Building health services in a rapidly changing landscape: Lessons in adaptive leadership and Pivots in a COVID-19 remote monitoring program

Celia Violet Laur, Payal Agarwal, Geetha Mukerji, Elaine Goulbourne, Hayley Baranek, Laura Pus, R Sacha Bhatia, Danielle Martin, Onil Bhattacharyya

Submitted to: Journal of Medical Internet Research
on: November 04, 2020

Table of Contents

Building health services in a rapidly changing landscape: Lessons in adaptive leadership and Pivots in a COVID-19 remote monitoring program

Celia Violet Laur[1*] MSc, PhD; Payal Agarwal[1, 2*] MD; Geetha Mukerji[1, 3] MD, MSc; Elaine Goulbourne[4]; Hayley Baranek[1]; Laura Pus[4]; R Sacha Bhatia[1, 5] MD; Danielle Martin[2, 4, 6] MD, MPP; Onil Bhattacharyya[1, 2] MD

[1]Women's College Hospital Institute for Health System Solutions and Virtual Care Toronto CA
[2]Department of Family and Community Medicine University of Toronto Toronto CA
[3]Department of Medicine, Division of Endocrinology & Metabolism University of Toronto Toronto CA
[4]Women's College Hospital Toronto CA
[5]University Health Network Toronto CA
[6]Dalla Lana School of Public Health University of Toronto Toronto CA
[*]these authors contributed equally

Corresponding Author:
Celia Violet Laur MSc, PhD
Women's College Hospital Institute for Health System Solutions and Virtual Care
76 Grenville St
Toronto
CA

Abstract

Adaptive Leadership has become an essential skill for leaders in the health system to respond to the COVID-19 pandemic as new knowledge emerges and case rates rise, fall and rise again. This leadership approach has been described as an iterative process of taking a wide view of the situation, interpreting the meaning of incoming data from multiple directions, and taking real-time action. This process is also common in start-ups that try to create a new product or service of uncertain value for a consumer market that may not yet exist. Startups manage uncertainty through “Pivots”, which can include changes in the target group, need, features, or intended benefit of a product or service. Pivots are large changes to account for the high likelihood of getting something wrong, and distinct from the “tweaks” or small tests of change that define quality improvement methodology. This case study describes three Pivots in the launch of a remote monitoring program for COVID-19. Adaptive Leadership helped inform strategic decisions, with Pivots providing a framework for internal and external stakeholders to make meaning of large program changes to address shifting needs. As healthcare always has a lot of uncertainty, these strategies are relevant at any time and for all healthcare leadership.

(JMIR Preprints 04/11/2020:25507)
DOI: https://doi.org/10.2196/preprints.25507

Preprint Settings

1) Would you like to publish your submitted manuscript as preprint?

✓ **Please make my preprint PDF available to anyone at any time (recommended).**
Please make my preprint PDF available only to logged-in users; I understand that my title and abstract will remain visible to all users.
Only make the preprint title and abstract visible.
No, I do not wish to publish my submitted manuscript as a preprint.

2) If accepted for publication in a JMIR journal, would you like the PDF to be visible to the public?

✓ **Yes, please make my accepted manuscript PDF available to anyone at any time (Recommended).**
Yes, but please make my accepted manuscript PDF available only to logged-in users; I understand that the title and abstract will remain v
Yes, but only make the title and abstract visible (see Important note, above). I understand that if I later pay to participate in <a href="http

Original Manuscript

Building health services in a rapidly changing landscape: Lessons in adaptive leadership and Pivots in a COVID-19 remote monitoring program

Running Head: Lessons in adaptive leadership and Pivots in a COVID-19 remote monitoring program

Celia V. Laur, PhD*
Women's College Hospital Institute for Health System Solutions and Virtual Care, Toronto, Ontario, Canada

Payal Agarwal, MD*
Women's College Hospital Institute for Health Systems Solutions and Virtual Care, University of Toronto, Toronto, ON, Canada
Department of Family and Community Medicine, University of Toronto, Toronto, ON, Canada

Geetha Mukerji, MD, MSc
Department of Medicine, Division of Endocrinology & Metabolism, University of Toronto, Toronto, Ontario, Canada
Women's College Hospital Institute for Health System Solutions and Virtual Care, Toronto, Ontario, Canada

Elaine Goulbourne
Women's College Hospital, Toronto, Ontario, Canada

Hayley Baranek
Women's College Hospital Institute for Health System Solutions and Virtual Care, Toronto, Ontario, Canada

Laura Pus
Women's College Hospital, Toronto, Ontario, Canada

R. Sacha Bhatia, MD,
Women's College Hospital Institute for Health Systems Solutions and Virtual Care, University of Toronto, Toronto, ON, Canada
University Health Network, Toronto, ON, Canada

Danielle Martin, MD, MPP
Women's College Hospital and Department of Family and Community Medicine, University of Toronto, Toronto, ON, Canada
Dalla Lana School of Public Health, University of Toronto, Toronto, Ontario, Canada

Onil Bhattacharyya, MD
Women's College Hospital Institute for Health Systems Solutions and Virtual Care, University of Toronto, Toronto, ON, Canada
Department of Family and Community Medicine, University of Toronto, Toronto, ON, Canada
*Joint first author

Abstract

Adaptive Leadership has become an essential skill for leaders in the health system to respond to the COVID-19 pandemic as new knowledge emerges and case counts rise, fall and rise again. This

leadership approach has been described as an iterative process of taking a wide view of the situation, interpreting the meaning of incoming data from multiple directions, and taking real-time action. This process is also common in start-ups that try to create a new product or service of uncertain value for a consumer market that may not yet exist. Startups manage uncertainty through “Pivots”, which can include changes in the target group, need, features, or intended benefit of a product or service. Pivots are large changes to account for the high likelihood of getting something wrong, and distinct from the “tweaks” or small tests of change that define quality improvement methodology. This case study describes three Pivots in the launch of a remote monitoring program for COVID-19. Adaptive Leadership helped inform strategic decisions, with Pivots providing a framework for internal and external stakeholders to articulate options for changes to address shifting needs. There is considerable uncertainty in the appropriate design and implementation of health services, and although this case example focuses on the use of Adaptive Leadership and Pivots during a pandemic, these strategies are relevant for healthcare leaders at any time.

Introduction

Addressing the COVID-19 pandemic has required many shifts in strategy as new knowledge about the disease, its trajectory and spread, and its treatment has emerged. Health system leaders have had to adapt health care delivery to clinical and system uncertainty, as well as the changing demographics of the populations most affected. For example, in mid-March 2020, the Ontario (Canada) government encouraged the transfer of stable hospitalized patients to long-term care to prepare for a surge in hospital admissions from COVID-19 (1). By mid-April, 2020, hospitals were mostly empty, so they paused transfers, and by mid-May, no transfers were happening from hospitals to long-term care, and 82% of the COVID-19 deaths in Canada were in long-term care facilities (2). In protecting the capacity of acute care hospitals to prepare for the surge in cases, it led to a strategic shift towards, then away from, transfers to long-term care in reaction to new information.

Adaptive challenges, or problems that cannot be solved by applying “current technical know-how or routine behavior,” can be managed using Adaptive Leadership, first proposed by Heifetz in 1994 (3). Key aspects of this leadership style include taking a wider view of the situation, interpreting what is really going on, and taking real-time action to rapidly ameliorate the situation in response to the perceived or projected needs (3). In other words, it is about *anticipating* future needs, trends and options; *articulating* these needs to build collective understanding and support for action; *adapting* to allow continuous learning and the adjustment of responses as necessary; and having *accountability*,

including transparency in decision making processes and openness to challenges and feedback (4). These are all essential skills during a pandemic (3,5–8).

The level of uncertainty in healthcare has risen substantially during the pandemic. Practical approaches to managing extreme uncertainty may come from groups that are used to it, such as the founders of start-up companies. Start-ups are well practiced in adaptive leadership since they are developing products and services which do not yet exist and may not be effective for a consumer market which may not materialize. To address this challenge, they have operationalized many adaptive strategies, most notably the concept of “Pivots,” which are used to match a service to a public need (9). These include large changes to programs, such as narrowing or expanding the set of functions, changing customer segments, focusing on a different customer need, or changing delivery channels (9). For example, Burbn, an app that allowed users to check-in, post their plans, and share photos, had limited use of these functions, so it “zoomed-in” on the photo sharing feature and relaunched as Instagram (10). YouTube began as a video dating website and successfully “zoomed-out” to become the video streaming service known today (11). When applied to healthcare, Pivots may help articulate different options that can be tested quickly to meet health system need during times of extreme clinical and system uncertainty.

Pivots and Adaptive Leadership appear to be complementary. Adaptive Leadership supports the program team to make the required changes in values, beliefs and behaviours so they can continue to meet the needs of their patients and healthcare system. Ideally, the approach helps teams to make meaning of large changes, potentially protecting against change fatigue, and positions the management of constant change as a core skill for the team. Pivots provide a framework to facilitate difficult strategic decisions.

In March 2020, as the number of people testing positive for COVID-19 in Canada was rising (14), Women’s College Hospital, an academic ambulatory hospital in downtown Toronto, a diverse city of approximately 3 million, saw a need to support people in the community who tested positive for COVID-19. This need led to the development of COVIDCare@Home (CC@H), a remote monitoring program to support people who test, or are presumed positive for COVID-19, in their homes. CC@H offers remote monitoring using telephone and video visits, 7 days a week by an interprofessional, family-medicine led team, which aimed to follow patients during the acute phase of the illness (typically 14 days from symptom onset) or until they were discharged to community-based care from their primary care provider. To accelerate the process, senior hospital leaders enabled program leads

to make rapid, informed and strategic choices, drawing on principles of user-centered design with patient and provider interview feedback collected during the initial development (15,16). This case study describes the application of Adaptive Leadership and three of the key Pivots that allowed CC@H to launch within one week and adapt to the changing needs of COVID-19 positive patients during a period of rapid changes in clinical and health system needs. A timeline of Pivots in relation to COVID-19 case rates in Toronto is included in Figure 1. Descriptions of the named Pivots are visualized in Figure 2, with details and examples based on CC@H provided in Table 1.

Table 1: Names, descriptions and examples of Pivots mainly relevant to COVIDCare@Home. Pivots are named by Ries (9), and adapted for the healthcare context by the authors. "User" can refer to patients, customers, or other groups.

Pivot Name	Description	Example
Pivots Applied to COVIDCare@Home		
Zoom-In	A single feature is chosen to become the main feature and everything else is cut away, thus optimizing delivery of this feature and its value proposition.	The CC@H team quickly "zoomed-in" on focusing on remote monitoring of community-based patients, while other strategies were de-prioritized.
Business Architecture	Two major business architectures include: 1. high margin/intensity, low volume; 2. low margin/intensity, high volume. These approaches cannot be applied simultaneously.	The CC@H program initially provided low intensity care to a high volume of patients because the team initially predicted high demand, then pivoted to low volume/high intensity when the COVID-19 case counts came down, and patients were found to be more medically and socially complex.
Engine of Growth	There are different ways in which a program can grow, such as changing the cost structure to make better use of existing resources; encourage policy change to generate new revenue sources; or development of a hub and spoke model to support replication in other sites.	The second wave of COVID-19 meant CC@H needed to move from a short-term program with high resource use, to a long-term sustainable program with limited resources, such as by decreasing reliance on the use of high-cost staff such as physicians.
Channel	Changing to a different product or mode of delivery in order to increase effectiveness.	Many healthcare institutions changed their primary channel of delivery during COVID-19 when moving from in-person to virtual patient visits. Another example would be as CC@H moved from primarily video visits with patients to use of digital surveys to triage patients.
Technology	The same solution is delivered to the	The CC@H team began sending pulse

	user using a completely different technology, such as when new technology is available at better value.	oximeters and thermometers to support monitoring rather than only using paper-based systems for tracking physiological parameters.
Pivots that *Could* be Applied to COVIDCare@Home		
Zoom-Out	The reverse of the zoom-in pivot. When current features are insufficient for the user and the range of features is expanded.	To support the higher intensity approach, CC@H could expand their services such as by providing home care in addition to remote monitoring for patients at higher risk.
User Segment	A service may not be interesting to the users it was designed for, but early insights suggest a different user may benefit.	In the future, CC@H could change their patient population, such as to focus on post-discharge or complex patients who may receive more benefit from this approach.
User Need	If early user feedback shows that the problem being solved is not very important, the team may pivot to address a different need.	As evidence of post-acute COVID-19, also known as “long COVID,” emerges (12) and emphasis on new cases decreases, CC@H may move away from the focus on only supporting those recently diagnosed to include longer follow-up of patients with continuing symptoms.
Platform	A change from a service with a set of features to a platform which connects those who deliver a service to those who use that service.	CC@H could shift to a remote monitoring platform, where it connects specialty services to a multidisciplinary team to monitor patients with different conditions remotely.
Value Capture	The is a monetization or revenue model. Leaders change how the company captures value, such as increased focus on profits or exchange of services.	CC@H could change to offering a paid service to other institutions or include it as part of inpatient care for hospital partners to allow for reimbursement in a bundled payment.

Pivot 1: Zooming-in on remote monitoring

In Ontario, modelling data presented on April 3, 2020, projected that the demand for Intensive Care Unit beds would exceed the capacity by mid-April, with a projected 80 000 cases by April 30 if current measures were followed (17). There were concerns that hospitals would become overwhelmed. The literature had one well-described model for remote monitoring in primary care (18). In a desire to keep people out of hospital who could safely care for themselves at home with support, CC@H was launched by Women’s College Hospital on April 8, 2020. Partners in this program included the Department of Family and Community Medicine at the University of Toronto,

and Mount Sinai Hospital, an acute care academic hospital and part of the Sinai Health System.

Initial strategies of CC@H included setting up a phone line to provide primary care providers access to expertise in social work, pharmacy, nurse navigation, general internal medicine, respirology, and psychiatry. The team also developed resources to support early discharge from acute care, and a protocol for remote monitoring for patients in the community (19). CC@H quickly "zoomed-in" (Table 1) on remote monitoring of community-based patients within the Greater Toronto Area who tested positive for COVID-19, while other strategies were de-prioritized. This zoom-in Pivot enabled the team to focus resources on refining remote monitoring processes including video and telephone visits, methods for remote triaging, clinical pathways to address symptoms, and utilization of devices such as sending pulse oximeters and thermometers to patients. Remote monitoring services followed recommendations from Greenhalgh et al., 2020 (18), and were available 24-hours a day for up to 14-days. Details are published elsewhere (20).

Initial Staffing: A primary care, team-based, approach was taken, relying on redeployed physicians and staff from Women's College Hospital, primary care residents, and a multidisciplinary team (MDT) of providers. The MDT included nurses, a pharmacist, social workers, mental health workers, and other available specialists, who worked together to address clinical needs, as well as the social determinants of health of the patients remotely.

Pivot 2: Supporting complex patients

The original aim of CC@H aligned with system projections that support would be needed for a high volume of COVID-19 positive patients at a low intensity, including occasional contact with mechanisms for escalation as needed (17). However, with the initial health system focus on protecting acute care (1), then long-term care (2), there was delayed recognition of the need to support underserved populations who were at high risk, such as those in congregate living settings or whose low incomes, precarious work or housing situations made their social situations particularly complex (21–23). For CC@H this meant that fewer patients were admitted to the program than anticipated, but those who were admitted had complex needs beyond the COVID-19 diagnosis (20).

By early May, half of the patients admitted to CC@H had one or more comorbidity (20), and 56% belonged to occupational groups who are more likely to contract COVID-19 (such as personal support workers, shelter workers and cleaners), and to have social challenges (such as food insecurity

or lack of access to financial support), that increased the risk of poor health outcomes (20,21). For these reasons, the program pivoted from high patient volume with low patient contact, to low patient volume with high service intensity. There was an average of 4.4 visits per patient, in the first month (20), with visits focused on monitoring symptoms and addressing medical and social needs, and subsequent visits determined at the end of each visit based on patient preferences and clinical judgement. This type of shift in intensity is called a business architecture Pivot (Table 1) , which posits that a business can be low-margin, high-volume or high-margin, low-volume but not both (9). The analogous situation in health care is a shift in intensity and volume of a service, which in this case allowed for a more patient-centred approach that supported complex patients. The Pivot facilitated use of services such as access to mental health support (i.e., brief counselling and access to community resources), navigation of government support (i.e., providing information on what financial or other programs the patient is eligible for and how to apply), and strategies to address food insecurity (i.e., providing information on grocery delivery services, food banks and other local initiatives available during the pandemic).

Staffing Changes: As the program grew, the original plan was to recruit more physicians and Registered Nurses (RNs) to support the high volume of patients with COVID-19 specific needs. However, with the focus on supporting patients with complex needs, a Nurse Practitioner (NP) was assigned instead. The NP could focus on case management specifically for complex patients that needed more intense support and delivered clinical care when the number of patients in the program increased. The emphasis was on comprehensive care, and social workers and mental health professionals also became more involved in case management.

Pivot 3: Adapting, Spreading and Sustaining the Program

When the number of COVID-19 cases decreased across Ontario in July and August 2020 (24), CC@H responded by ramping down, allowing redeployed staff to return to their original roles and many participating primary care physicians had returned to their pre-pandemic practice models. The program remained nimble with the ability to service higher volumes if needed. In September, when a second wave began to build with predominately younger and lower risk patients (24), a new emphasis was placed on improving triage. This approach included light-touch digital monitoring systems, such as electronic survey questions for low risk patients to help triage risk and frequency of monitoring.

This second wave necessitated an engine of growth Pivot (Table 1), moving from a short-term

program with high resource use and access to redeployed staff, to a long-term sustainable program with limited resources and a staffing model that did not rely on redeployment. To achieve this change, the program leaders decreased reliance on the use of high cost staff such as physicians. With increasing clinical confidence, the program team felt more comfortable with minimal physician contact for low risk patients, allowing physicians to prioritize complex and high-risk patients. “Digital Care Coach,” an EMR tool that includes a symptom questionnaire to allow for low-touch remote monitoring, was prepared and triaging guidelines (criteria for low, medium and high-risk patients, based on symptoms, patient history, and clinical judgement) were adapted to allow for longer times between virtual visits. This EMR tool monitored symptoms of low-risk patients and provided educational materials, allowing the program to provide care to more patients, while maintaining staffing levels, and facilitating providers to focus on higher risk patients.

Staffing Changes and Communication Strategies: To run a more sustainable program, the number of physicians involved in the program did not increase in proportion to the number of patients, instead relying on more NPs and RNs to manage lower risk patients, supported by digital tools such as Digital Care Coach. Communication strategies also became more sustainable with the use of a patient roster and weekly clinical case conferences, rather than daily huddles. The emphasis shifted to effective use of time and resources for a longer-term program.

Barriers and Enablers

A significant enabler in the rapid launch of CC@H was the suspension of many elective activities in the hospital, as well as a sense of urgency. The leadership commitment to rapid action helped overcome the typical barriers and delays associated with building new programs in large organizations. Senior leaders worked closely with the program lead to ensure the necessary staffing, resources, and IT support were available. The program lead facilitated integration of the EMR system into the program workflow, responded to stakeholder feedback in real time, developed processes more efficient for care delivery, and thus built trust among the team that enabled future Pivots. Everyone involved saw the need for this program and worked through several hurdles in order to meet this need. Among those hurdles was adapting the EMR system to meet the changing needs of the program, which led to a steep learning curve for providers who were accustomed to a different EMR. Maintaining the appropriate staffing levels was also challenging with fluctuating case numbers. A core group of physicians were involved for several months at a time, varying their number of hours per week with the program rather than adding new providers. Social work/mental

health and pharmacists stayed constant throughout, however there was high turnover among RN and NPs. Providers were flexible, moving between several programs across Women's College Hospital based on program needs and provider skills. Providers were aware of this shifting need, and training was provided to facilitate transitions. With increasing focus on the social determinants of health, more mental health and social workers were needed, and the team had to keep up to date with what services to recommend that were still open.

The rapid speed at which Pivots occurred was an enabler and a barrier. Changes were enacted quickly (typically within a few days) to meet the needs of their patients, thus limiting the time for team consultation, and leading to a more top-down approach. The daily huddles and weekly meetings allowed the team to be informed quickly, and to be involved in making sure the changes worked for them. Although decisions to Pivot were made by leadership, those decisions were informed by the team, and adapted based on their continuous input at huddles.

The decision to make this program primary care-led was another significant enabler as it allowed for a holistic approach to care, addressing issues beyond a COVID-19 diagnosis, including social determinants of health. The primary care approach may help with spread of the program, as it can be used in low-resource settings and any primary care-led facility, such as long-term care, and can be adapted for non-COVID-19 patients and be integrated into the general delivery of primary care. This remote monitoring approach did have several barriers, particularly regarding the use of technology, as many patients were unable to access video visits due to device compatibility, internet bandwidth and other reasons. The team had to rely on different methods including providing care via telephone or other video calling methods, such as Facetime.

System-level enablers included increased access to human resources for pandemic specific programs. The launch of medical billing codes for phone and video visits facilitated physician involvement though financial renumeration of virtual care services provided. The availability of medical residents whose rotations were suspended was key, as the residents were able to serve in the model and quickly adapted to new systems and ways of working. System-level barriers included the limitations of billing codes to support case conferences and coordination.

Discussion

The rapid launch and strategic Pivots enacted through Adaptive Leadership in CC@H allowed the

team to continue to meet the needs of their patients through different waves of the pandemic. This provides a concrete example of how Adaptive Leadership in healthcare can support important outcomes in times of uncertainty (5–7).

There is considerable uncertainty in the appropriate design and implementation of health services, and although this case example focuses on the use of Adaptive Leadership and Pivots at the organization level during a pandemic, these strategies are relevant for healthcare leaders at any time. These leadership skills can be learned, and the use of specified Pivots may help describe options for major modifications based on emerging evidence and facilitate this adaptive approach in practice. This case focuses on individual and organizational level changes and further work is needed to consider applicability at the population level, such as how elected leader may use this approach, and how to prepare the population for these rapid changes. Using this approach takes practice and courage. While the literature provides basic steps (3), there are few documented examples of the types of choices that are involved in practicing this form of leadership.

Training in design and deployment of new services can facilitate this leadership strategy, as can the use of real-time data on implementation and outcome measures to guide decisions. Training for all staff about this adaptive approach would also be beneficial so the team can be ready for rapid change, understand their role in the change process, and know when and how to have their feedback heard. This rapid feedback process will be important for staff and leadership to ensure the Pivot aligns with the needs of the team, and that they have the trust of the team to go forward. The “balcony view” clearly articulated in Adaptive Leadership theory also acknowledges the need for systems-level thinking in order to meet the needs of the healthcare system, providers and patients. The combination of Adaptive Leadership and Pivots provides a mechanism for making major changes in a complex system such as healthcare.

Additional contextual factors may have enabled the use of Adaptive Leadership in CC@H, such as close communication with senior leadership initially, access to staff from different disciplines, and a dedicated program lead who had training in systems engineering and had worked in startups. Although some of these factors are difficult to reproduce or sustain, clear communication from senior leadership and trust among team members were key and are achievable in other settings to facilitate use of Adaptive Leadership.

Comparison to other COVID-19 remote monitoring programs highlights directions that could have been taken by CC@H. For example, a model from Minneapolis used newsfeeds with reminders and daily check-in questionnaires about symptoms. Initially, CC@H started developing a similar dashboard, however where the Minneapolis program was monitoring over 1300 patients (10), CC@H only had 100 patients in the first month. Without the change in intensity (Pivot 2), CC@H would have continued to provide light-touch care for patients and would not have been able to provide the comprehensive care and case management needed for patients with complex needs at the time. However, in the second wave (Pivot 3), use of dashboards and low-touch monitoring became a priority to make the program more sustainable given the rising number of low-risk patients.

Conclusion

The CC@H program uses Adaptive Leadership and Pivots to nimbly adapt to meet the changing needs of their patients during this time of clinical and system uncertainty, demonstrating the value of this approach. By using Pivots as a framework for large strategic changes, rather than small tweaks, Pivots can provide direction and meaning to support health system leaders to quickly adapt to the changing needs in health care. This combination of Adaptive Leadership and Pivots is broadly relevant at most levels of healthcare leadership.

Acknowledgements: The authors wish to thank everyone involved in the development and running of the COVIDCare@Home program, including providers, staff and patients.

Competing interests: Nothing to declare.

Authorship Contributions: CL and PA led on the writing of this manuscript with oversight and input from GM, and OB. PA is lead of the CC@H program. DM, SB, LP, EG, and HB were all involved in the development and/or running of CC@H and inputted to the drafting of this manuscript. All authors approved the final version.

References

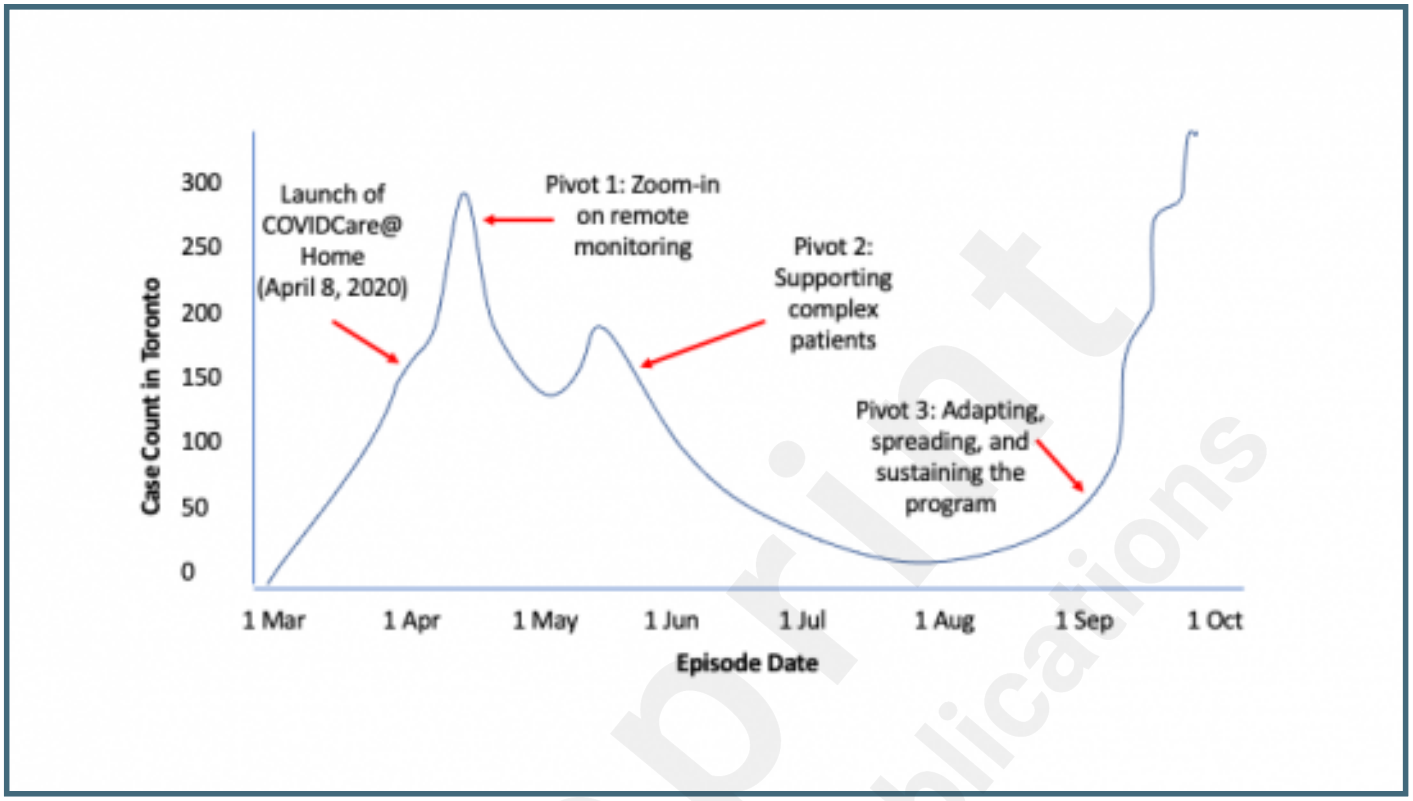
1. Ontario.ca. COVID-19 action plan: long-term care homes. Ontario.ca. 2020 [cited 2020 Sep 9]. Available from: https://www.ontario.ca/page/covid-19-action-plan-long-term-care-homes
2. Sibbald B. What happened to the hospital patients who had “nowhere else to go”? | CMAJ News. CMAJ. 2020 May 15;
3. Heifetz R. Leadership Without Easy Answers. 1st Editio. Belknap Press: An Imprint of Harvard University Press; 1994 edition (July 22 1998); 1994.
4. Ramalingam B, Nabarro D, Oqubuy A, Carnall DR, Wild L. 5 Principles to Guide Adaptive Leadership. Harvard Business Review. 2020 Sep 11;
5. Ramalingam B, Wild L, Ferrari M. Adaptive leadership in the coronavirus response Bridging

science, policy and practice. 2020.
6. Baker E, Irwin R, Matthews G. Thoughts on Adaptive Leadership During the COVID-19 Pandemic - JPHMP Direct. Journal of Public Health Management and Practice. 2020.
7. Warraich S, Olabi B, Azhar B, Tanzeem SF, Fischer M. Medical leadership in the NHS during the COVID-19 pandemic. Br J Hosp Med. 2020 Jun 2;81(6):1–3.
8. Haeusler JM. Medicine needs adaptive leadership. Physician Exec. 2010;36(2):12–5.
9. Ries E. 10 Classic Strategies For A Fast, User-Focused Company Rebo. 2012 [cited 2020 Aug 23]. Available from: https://www.fastcompany.com/1669814/eric-ries-10-classic-strategies-for-a-fast-user-focused-company-reboot
10. Blystone D. The Story of Instagram: The Rise of the #1 Photo-Sharing Application. Investopedia. 2020 [cited 2020 Oct 7]. Available from: https://www.investopedia.com/articles/investing/102615/story-instagram-rise-1-photo0sharing-app.asp
11. Enright Kenzi. The 4 Best Pivots in Tech History | StarterNoise. StarterNoise. 2017 [cited 2020 Oct 7]. Available from: https://www.starternoise.com/4-best-pivots-tech-history/
12. Greenhalgh T, Knight M, A'Court C, Buxton M, Husain L. Management of post-acute covid-19 in primary care. BMJ. 2020 Aug 11;370.
13. Guillen M. How Businesses Have Successfully Pivoted During the Pandemic [Internet]. Harvard Business Review. 2020 [cited 2020 Oct 7]. Available from: https://hbr.org/2020/07/how-businesses-have-successfully-pivoted-during-the-pandemic
14. Government of Canada. Epidemiological summary of COVID-19 cases in Canada: Hospitalizations, intensive care unit (ICU) admissions and deaths. 2020 [cited 2020 Oct 8]. Available from: https://health-infobase.canada.ca/covid-19/epidemiological-summary-covid-19-cases.html#a7
15. Chokshi SK, Mann DM. Innovating From Within: A Process Model for User-Centered Digital Development in Academic Medical Centers. JMIR Hum Factors. 2018 Dec 19;5(4):e11048.
16. Harte R, Glynn L, Rodríguez-Molinero A, Baker PM, Scharf T, Quinlan LR, et al. A Human-Centered Design Methodology to Enhance the Usability, Human Factors, and User Experience of Connected Health Systems: A Three-Phase Methodology. JMIR Hum factors. 2017 Mar 16;4(1):e8.
17. Ontario Health. COVID-19 Modelling. 2020 Apr.
18. Greenhalgh T, Koh GCH, Car J. Covid-19: A remote assessment in primary care. BMJ. 2020 Mar 25;368.
19. World Health Organization. COVID-19 Strategy Update. 2020 Apr.
20. Agarwal P, Mukerji G, Laur C, Chandra S, Pimlott N, Heisey R, et al. COVIDCare@Home: Lessons from a Family Medicine Led Remote Monitoring Program. medRxiv. 2020 Jul 25;2020.07.20.20158386.
21. Toronto Public Health. COVID-19 and the Social Determinants of Health: What do we know? Toronto; 2020.
22. Laurencin CT, McClinton A. The COVID-19 Pandemic: a Call to Action to Identify and Address Racial and Ethnic Disparities. J Racial Ethn Heal Disparities. 2020 Jun 1;7(3):398–402.
23. Kantamneni N. The impact of the COVID-19 pandemic on marginalized populations in the United States: A research agenda. Vol. 119, Journal of Vocational Behavior. Academic Press Inc.; 2020.
24. Public Health Ontario. Ontario COVID-19 Data Tool. Public Health Ontario. 2020 [cited 2020 Sep 5]. Available from: https://www.publichealthontario.ca/en/data-and-analysis/infectious-disease/covid-19-data-surveillance/covid-19-data-tool

Supplementary Files

Figures

Mapping the Pivots of the COVIDCare@Home program to an approximation of the cases (confirmed and probable) of COVID-19 in Toronto, Ontario, Canada from March to October 2020.



Pivot names with brief descriptions.