

Business school teams up with clinical innovators: An opportunity for health system transformation

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Abstract

Healthcare represents one of the largest sectors in the economy with the health spending on average accounting for about 9% of GDP in OECD countries. Canada was projected in 2018 to spend about 11% of its GDP on healthcare with an expected health expenditure growth of 4.2%. Addressing this issue asks for a redesign of health delivery system and associated cultural shift allowing for incorporation of industry and business best practices. To make this redesign happen, system transformation requires seeking out new institutional mechanisms, partnerships, and forums where industry leaders in business and healthcare can develop a top-down approach with a shared vision, shared best practices, and support coming from a bottom-up approach through pilots and scaling-up initiatives. In this article, we describe one successful partnership initiative—Telfer Health Transformation Exchange at the Telfer School of Management at the University of Ottawa.

Introduction

Healthcare represents one of the largest sectors in the economy with the health spending on average accounting for about 9% of GDP in OECD countries. Canada was projected in 2018 to spend \$253.5 billion on healthcare, representing 11.3% of Canada's GDP with an expected health expenditure growth of 4.2%.^{1,2} This spending is growing at unsustainable rates fuelled by well-documented challenges which include policy and funding misalignments, care delivery fragmentation, inability to incorporate best scientific, business, and operational evidence practice into care, and changing demographic demands.³⁻⁵ These challenges are manifested as long wait times to access family doctors, specialists, diagnostic and specialized treatments, overburdened services, and a less than optimal patient experience.^{6,7} One of the possible answers to these challenges is the redesign of health delivery system to meet demand in a cost-effective way while being innovative and transformative. A number of organizations articulate such a redesign goal as a focus on value—better care at lower cost and a care that is sustainable and that incorporates outcomes pertinent to patients.⁷⁻¹³

Approaches to achieve redesign goal have been multifaceted. The central themes of which have been the identification of the need to incorporate system approaches to leveraging technology for connectivity and data sharing and mining, capacity building for innovation, collaboration and learning, and the use of best business practices.¹¹⁻¹⁴

The complexities involved in implementing a redesign goal require a cultural and knowledge shift allowing for incorporation of industry and business best practices. One aspect of this shift is that clinical leaders need to be both entrepreneurs and intrapreneurs in order to evoke change with a business management lens at the individual, organizational, and macro levels.¹⁵⁻¹⁷

Health Council of Canada further underscores this need to increase innovation and its spread in healthcare by making it one of their five key enablers to support and sustain transformative change in health.⁸ The National Academy of Medicine also identifies developing innovative and strategic approaches to disseminating information through public and private actions and partnerships to accelerate advances in health, science, and medicine as a strategic direction in 2018-2023.¹⁸

To make healthcare redesign happen, system transformation requires seeking out new institutional mechanisms, partnerships, and forums, where industry leaders in business and healthcare can develop a top-down approach with a shared vision, shared best practices, and support coming from a bottom-up approach through pilots and scaling-up initiatives.¹¹ Some of these partnership areas include change management, design thinking, creativity training, intrapreneurship skills, innovation training, systems thinking, and learning systems development (see Figure 1). Development of these partnerships for the improvement of health outcomes at lower costs is an opportunity, providing that we can create the platform for business leaders and academics to work with and share knowledge with their clinical counterparts. This will fill an important void as traditional medical education and training is

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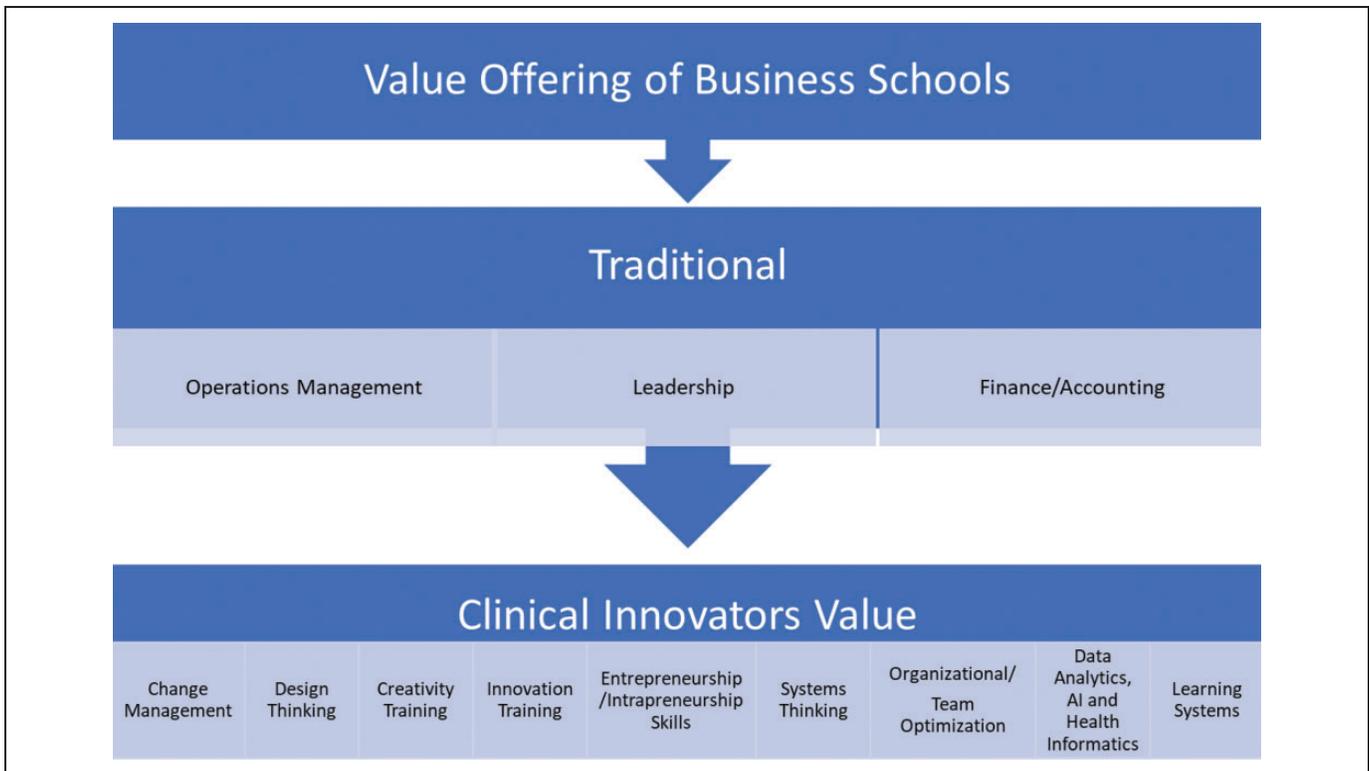


Figure 1. Transformation domains.

not concerned with the operational aspects of health systems, financial systems, entrepreneurship/intrapreneurship, and business processes. Thus, academic business schools while leveraging expertise in innovation, technology, and management processes can gain the hands-on experience and contextual knowledge of the health delivery system.

In this article, we describe one of such partnership initiatives—Telfer Health Transformation Exchange—that was established at the Telfer School of Management at the University of Ottawa, Ontario, Canada. The article is organized as follows. In the next section, we describe the Telfer Health Transformation Exchange value creation model, and we conclude the article with a discussion of the preliminary results and of the next steps.

Telfer Healthcare Transformation Exchange value creation model

Telfer School of Management is a medium-sized academic business school at the University of Ottawa—one of the top research-intensive universities in Canada. Because of its long tradition in health administration (its Master of Health Administration program is one of the oldest in the country), the Telfer School has established strong and fruitful relationships with healthcare organizations in Ottawa. Building on these relationships, the Telfer School created the Telfer Health Transformation Exchange (THT_{EX})—a regional collaborative platform that transcends barriers for multidirectional knowledge sharing between clinical and health systems academics,

business leaders, and industry. The vision behind the THT_{EX} was to have a regional hub integrating innovators from healthcare organizations, business, academia, and government in order to drive transformational change in healthcare delivery at the regional level. In order to realize this vision, it was clear that THT_{EX} needed to have dual leadership—from the business school and healthcare domain—and should act as a regional hub for dialogue between clinicians, health systems researchers, business, and academia with shared goals of transforming healthcare through innovation and collaboration. The main idea behind the THT_{EX} is not unique as there are other healthcare transformation initiatives. For example, the Center for Innovation, located at the Mayo Clinic in Rochester, Minnesota, seeks to transform healthcare and the experience of healthcare delivery through open innovation and focus on the design of methods to transform practices. This initiative is primarily located at the hospital, with external collaborations. The Healthcare Transformation Lab at the Massachusetts General Hospital in Boston supports projects that seek to transform and innovate, through the competitions focused on specific issues and asking for creative solutions. The Innovation Hub at Brigham and Women's Hospital, a teaching hospital at Harvard University, provides opportunities to meet with experts and set up appointments to learn new skills and get help with bringing innovations to life. Finally, the Duke Institute of Innovation at Duke University promotes transformative innovation across its medical and academic network, seeking mostly internal members. In Canada, the Ivey International Centre for Health Innovation at the Ivey School of Business at Western

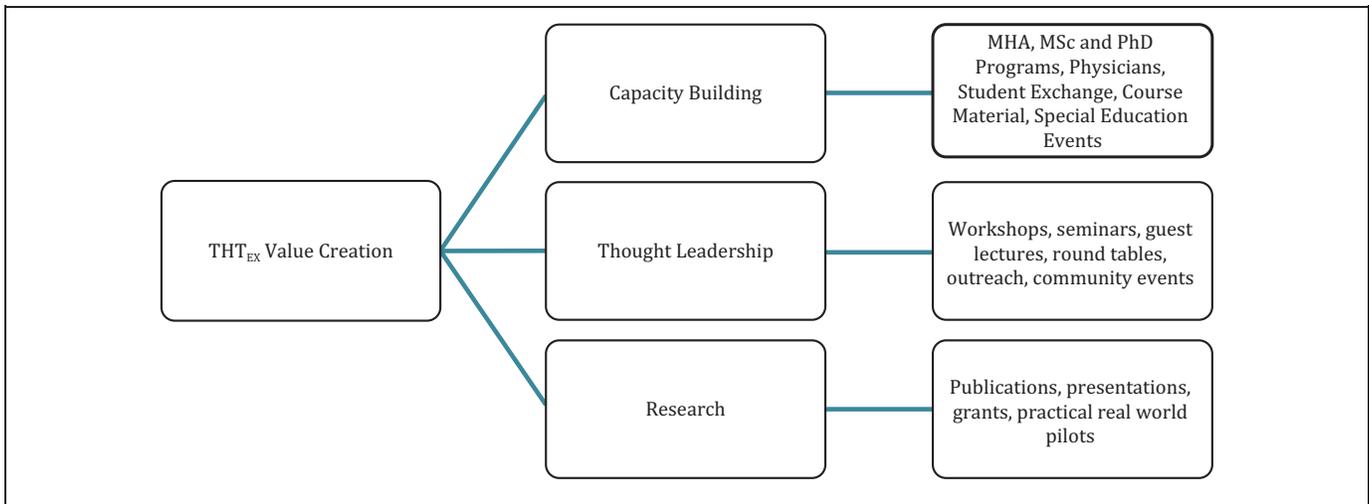


Figure 2. Telfer Health Transformation Exchange (THT_{EX}) value creation model.

University aims to be a leader in knowledge translation and dissemination of value-based health management. The Centre is a business school initiative that collaborates with the London Health Network. At the Rotman School of Management at the University of Toronto, the Sandra Rotman Centre for Health Sector Strategy aims to improve management of healthcare organizations through innovative research and business learning. However, none of these initiatives systematically target physicians or nurses who are the ultimate innovators at the point of care delivery. The THT_{EX} builds on the success of these initiatives. It seeks to approach issues related to healthcare transformation and redesign from both a clinical and an academic perspective, recognizing that improving healthcare delivery on the frontlines would benefit from an integrated health focus and a business approach. The initiative aspires to build on stakeholder involvement, creativity, and entrepreneurialism in order to add value. Three main pillars that define THT_{EX} activities include:

- Value creation according to the initiative’s model explained in detail below (see Figure 2),
- Recognition and awareness through leveraging existing education programs at the Telfer School and providing new educational opportunities to the students, faculty, and clinicians, and
- Capacity building through sponsored research and outreach.

The Community of Practice (CoP) approach, which has been highly successful in our region,¹⁹⁻²¹ inspired the value creation model presented in Figure 2, with the elements of this model explained in detail later in the text. The CoP is understood as a group of “people who engage in a process of collective learning in a shared domain of human endeavour.” It is a platform for engagement, learning, and innovation, which has had broad following in health and business^{22,23}. The THT_{EX} provides such a platform for bringing together clinical leaders from nine local hospitals, business school, local

industry, and the government departments. As a growing collective, exchange participants share a vision for health system redesign and a curiosity to learn and share across domains and silos.

Capacity building

The Telfer School of Management was one of the first in Canada when about 50 years ago it started to train hospital administrators by offering a Master of Health Administration (MHA) program. Since these early days, the program has evolved to broaden the scope to the entire health sector. The MHA program allowed the school to develop a “foot hole” in the health sector and also acted as a catalyst for developing research expertise in the health systems area. Creation of two research-based graduate programs—a Master of Science in Health Systems and a Health Systems Concentration in the PhD in Management program—represented a natural evolution of the School. The THT_{EX} leverages these educational resources by engaging graduate students in a number of initiatives it undertakes, including applied research of a relevance to the THT_{EX} stakeholders. The THT_{EX} draws from the diversified Telfer School faculty expertise in such areas as health informatics, analytics, innovation and entrepreneurship, and change management and connects these business academics with a similarly diversified group of clinical innovators from cancer care, surgery, general internal medicine, paediatrics, gastroenterology, gynaecology, or orthopaedics. Working in truly inter-professional and interdisciplinary teams, they can produce unorthodox approaches to the problems faced in health delivery and also exposes trainees to “out of box” thinking and teaches them interdisciplinarity—a key ingredient in health system innovation and transformation.

Research

The THT_{EX} facilitated and supported a number of research endeavours and real-world clinical pilots. These endeavours

Table 1. Examples of research initiatives facilitated by the THT_{EX} platform

Title	Description
Predicting post-operative complications of the patients having spine surgery	This research used artificial intelligence and machine learning methods to assess complication risks for different classes of patients
Predicting chances of in-hospital death for the patients assessed by the rapid response team	This research used Data Mining and Machine Learning methods to assess chances of a patient's death within 30 days
Developing schedules and itineraries for the nurses assigned to home dialysis program	This research used data analytics methods to create daily itineraries for the nurses visiting home dialysis patients
Assessing "Choosing Wisely" educational initiative to reduce low-acuity pediatric ED visits	This research used qualitative analysis methods to identify barriers and enablers of physicians-led educational initiatives aimed at children and parents ²⁷
Developing computer model capturing dynamics and interactions among members of an interdisciplinary healthcare team	This research used first-order logic and artificial intelligence methods to model behaviour of a team and to integrate this behaviour with clinical workflow
Developing conceptual framework for the Learning Health System	This research created novel methodology that guides design of a learning system in healthcare organization ²⁴
Developing an implementation framework to achieve system redesign with a Learning Health System approach	This framework enabled a regional system redesign for lung cancer care in the region led by a major Hospital ²⁵
Forecasting need for implants to meet demand of spine surgeries	This research used data analytics and forecasting methods to predict need for the implants by type, surgical complexity, and volume
Patient navigation application for lung cancer assessment patients	This research developed mobile application to be used by patients with lung cancer who undergo assessments and clinical evaluations
Identifying risk of post-surgical complications among the patients with endometrial cancer who underwent hysterectomy	This research used predictive analytics to develop predictive model of post-operative risk of hysterectomy patients

Abbreviation: ED, emergency department; THT_{EX}, Telfer Health Transformation Exchange.

were identified during several brainstorming sessions and workshops involving all stakeholders and follow the "bottom-up, top-enabled" mantra embraced by the THT_{EX}. This mantra is interpreted as a stakeholder-led initiative that has clear potential to be scaled up to other service lines of the hospital or other healthcare organizations. Sample list of the research initiatives is presented in Table 1.

Results of the projects outlined in Table 1 were published in academic journals and presented at national and international conferences. It included journal articles that appeared among others, in *Interfaces*, *Implementation Science*, *Journal of Biomedical Informatics*, *PLoS One*, *Healthcare Management Science*, *Journal of Pathology Informatics*, *Journal of Medical Systems*,²⁶⁻³⁰ and in the conference proceedings of American Medical Informatics Conference, or Conference on Current and Future Trends in Information and Communications Technologies.³¹⁻³⁴ Members of the THT_{EX} gave presentations among other at the American Medical Informatics Annual Meeting, European Conference on Operational Research, Multiple Criteria Decision-Making Conference, or Canadian Operations Research Society Annual Meeting.

Thought leadership

The THT_{EX} was very active in facilitating knowledge mobilization and creating forums for thought leadership exchange. Most notable activities are listed in Table 2.

Members of the THT_{EX} Exchange were active in giving presentations to the students, both in form of seminars and guest lectures. These presentations are open to the wider health

Table 2. Examples of THT_{EX} knowledge mobilization activities

Event	Organization
Innovate Health, Not Healthcare: The Mayo Clinic Experience	Center for Innovation, Mayo Clinic
Innovation to Transform Healthcare: The Massachusetts General Hospital Experience	Healthcare Transformation Lab, Massachusetts Hospital
Modernizing Healthcare through Quality and Analytics with the Aim of Population Health	United Health Group
Transforming our Hospitals: Clinician-Driven Operations Management	Institut de recherche de l'Hôpital Monfort
Mayday . . . Canada's Healthcare System in Crisis	Senate of Canada
Design Workshop for the Radiation Oncology	University of Ottawa and The Ottawa Hospital
Community of Practice in Action Workshop	University of Ottawa and The Ottawa Hospital
Connectivity and collaboration. The road to a collaborative health ecosystem	Telus Health
Entrepreneurship and Intrapreneurship in Health Workshop-Role of incubators and intrapreneurship training	University of Ottawa
Innovations in Long-Term Care	Extendicare

Abbreviation: THT_{EX}, Telfer Health Transformation Exchange.

community, students from other universities, and industry leaders. They are considered important because they not only make future healthcare leaders aware of the redesign

opportunities but also provide additional venue to communicate THT_{EX} vision to a larger community.

Discussion and conclusions

Since the initial concept and gradual deployment of the THT_{EX}, we can conclude that the proposed value creation model has merit and is working at a regional level. Considering distinctly different cultures prevalent in the healthcare domain and in the business school, our model has demonstrated the capacity to bridge the gap and bring these two cultures closer with a mutual understanding and a shared focus. Currently, our activities are regional and geared toward clinical leaders in the hospitals. While it might be perceived as a shortcoming of the initiative, we justify it by a need to be clear where value can be added and to have a channel for our initial energies. By focusing on the frontline medical innovators and empowering them with evidence-based business methods and approaches, we seek to leverage their unique knowledge and positions to break down one of the silos so inherent in healthcare domain. Simultaneously, we provide business academics, with an understanding of healthcare sector, and the opportunities to have their research inform its redesign and optimization for the training of the next generation of leaders.

Central to the next stage of the THT_{EX} is an increasing focus on research, training, and partnerships in developing specialized areas in learning health systems, entrepreneurship/intrapreneurship, and actionable artificial intelligence and data analytics applications. We envision these competencies as essential to building capacity for innovation and a redesign of health system delivery. These foci do not diminish the relative importance of traditional management competencies but provide a context for further evolution of these traditions. Considering relative maturity of the THT_{EX} model, our immediate step is to develop and implement an evaluation framework to better assess its performance and impact in terms of capacity building (engagement, educational initiatives), research outputs, and transformative initiatives. Possible metrics would include the number of successful implementation projects or knowledge mobilization activities and their measurable impact and the number of collaborative partnerships across stakeholders. To this end, we are planning to conduct a limited qualitative study involving clinicians, business school faculty, and industry partners so we better understand their perceptions and how participating in THT_{EX} community empowers them to be innovation champions and facilitates their success. The results of this study will allow us to adapt the THT_{EX} model as needed. Our long-term plans include expanding of the collaborative platform to include incubators for provision of specialized knowledge in entrepreneurship/intrapreneurship and business processes, research curation of best practices to support intrapreneurship in healthcare, and on-going partnerships with the industry and government agencies, especially in the area of digital health.

In conclusion, business schools are a unique stakeholder in the vision to transform healthcare. Their value contribution,

however, will be vastly diminished if they are unable to create a platform for multidirectional learning and product/service creation. The platform construct that we proposed and implemented is that of an open learning collaborative that can become a safe and trusted space for sharing across siloes and traditions. This vision, like all collaborative approaches, requires effort, resources, and continual engagement with no expectation for a direct one for one return. The path to transformation is gradual and not linear. However, our experience shows that such a path is possible, and it creates value for all involved.

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References

1. Canadian Institute for Health Information (CIHI). *National Health Expenditure Trends, 1975 to 2014*. Ottawa, Ontario: CIHI; 2018. doi:10.1007/s10916-010-9605-x.
2. Organisation for Economic Co-operation and Development (OECD). *Health at a Glance 2017: OECD Indicators*. Paris, France: OECD Publishing; 2017. doi:10.1787/health_glance-2017-en.
3. Falk W, Mendelsohn M, Hjartarson J. Fiscal sustainability & the transformation of Canada's healthcare system. 2011. Available at: https://mowatcentre.ca/wp-content/uploads/publications/38_fiscal_sustainability_and_transformation_canada.pdf. Accessed May 7, 2019.
4. IBM. Healthcare 2015: a portrait and a path to successful transformation win-win or lose-lose? 2006. Available at: <http://www-935.ibm.com/services/us/gbs/bus/html/healthcare-2015-win-wiin.html?cntxt=a1000056%5Cnftp://public.dhe.ibm.com/common/ssi/pm/xb/n/gbe03219usen/GBE03219USEN.PDF>. Accessed May 7, 2019.
5. University of Toronto. *The Land of Stranded Pilots*. Toronto, Ontario: University of Toronto; 2018.
6. Snowdon A, Shell J, Leitch K. *Transforming Canadian Healthcare Through Consumer Engagement: The Key to Quality and System Innovation*. Ontario: Ivey International Centre for Health Innovation and Leadership, Richard Ivey School of Business, Western University London; 2011. doi:10.1038/nmeth.1435.
7. Canadian Medical Association (CMA). *Health Care Transformation in Canada*. Ottawa, Ontario: CMA; 2010.
8. Health Council of Canada. Better health, better care, better value for all: refocusing healthcare reform in Canada. *Heal Council Canada Fact Sheet*. 2013:1-46. Available at: https://healthcouncilcanada.ca/files/HCC_Summative_Report_Accessible_FA.pdf. Accessed May 7, 2019.
9. Institute of Medicine. *Crossing the Quality Chasm: A New Health System for the 21st Century*. Washington, D.C.: The National Academies Press; 2001. doi:10.17226/10027.
10. Institute of Medicine. *Institute of Medicine: Roundtable on Value & Science-Driven Health Care: Charter and Vision Statement*. 2014. Available at: <https://www.ncbi.nlm.nih.gov/books/NBK50934/>. Accessed May 7, 2019.

11. World Economic Forum and Boston Consulting Group. Value in Healthcare Laying the Foundation for Health System Transformation: Insight Report. 2017; Insight Re(April):1-40. Available at: http://www3.weforum.org/docs/WEF_Insight_Report_Value_Healthcare_Laying_Foundation.pdf. Accessed May 7, 2019.
12. World Economic Forum and Boston Consulting Group. *Value in Healthcare Accelerating the Pace of Health System Transformation*. Geneva, Switzerland: World Economic Forum and Boston Consulting Group; 2018.
13. World Economic Forum and Boston Consulting Group. *Value HealthCare Mobilizing Cooperation for Health System Transformation*. Geneva, Switzerland: World Economic Forum and Boston Consulting Group; 2018.
14. National Academy of Engineering and Institute of Medicine. In: Reid PP, Compton WD, Grossman JH, Fanjiang G, eds. *Building a Better Delivery System: A New Engineering/Health Care Partnership*. Washington, DC: National Academies Press; 2005. doi: 10.17226/11378.
15. Lages M, Marques CS, Ferreira JJM, Ferreira FAF. Intrapreneurship and firm entrepreneurial orientation: insights from the healthcare service industry. *Int Entrep Manag J*. 2017;13(3): 837-854. doi:10.1007/s11365-016-0428-1.
16. Antoncic B, Hisrich R. Intrapreneurship: Construct development and cross-cultural validation. *Journal of Business Venturing*. 2001;16:495-527.
17. Marques CS, Valente S, Lages M. The influence of personal and organisational factors on entrepreneurship intention: an application in the healthcare sector. *J Nurs Manag*. 2018;26(6):696-706. doi:10.1111/jonm.12604.
18. National Academy of Medicine. Goalposts for a Healthier Future. 2018. Available at: <https://nam.edu/wp-content/uploads/2017/10/National-Academy-of-Medicine-2018-2023-Strategic-Plan.pdf>. Accessed May 7, 2019.
19. Fung-Kee-Fung M, Boushey RP, Morash R. Exploring a “community of practice” methodology as a regional platform for large-scale collaboration in cancer surgery-the Ottawa approach. *Curr Oncol*. 2014;21(1):13-18. doi:10.3747/co.21.1662.
20. Fung-Kee-Fung M, Boushey RP, Watters J, et al. Piloting a regional collaborative in cancer surgery using a “community of practice” model. *Curr Oncol*. 2014;21(1):27-34. doi:10.3747/co.21.1663.
21. Fung-Kee-Fung M, Goubanova E, Sequeira K, et al. Development of communities of practice to facilitate quality improvement initiatives in surgical oncology. *Qual Manag Health Care*. 2008;17(2): 174-185. doi:10.1097/01.QMH.0000316995.79167.be.
22. Nix M, Namara P, Genevro J, et al. Learning collaboratives: insights and a new taxonomy from AHRQ’s two decades of experience. *Health Aff*. 2018;37(2):205-212. doi:10.1377/hlthaff.2017.1144.
23. Mazel O, Ewen S. Innovation in indigenous health and medical education: the Leaders in Indigenous Medical Education (LIME) network as a community of practice. *Teach Learn Med*. 2015; 27(3):314-328. doi:10.1080/10401334.2015.1044655.
24. Lessard L, Michalowski W, Fung-Kee-Fung M, Jones L, Grudniewicz A. Architectural frameworks: defining the structures for implementing learning health systems. *Implement Sci*. 2017; 12(1):78. doi:10.1186/s13012-017-0607-7.
25. Fung-Kee-Fung M, Maziak D, Pantarotto J, et al. Regional process redesign of lung cancer care: a learning health system pilot project. *Curr Oncol*. 2018;25(1):59-66. doi:10.3747/co.25.3719.
26. Patrick J, Montazeri A, Michalowski W, Banerjee D. Automated pathologist scheduling at the Ottawa hospital. *Interfaces*. 2019; 49(2):93-103. <https://doi.org/10.1287/inte.2018.0969>.
27. Huyer G, Chreim S, Michalowski W, Farion K. Barriers and enablers to a physician-delivered educational initiative to reduce low-acuity visits to the pediatric emergency department. *PLoS One*. 2018;13(5):e0198181. doi:10.1371/journal.pone.0198181.
28. Wilk S, Michalowski M, Michalowski W, Rosu D, Carrier M, Kezadri-Hamiaz M. Comprehensive mitigation framework for concurrent application of multiple clinical practice guidelines. *J Biomed Inform*. 2017;66:52-71.
29. Fiallos J, Patrick J, Michalowski W, Farion K. Using data envelopment analysis for assessing the performance of pediatric emergency department physicians. *Health Manag Sci*. 2017;20(1): 129-140.
30. Halwani F, Li W, Banerjee D, et al. A real-time dashboard for managing pathology processes. *J Pathol Inform*. 2016;7:24-35.
31. Parimbelli E, Wilk S, Kingwell S, Andreev P, Michalowski W. Shared decision-making ontology for a healthcare team executing a workflow: an instantiation for metastatic spinal cord compression management. In: *AMIA 2018 Annual Symposium Proceedings*. San Francisco, 2018.
32. Çatal N, Amyot D, Michalowski W, et al. Supporting process execution by interdisciplinary healthcare teams: Middleware design for IBM BPM. Paper presented at: 7th International Conference on Current and Future Trends of Information and Communication Technologies in Healthcare (ICTH 2017); September 18-20, 2017; Lund, Sweden.
33. Chandhoke GS, Grewal AS, Pathak V, et al. A virtual patient navigation application for lung cancer assessment patients. Paper presented at: 7th International Multidisciplinary Conference on e-Technologies (MCETECH); May 17-19, 2017; Ottawa, Ontario.
34. Lessard L, Michalowski W, Li W, Halwani F, Amyot D, Banerjee D. Predictive analytics to support real-time management in pathology facility. In: *AMIA 2016 Annual Symposium Proceedings*; November 12-16, 2016; Chicago.