Title of Manuscript: An Integrative Review of Organizational Factors Influencing Successful Large-Scale Changes in Healthcare

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Abstract

Objective: To review organizational factors influencing successful large-scale change (LSC) in healthcare.

Background: LSC is necessary to achieve sustained and meaningful healthcare improvement. However, organizational readiness needs to be considered to promote successful LSC.

Methods: Four databases were searched for articles published between 2009-2018. Thematic analysis was used to identify enabling or hindering factors to LSC.

Results: Seven organizational factors were consistently described as facilitators or barriers to successful LSC in healthcare: infrastructure support, organizational culture, leadership, change management approach, roles and responsibilities, networks, and measurement and feedback.

Conclusion: The factors that emerged from this review are consistent with concepts of implementation but broadened, and highlight learning organizations in successful LSC. The results of this review informed the development of a reflective tool on LSC for nurse leaders.

The vision for quality healthcare entails coordinated and humane services that address complex health needs, modern care delivery models and facilities, consistent integration evidence-based practices, all while reducing costs related to healthcare delivery (1,2). Changes aimed at significant and widespread improvements are referred to as large-scale changes (LSC) (3), which target behaviors, beliefs, and philosophies of care of diverse stakeholders at the organization to health system levels (4). LSC differ from local changes in that they seek a fundamental shift in the ethos of the organization that affect and redirect transversal processes over an extended period of time (5). Examples of LSC include mandated initiatives such as the consolidation, harmonization, and implementation of innovative practices or policies in a merger of healthcare centers (6) or culture-based changes such as the implementation of patient-centered care (7).

Despite their potential, many LSCs fail to deliver the sweeping and sustainable changes necessary for meaningful improvement (8). Failed attempts may have serious consequences, where reports of increased stress and low work satisfaction among nursing staff can perpetuate existing issues related to quality care (9,10). Research suggests that in order to achieve successful LSC, organizational readiness needs to be established (11). Readiness considers the dynamic and interrelated components at multiple levels within and external to the organization and can act as a precursor to successful LSC (12). Additionally, healthcare organizations are increasingly recognized as complex and dynamic systems that continuously evolve (13) and thus their readiness for change is also not static (11). It is incumbent for change leaders embarking on LSC within their organizations to reflect on factors conducive to organizational readiness.

Nurse leaders can play an important role engaging stakeholders to address organizational readiness for LSC. While an increasing number of measurement tools are available to assess organizational readiness, few are validated and contextualized for LSC and many are too lengthy for feasible use in practice (14). Additionally, these tools may not be conducive to a nurse-driven collaborative and reflective approach with stakeholders. Therefore, nurse leaders still need practical guidance informed by an updated review of the literature (15).

Aim

This article describes a review of organizational factors that influenced the successful implementation of LSC in healthcare literature.

Search Methods and Outcomes

An integrative literature review was used (16) as it boasts to comprehensively understand complex phenomena, incorporates studies using a range of methods and approaches, and informs practical understandings and applications. LSC was defined as the implementation of a complex set of interventions aimed at multiple care providers and/or users to improve healthcare delivery, quality and patient outcomes within an organization or multiple organizations of a health system (17). Source articles were included when: 1) the study described, evaluated or reviewed the implementation of LSC in a healthcare context; 2) the study described barriers and facilitators to LSC within the implementation setting(s); 3) the organization was located within a developed country; 4) the article was published in English.

The search proceeded through two phases with the support of a medical librarian: First, the primary author (SAC) used ancestral searching and citation tracking strategies via Google Scholar and Pubmed to accumulate an initial collection of relevant full-text articles, starting with a recognized review on factors contributing to LSC in health systems (3). From this collection, 10 articles met the inclusion criteria and were used to identify keywords and subject headings for a systematic search in 2 bibliographic databases (phase two): Medline and HealthSTAR via OVID (SDC #1). Following the removal of duplicates, title and abstract screen, 1128 titles were reduced to 55 full-text articles. Ten of these met the inclusion criteria and were added to results from phase 1. The 2nd author (MLT) reviewed the full text of these papers to validate inclusion in the final sample (18). A total of 20 articles proceeded to data extraction and synthesis (SDC #2). Included papers were published between 2009-2018.

Quality Appraisal

As the results of this present review demonstrate, LSC investigations employed heterogeneous methods, including emerging designs for which no standard tool is available for evaluation. Evaluating the quality of primary sources is complex due to the diversity of study designs and wide sampling frame that characterize integrative reviews (16). Therefore, the quality of each article in this review was subjectively judged for its authenticity and information value. Based on this evaluation, none of the studies identified were excluded from this review. A wide array of changes was described, each targeting distinct patient populations, influencing various healthcare professionals and seeking diverse outcomes. However, due to a lack of standardized reporting, not all transformations were described in detail, often with missing information on specific interventions for implementation. In addition, the organization(s) were also superficially described, with little information about the size of the center(s), the care offered, and the characteristics of the population served. Finally, determinations of successful transformation were rarely described.

Data Extraction and Synthesis

A data table was constructed to standardize extraction of key information, including study methods, context, details of the LSC, and described or resulting organizational factors that appeared to influence LSC implementation. The findings were synthesized and interpreted through a deductive and inductive thematic approach and validated by the 2nd author. Data were synthesized narratively and through tables.

Results

Study Characteristics

This review included 20 peer-reviewed articles describing 19 unique LSCs and represented a diversity of study designs (SDC #3). The articles describe a variety of LSC implemented in large organizations, across multiple healthcare establishments within a health system, or in entire healthcare systems within a specific jurisdiction (province) or country, mostly in North America. Various settings were implicated, including hospitals and acute care, ambulatory or community care, primary care and nursing homes or secondary levels of care. The reforms targeted practice changes within several health disciplines and with health administrators, often as interdisciplinary care teams or units.

Seven factors within the organization were consistently described as influencing LSC in a healthcare context: infrastructure support, organizational culture, leadership, change management approach, roles and responsibilities, networks, and measurement and feedback (SDC #4). These were described as facilitators and/or as barriers to the implementation of LSC.

Factor 1: Infrastructure Support

Infrastructure support deals with the availability and contribution of adequate financial, human, physical, time and technological resources for the active implementation period. Organizations invested in resources most often financial, to reduce staff workload and for release time, materials and locations for ongoing training (19,20,21), which positively favored LSC. Organizations contributed resources for individuals, including healthcare professionals and staff to keep up-to-date with information about the transformation, the behaviors associated with the desired practices and evidence-based knowledge (20). Lack of knowledge and skills related to the innovation hindered successful transformation, as did the imposition of added responsibilities on staff already limited by time constraints and lack of financial investments (22-24). Large organizational size was attributed to a scarcity of resources to be put towards the change (25).

Factors in workforce stability within the organization, such as low staff turnover and reliable leadership, weighed heavily in the success of LSC (26). Major upheavals, including staffing crises, leadership instability, budget crises or other major concurrent changes drawing on internal resources, were barriers to success (21,23,27-29).

Factor 2: Organizational Culture

Organizational culture refers to the values and corresponding behaviors of individuals and the organization. Successful LSC change occurred when values and behaviors including care processes, aligned with the

corresponding change initiative. For example, organizations that promoted patient-centered care (22), multidisciplinarity (23), or palliative care (30) were well-positioned to reorganize service delivery and to introduce revolutionary practice changes. The fit between the existing values and innovation was described as a pre-requisite to change (30). The alignment is explicitly communicated and made available to its members and stakeholders (21). In turn, the organization and its members provided early support for transformation, expressing the need for the change and touting its benefits.

Another pre-requisite for success relates to the organizational perception of change, improvement and innovation. LSC was facilitated by a pattern of seeking out opportunities for innovation and improvement, characterizing the organization as having a culture of innovation (22). In these organizations, change innovations were prioritized and integrated into existing projects (31). Organizations that lacked integration and prioritization of the change initiative experienced a fragmented implementation approach and perceived new initiatives as disruptive and burdensome (21).

Factor 3: Leadership

Leadership signifies traits characterizing the leadership process, formal and emergent leadership and spheres of influence within the organization. An engaging leadership style across organizational levels that supported and sustained the innovation was facilitative. Leadership engagement meant that leaders, particularly senior leaders, were actively involved early on in the design phase of the transformation (21). As LSC transcends disciplinary boundaries, the involvement of multidisciplinary leaders and especially physicians (3,32) was important. In addition to when and how leadership is engaged, facilitative leadership was described as strong, active and collaborative (23,26,28,29). Leadership was a barrier to successful change when leaders appeared disconnected, displayed a lack interest in the change initiative and when decisions revealed a lack of commitment to the transformation process (23,32).

The sphere of leader influence for LSC is simultaneously vertical and dispersed as organizations designated senior leadership across the network to oversee and provide foundational support for implementation (3,26,27,33). Similarly, dispersed leadership was also described as the strategic use of champions or the engagement of local managers in leading local change efforts (19,27,29,34). A lack of engagement and support of local leaders such as champions (23) otherwise severely challenged the change process.

Factor 4: Change Management Approach

This factor concerns the organization's philosophy, processes and practices in change management. A participatory process of organizational change that engages stakeholders at all levels of the organization and the community set the stage for successful transformations. Stakeholders such as patients and families, professional associations, communities and the public were involved and contributed to decision-making throughout the transformation in a meaningful versus a tokenistic way (3,21,24,32-34). In 1 instance, formal roles for patient representatives were created for the specific change initiative (35). This participatory approach extended to collaborative problem-solving perceived as the responsibility of all stakeholders (17) versus solutions imposed by 1 group onto another. In addition, imaginative, flexible, and reflective change procedures yielded greater success in LSC initiatives than rigid and authoritative approaches did (17).

Factor 5: Roles and Responsibilities

This factor touches upon the existence, addition, or reassignment of individual and group roles and responsibilities that actualize change. LSC was facilitated when the innovation goals were bound to specified roles within the organization (26). The assignation of these roles and their functions to support change required clear and effective communication from leaders (28). On the other hand, confusion about role expectation during and as a consequence of LSC contributed to resistant attitudes (24). Another barrier was the increase of responsibilities for staff with already limited time constraints (23).

Factor 6: Networks

The network entails formal and informal interactions between individuals, groups, or organizations. The studies described networks within and across organizations characterized by trust and mutual history, which contributed to successful LSC. Willis et al. (26) regarded this relationship as a partnership influenced by what they termed collaborative leadership. This "strong" network (23), brought together formally for the LSC, was a product of clinical and management professionals' familiarity from previous clinical visits and events (17,24). In contrast, relationships within and among organizations that lacked a history of collaboration, where trust was not established and values not aligned or shared, were to the detriment of successful change (17).

Existing networks with established and effective communication channels (20,22,35) were critical to implementation. Effective communication strategies were unique and dependent on each innovation and setting. Communication was strong and effective when senior leadership was responsible for communication rather than designating this task to front-line managers (21).

Factor 7: Measurement and Feedback

Measurement and feedback involve the infrastructure and process of data collection on organizational performance as well as its communication. Successful LSC was contingent on organizations with established measurement and feedback processes such as up-to-date data management and informational support systems (3,24,28). When the measurement of organizational quality indicators aligned with implementation goals, LSC were facilitated (26). Reporting back of audit results was also critical to the implementation of LSC and depended on the commitment of leadership for this communication (3).

Discussion

This review draws attention to LSC as an ongoing worldwide phenomenon in healthcare, spanning multiple practice care settings. The factors paint a reassuringly stable picture of how the implementation of LSC depends on influences that transcend specific projects and settings. There is relative agreement across the sample and also with healthcare change management literature on LSC. Similarly, these factors overlap and broaden the scale of constructs from implementation frameworks intended to inform local change (36). For example, in LSC, communication across settings within the larger network is more prominent and an important consideration. Nurse leaders must expand their conceptualizations of implementation to address and optimize factors in the context of LSC.

This review demonstrates how learning organizations act as antecedents to successful LSC in healthcare. Learning organizations are those that regularly engage in a process of modifying individual and shared understandings based on previous experiences in order to improve current and future performance (37). Attributes of learning organizations are consistent with what were described as enabling factors for LSC in this review, including dedicating resources for learning to support general and specific change initiatives, leadership development, shared and aligned vision and values, systems thinking, distributed leadership, and reflective and flexible approaches throughout the change process (38). This process of iterative learning is key to effective adaptation and ongoing readiness in the context of constant and LSC (39). Consistent with the notion that innovations involve product, outcome, and process to transform the system (40), LSCs have not only established desirable outcomes for service delivery and patient care but may also enable future effective change. Nursing leaders have the capacity to promote ongoing learning, which is an important process for organizational readiness.

A set of questions was developed for nurse leaders to identify strengths and areas for improvement in preparing for LSC (figure 1) and can be used as an exercise in reflexivity with stakeholders. Reflective questions differ from rules (3) or checklists (41) already devised for LSC, as they encourage discussion and engagement (42), foster collective beliefs in the capability for change (11) and gauge outcomes as a learning organization. The reflective questions can be easily customized to meet specific needs and addressed to multidisciplinary or nursing teams across

organizational levels. Also, these questions can be useful in assessing reported negative consequences of LSC, such as change fatigue (43), which can impact the success of ongoing and future reform.

Limitations

This integrative review has several limitations. First, subjective rather than a standardized appraisal of the included studies was completed due to the broad inclusion criteria. Critics of the integrative review design cite a lack of rigour due to the inclusion of methodologically diverse studies (16). In this review, restricting study designs could have averted this problem but may have also limited learning on the complexities of LSC. Second, while organizational factors are critical in the success of LSC, other elements were overlooked such as the characteristics of the innovation, external pressures (governmental, public) connected with organizational factors. Rather, the focus was to consider aspects within organizations and systems that nurse leaders could realistically modify and strengthen in preparation and throughout LSC processes.

Conclusion

This review identified 7 organizational factors that acted as barriers or facilitators influencing LSC in healthcare and builds on current knowledge of how to support nurse leaders' capacity for change. As the calls for changes of this magnitude to healthcare delivery continue, nurses are well-positioned to take an active role in organizational preparedness. Future research may capitalize on nurses as agents and facilitators for LSC in healthcare.

References

1. CMA. The state of seniors health care in Canada. CMA.ca. https://www.cma.ca/sites/default/files/2018-11/the-state-of-seniors-health-care-in-canada-september-2016.pdf. Published September, 2015. Accessed July 15, 2020.

2. Barua B, Palacios M, Emes J. The sustainability of healthcare spending in Canada 2017. Fraserinstitute.org. Available at: https://www.fraserinstitute.org/sites/default/files/sustainability-of-health-care-spending-in-canada-2017.pdf. Published March, 2017. Accessed: July 15, 2020.

3. Best A, Greenhalgh T, Lewis S, Saul JE, Carroll S, & Bitz J. Large-system transformation in health care: a realist review. *Milbank Q.* 2012;90(3): 421-456.

4. NHS. Leading large scale change: a practical guide. England.nhs.uk. Available at: https://www.england.nhs.uk/publication/leading-large-scale-change/. Published September 11, 2017. Accessed: July 15, 2020.

5. Bevan H, Plsek P, Winstanley L. Part 1. Leading large scale change: A practical guide. England.nhs.uk. Available at: https://www.england.nhs.uk/improvement-hub/wp-content/uploads/sites/44/2011/06/Leading-Large-Scale-Change-Part-1.pdf. 2011; Accessed: July 15, 2020.

6. Lavoie-Tremblay M, Aubry M, Cyr G, et al. Innovation in health service management: Adoption of project management offices to support major health care transformation. *J Nurs Manag.* 2017;25:657-665.

7. Bokhour BG, Fix GM, Mueller NM, et al. How can healthcare organizations implement patient-centered care? Examining a large-scale cultural transformation. *BMC Health Serv Res.* 2018;18(1):168.

8. Kotter JP. Leading change. Boston MA: Harvard Business School Press;1996.

9. Brown R, Wey H, Foland K. The relationship among change fatigue, resilience, and job satisfaction of hospital staff nurses. *J Nurs Scholarsh.* 2018;50(3):306-313.

10. Aiken L H, Sermeus W, Van den Heede K, et al. Patient safety, satisfaction, and quality of hospital care: cross sectional surveys of nurses and patients in 12 countries in Europe and the United States. *BMJ.* 2012;344:e1717.

11. Weiner BJ. A theory of organizational readiness for change. *Implement Sci,* 2009;4:67.

12. Braithwaite J. Changing how we think about healthcare improvement. *BMJ.* 2018;361:k2014.

13. Reed JE, Howe C, Doyle C, Bell D. Simple rules for evidence translation in complex systems: A qualitative study. *BMC Med.* 2018;16(1):92.

14. Gagnon MP, Attieh R, Ghandour el K, et al. A systematic review of instruments to assess organizational readiness for knowledge translation in health care. *PLoS One.* 2014;9(12):e114338.

15. Storkholm MH, Savage C, Tessma MK, Salvig JD, Mazzocato P. Ready for the Triple Aim? Perspectives on organizational readiness for implementing change from a Danish obstetrics and gynecology department. *BMC Health Serv Res*. 2019;19(1):517.

16. Whittemore R, Knafl K. The integrative review: updated methodology. *J Adv Nurs*. 2005;52(5):546-553.

17. Greenhalgh T, Humphrey C, Hughes J, Macfarlane F, Butler C, & Pawson R. How do you modernize a health service? A realist evaluation of whole-scale transformation in london. Milbank Q. 2009;87(2):391-416.

18. Moher D, Liberati A, Tetzlaff J, Altman DG; PRISMA Group. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *PLoS Med*. 2009;6(7):e1000097.

19. Cresswell K, Sheikh A. Organizational issues in the implementation and adoption of health information technology innovations: an interpretative review. *Int J Med Inform*. 2013;82(5):e73-e86.

20. Watt N, Sigfrid L, Legido-Quigley H, et al. Health systems facilitators and barriers to the integration of HIV and chronic disease services: a systematic review. *Health Policy Plan*. 2017;32(suppl 4):iv13-iv26.

21. Woiceshyn J, Blades K, Pendharkar SR. Integrated versus fragmented implementation of complex innovations in acute health care. *Health Care Manage Rev*. 2017;42(1):76-86.

22. Breland JY, Asch SM, Slightam C, Wong A, Zulman DM. Key ingredients for implementing intensive outpatient programs within patient-centered medical homes: A literature review and qualitative analysis. *Healthc (Amst)*. 2016;4(1):22-29.

23. Kadu MK, Stolee P. Facilitators and barriers of implementing the chronic care model in primary care: a systematic review. *BMC Fam Pract*. 2015;16:12.

24. Darker CD, Nicolson GH, Carroll A, Barry JM. The barriers and facilitators to the implementation of national clinical programmes in Ireland: Using the MRC framework for process evaluations. *BMC Health Serv Res*. 2018;18(1):733.

25. Embuldeniya G, Kirst M, Walker K, Wodchis WP. The generation of integration: The early experience of implementing bundled care in Ontario, Canada. *Milbank Q*. 2018;96(4):782-813.

26. Willis CD, Saul JE, Bitz J, Pompu K, Best A, Jackson B. Improving organizational capacity to address health literacy in public health: A rapid realist review. *Public Health*. 2014;128(6):515-524.

27. Tappen RM, Wolf DG, Rahemi Z, et al. Barriers and facilitators to implementing a change initiative in long-term care using the INTERACT® quality improvement program. *Health Care Manag (Frederick)*. 2017;36(3):219-230.

28. Akin BA, Brook J, Lloyd MH, Bhattarai J, Johnson-Motoyama M, Moses M. A study in contrasts: Supports and barriers to successful implementation of two evidence-based parenting interventions in child welfare. *Child Abuse Negl*. 2016;57:30-40.

29. Busetto L, Luijkx K, Calciolari S, Ortiz LGG, Vrijhoef HJM. Barriers and facilitators to workforce changes in integrated care. *Int J Integr Care*. 2018;18(2):17.

30. van Riet Paap J, Vernooij-Dassen M, Brouwer F, et al. Improving the organization of palliative care: identification of barriers and facilitators in five European countries. *Implement Sci*. 2014;9:130.

31. Bauer MS, Krawczyk L, Tuozzo K, et al. Implementing and sustaining team-based telecare for bipolar disorder: Lessons learned from a model-guided, mixed methods analysis. *Telemed J E Health*. 2018;24(1):45-53.

32. Dickson G. Health reform in Canada: Enabling perspectives for health leadership. *Healthc Manage Forum*. 2016;29(2):53-58.

33. Nancarrow SA, Roots A, Grace S, Moran AM, Vanniekerk-Lyons K. Implementing large-scale workforce change: Learning from 55 pilot sites of allied health workforce redesign in Queensland, Australia. *Hum Resour Health*. 2013;11:66.

34. Levesque JF, Haggerty JL, Hogg W, et al. Barriers and facilitators for primary care reform in Canada: Results from a deliberative synthesis across five provinces. *Healthc Policy*. 2015;11(2):44-57.

35. Tonges M, Ray JD, Herman S, McCann M. Carolina Care at University of North Carolina Health Care: Implementing a Theory-Driven Care Delivery Model Across a Healthcare System. *J Nurs Adm*. 2018;48(4):222-229.

36. Damschroder LJ, Aron DC, Keith RE, Kirsh SR, Alexander JA, Lowery JC. Fostering implementation of health services research findings into practice: a consolidated framework for advancing implementation science. *Implement Sci*. 2009;4:50.

37. Basten D, Haamann T. Approaches for organizational learning: A literature review. *Sage Open*. 2018;July-September 2018:1-20.

38. Senge PM. *The fifth discipline fieldbook: Strategies and tools for building a learning organization.* New York, NY: Doubleday; 1994

39. Soklaridis S. Improving hospital care: are learning organizations the answer? *J Health Organ Manag*. 2014;28(6):830-838.

40. Nicholson P. Innovation and business strategy: Why Canada falls short. *Centre for the Study of Living Standards*. 2009;18:51-71.

41. Sligo J, Gauld R, Roberts V, Villa L. A literature review for large-scale health information system project planning, implementation and evaluation. *Int J Med Inform*. 2017;97:86-97.

42. Wutzke S, Benton M, Verma R. Towards the implementation of large scale innovations in complex health care systems: views of managers and frontline personnel. *BMC Res Notes*. 2016;9:327.

43. Camilleri J, Cope V, Murray M. Change fatigue: The frontline nursing experience of large-scale organisational change and the influence of teamwork. *J Nurs Manag*. 2019;27(3):655-660.

Acknowledgments

3R. Figures (information not in column format)

Figure 1: Reflective Questions

Reflective Questions

These questions emerged from the results of this evidence review, adapted from the CFIR evaluation tool (https://cfirguide.org/) and in consideration of the Strength-Based Leadership program goals.

- *What resources are we counting on (e.g. funding, personnel, physical space, IT) to implement and administer the program?*
  - *What resources are currently available?*
  - *What resources will need to be procured?*
  - *What challenges do we expect to encounter in securing resources in our organization?*

- *What are our current constraints?*
  - *Is our organization stable?*
  - *What other high priority activities may divert our commitment to implementing this program?*

- *What kind of information/knowledge do we need?*
  - *What information have we received and what is missing?*

- *How are new ideas received in our organization?*

- *How do our values align or not with this program?*

- *In what ways will our organizational culture embrace or hinder the implementation of this program?*

- *What kinds of supports or actions can we expect from our leaders to help implement this program successfully?*
  - *What level of support or endorsement have we seen so far from our leaders toward this program?*

- *How does our organization approach implementation?*
  - *Is there a flexible or formulaic process, or no process?*

- *How are stakeholders engaged in change initiatives?*
  - *What is the expectation for patient and family involvement? Involvement of professional associations or labour unions?*

- *Who in the organization can support the implementation of the program?*
  - *What specific roles are needed?*
  - *What roles need to be created or have responsibilities modified?*

- *What is the nature of the relationships across or within our network?*
  - *Is it trusting or suspicious? Collaborative or competitive?*

- *How are information, successes or challenges communicated across our organization and network?*
  - *Would our current communication mechanisms challenge or hinder the implementation of the program?*

- *How are organizational goals measured and monitored by our organization?*
  - *How is our performance communicated?*
  - *How does our organization respond and react to feedback?*

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