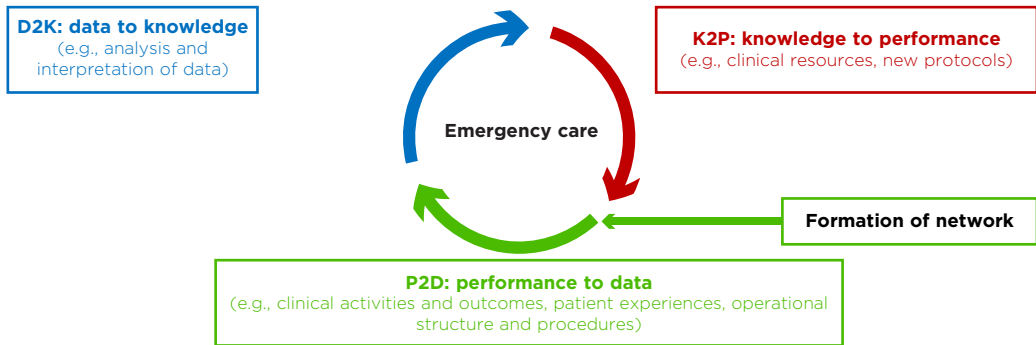
ECCNs, as with other CNs, translate practice to data and implement new knowledge from research or quality improvement back to practice (Figure 1). Understanding the scope and framework of these organizations may provide guidance on how best to incorporate successful elements of highly functional CNs to optimize the LHS. This paper describes and provides context on the results from an international survey to identify ECCNs and their structure, operations and sustainability (Roerig et al. 2021).

Methods

As this paper highlights the data and policy implications that arose from previous work by our group, detailed methods and materials are described elsewhere (Roerig et al. 2021).

The research team obtained access to membership organizations of the International Federation of Emergency Medicine (IFEM), representing nearly 100 nations (Abu-Laban 2020), and undertook a two-phased approach to data collection. In phase 1, we used an

FIGURE 1. The learning cycle of an emergency care clinical network



Source: Adapted from Friedman et al. (2017).

e-mail including our project objectives and operational definitions (Burkholder et al. 2019; Institute of Medicine [US] et al. 2011; McInnes et al. 2012) to inquire if IFEM members believed that an ECCN existed in their jurisdiction and achieved a 75% response rate. If yes, we asked for the contact information of the identified networks for phase 2 of data collection. We contacted those networks to ask if they would complete a survey using a modified Dillman process that re-engaged those contacts over 10 days from the initial invitation for a total of four times. If identified network contacts did not respond, the research team captured information on the survey questions from publicly available data where possible (Roerig et al. 2021). A flow diagram of this process is provided in the previous report (Roerig et al. 2021). The design of the survey was inspired by the “pillars” necessary for LHS functionality from Menear et al. (2019). Thematic grouping of results was done by the research team to aid interpretation following survey completion.

The survey materials (Roerig et al. 2021) were approved by the University of British Columbia Office of Research Ethics (#H20-02477).

Results

Identifying ECCNs

Forty ECCNs were invited to participate in phase 2. Of those, 24 network contacts or representatives returned a completed survey, and for an additional eight ECCNs, there was sufficient publicly available information, leading to a final sample of 32 ECCNs. Those 32 networks include 21 national-level networks and three supranational networks, collectively representing approximately 90 independent countries (Abu-Laban 2020). Table 1 (available online at longwoods.com/content/27235), provides the characteristics of the included ECCNs. In our original review, we identified 11 ECCNs that appear to support an LHS framework (Roerig et al. 2021).

Governance and membership

Although all ECCNs involve physicians, the involvement of other membership groups varies. The two Canadian ECCNs are among the most inclusionary and were among the 38% of ECCNs with participation from four or more groups. Most ECCNs have a formal governance structure (88%) composed of network members, leaders and a board. Who initially developed the network also varies, with the largest plurality being providers (44%), followed by a combination of providers and health system administrators (16%) and health system administrators alone (13%). Network development was not reported or available for 25% of ECCNs. Canadian ECCNs stood out in comparison to global peers as the BC EMN was the only ECCN developed by providers in partnership with academics and the Alberta ECCN was one of the few developed primarily by health system administrators (13%). Membership size varied greatly – from fewer than 50 members to some 10,000. Even in the Canadian context, a large difference in scale exists, with the British Columbia ECCN having a membership of over 1,200 and the Alberta one having a membership of fewer than 100. Identifying governance principles and membership of networks is important to assess their alignment with LHS values such as “inclusiveness,” “accessibility” and “transparency” (p. 2) as described by Friedman et al. (2017).

Funding

Only 20 ECCNs reported dedicated funding (63%). Both Canadian ECCNs reported that their funding was provided from governmental and non-governmental organizations, whereas only 25% of ECCNs globally were funded in this manner. Other funding sources include membership fees (34%), conferences and events (9%), grants (6%) and fundraising/donations (6%). For ECCNs that reported having funding, the majority have ongoing arrangements (85%). The BC EMN, however, reported their funding sources to be variable and determined annually. Sustainability is a key concern for all health systems and is an integral part of planning a successful LHS (Menear et al. 2019); consequently, any analysis of meso-level organizations, such as ECCNs, must capture funding data.

Limitations

Definitions of CNs are frequently inconsistent (Brandes et al. 2013; Haines et al. 2012), which may have complicated identification of networks in phase 1. This likely resulted in varied interpretations of what constituted an ECCN in phase 1 and is a probable factor in heterogeneity across identified ECCNs. Similarly, although we intended “research activity” to be understood using conventional academic understandings, respondents’ conceptions could have varied. The global nature of this survey also precluded examination of regulatory and incentive structures. Finally, our findings represent a snapshot of ECCNs surveyed during the COVID-19 pandemic and thus may not reflect pre- or post-pandemic structures.

Our survey was created iteratively, informed by experts and literature. It did not involve a systematic review or meta-analyses. Study materials were only made available in English

and relied on IFEM membership, American College of Emergency Physicians chapters and literature searches to identify networks. We did not capture details on what specific data ECCNs collect, such as electronic health record integration, nor did we validate survey responses. Doing so could be the focus of future work.

Discussion and Implications for Canadian ECCNs and Learning Health Systems

Activities

Nearly all ECCNs provide clinical resources (90%) and participate in continuing professional development (90%). Most participate in research (74%) and almost half include real-time support (48%). Nearly all ECCNs operate two or more activities (97%). Notably, only three ECCNs, including the two Canadian ECCNs, have any formal evaluation of their network.

Data implications

From these activities, we can make inferences regarding the data collected and knowledge produced by ECCNs as part of a theoretical learning cycle. The generation of clinical resources and professional development programs suggests that ECCNs are synthesizing knowledge emerging from clinical practice learning. Research participation suggests that many ECCNs actively contribute to the scientific understanding of their local system, and in fact, some are engaged beyond local data systems. Notably, both Canadian ECCNs actively measure the impact of their activities on the component of the health system under their mandate (here provincial), in contrast to 25% of ECCNs globally. Network- or organization-level evaluation is particularly complex and uncommon even in Canada outside the identified ECCNs (Abu-Laban et al. 2022). This is a realm where British Columbia and Alberta ECCNs may show leadership.

The survey data presented in Table 1 reflect variables that would ideally be captured for CNs broadly. Currently, data on these networks and other meso-level organizations in the Canadian health system are often not captured in the routine, standardized manner that patient- or provincial-level strata are, constituting a “missing middle” in our data landscape. Although the survey was initially a way for the EMN to identify potential peers for comparison, we came to realize that further coordination and capture of data are required to understand the role of ECCNs and other networks in affecting the health of Canadians. The current data landscape in Canada does not provide adequate coverage for us to identify meso-level hubs of learning, their successes and barriers and comparison across such centres for ongoing improvement.

Policy implications

In addition to a dearth of data regarding ECCNs and similar meso-level organizations within the health system, key performance indicators for evaluating the “success” of CNs remain

largely undefined and lack accepted standards, both in Canada and internationally. Greater efforts by provincial ministries to identify, embed and make data available on ECCNs and similar organizations would aid in the development of such standards and encourage future successes.

Finally, as LHS implementation is an identified Canadian priority (CIHR 2021), targeted efforts to facilitate the identification, understanding, integration and impact of ECCNs, and CNs generally, are required for more effective understanding of best network practices.

Data Sources and Permissions

Survey data in this article have been drawn from a previously published rapid review:

Roerig, M., S. Carbone, M. Lynch, R. Abu-Laban, R. Duncan, G. Marchildon et al. 2021, March. An International Review of Emergency Care Clinical Networks. North American Observatory on Health Systems and Policies. *Rapid Review* (31).

This commentary has been written by the same authorship team, and we grant permission for use of the survey data for that purpose.

Correspondence may be directed to Ross Duncan by e-mail at rduncan@healthresearchbc.ca.

References

- Abu-Laban, R.B. 2020. The Evolution of Emergency Medicine Internationally. *Canadian Journal of Emergency Medicine* 22(4): 454–55. doi:10.1017/cem.2020.27.
- Abu-Laban, R.B., J. Christenson, R.R. Lindstrom and E. Lang. 2022. Emergency Care Clinical Networks. *Canadian Journal of Emergency Medicine* 24(6): 574–77. doi:10.1007/s43678-022-00348-3.
- Abu-Laban, R.B., S. Drebit, R.R. Lindstrom, C. Archibald, K. Eggers, K. Ho et al. 2018. The British Columbia Emergency Medicine Network: A Paradigm Shift in a Provincial System of Emergency Care. *Cureus* 10(1). doi:10.7759/cureus.2022.
- Abu-Laban, R.B., S. Drebit, B. Svendsen, N. Chan, K. Ho, A. Khazei et al. 2019. Process and Findings Informing the Development of a Provincial Emergency Medicine Network. *Healthcare Management Forum* 32(5): 253–58. doi:10.1177/0840470419844276.
- Brandes, U., G. Robins, A. McCranie and S. Wasserman. 2013. What Is Network Science? *Network Science* 1(1): 1–15. doi:10.1017/nws.2013.2.
- Burkholder, T.W., K. Hill and E.J. Calvillo Hynes. 2019. Developing Emergency Care Systems: A Human Rights-Based Approach. *Bulletin of the World Health Organization* 97(9): 612–19. doi:10.2471/BLT.18.226605.
- Canadian Institutes of Health Research (CIHR). 2021, April 26. *Strategic Plan 2021–2026*. Retrieved October 2, 2022. <https://cihr-irsc.gc.ca/e/documents/ihspr_strat_plan_2021-26-en.pdf>.
- Christenson, J. 2014. A Network to Improve Emergency Patient Care by Facilitating Practitioners to Effectively Support Practitioners. *Healthcare Management Forum* 27(3): 132–35. doi:10.1016/j.hcmf.2014.05.004.
- Drebit, S., K. Eggers, C. Archibald, R. Abu-Laban, K. Ho, A. Khazei et al. (2020). Evaluation of Patient Engagement in a Clinical Emergency Care Network: Findings from the BC Emergency Medicine Network. *Journal of Patient Experience* 7(6): 937–40. doi:10.1177/2374373520925721.

A Global Survey of Emergency Care Clinical Networks

Friedman, C.P., J.C. Rubin and K.J. Sullivan. 2017. Toward an Information Infrastructure for Global Health Improvement. *Yearbook of Medical Informatics* 26(1): 16–23. doi:10.15265/IY-2017-004.

Haines, M., B. Brown, J. Craig, C. D'Este, E. Elliott, E. Klineberg et al. 2012. Determinants of Successful Clinical Networks: The Conceptual Framework and Study Protocol. *Implementation Science* 7(1): 16. doi:10.1186/1748-5908-7-16.

Ho, K., H.N. Lauscher, K. Stewart, R.B. Abu-Laban, F. Scheuermeyer, E. Grafstein et al. 2021. Integration of Virtual Physician Visits into a Provincial 8-1-1 Health Information Telephone Service during the COVID-19 Pandemic: A Descriptive Study of HealthLink BC Emergency iDoctor-in-assistance (HEiDi). *CMAJ Open* 9(2): E635–41. doi:10.9778/cmajo.20200265.

Institute of Medicine (US), C. Grossmann, B. Powers and J.M. McGinnis, eds. 2011. *Digital Infrastructure for the Learning Health System: The Foundation for Continuous Improvement in Health and Health Care: Workshop Series Summary*. National Academies Press (US).

Lamontagne, F., K.M. Rowan and G. Guyatt. 2021. Integrating Research into Clinical Practice: Challenges and Solutions for Canada. *CMAJ* 193(4): E127–31. doi:10.1503/cmaj.202397.

Manns, B.J. and T. Wasylak. 2019. Clinical Networks: Enablers of Health System Change. *CMAJ* 191(47): E1299–305. doi:10.1503/cmaj.190313.

McInnes, E., S. Middleton, G. Gardner, M. Haines, M. Haertsch, C.L. Paul et al. 2012. A Qualitative Study of Stakeholder Views of the Conditions for and Outcomes of Successful Clinical Networks. *BMC Health Services Research* 12(1): 49. doi:10.1186/1472-6963-12-49.

McLane, P., B.R. Holroyd and E. Lang. 2019. Emergency Strategic Clinical Network: Advancing Emergency Care in Alberta through Collaborative Evidence-Informed Approaches. *CMAJ* 191(Suppl.): S24–26. doi:10.1503/cmaj.190591.

Menear, M., M.-A. Blanchette, O. Demers-Payette and D. Roy. 2019. A Framework for Value-Creating Learning Health Systems. *Health Research Policy and Systems* 17(1): 79. doi:10.1186/s12961-019-0477-3.

Roerig, M., S. Carbone, M. Lynch, R. Abu-Laban, R. Duncan, G. Marchildon et al. 2021. An International Review of Emergency Care Clinical Networks. *North American Observatory on Health Systems and Policies. Rapid Review* (31).