

CDL Rapid Screening Consortium

Final Report - Phase 3 Summary

JANUARY 31, 2023

About CDL RSC

The Creative Destruction Lab Rapid Screening Consortium (CDL RSC) is a private-led, not-for-profit initiative formed in August 2020 with the goal of establishing a robust rapid screening system and operational implementation strategy to be delivered as a public good to Canada and then the world. The consortium was led by Creative Destruction Lab.

This was an unprecedented collaboration among businesses, researchers, and government working together on a singular public-interest **mission**: To develop a cost-effective system for reopening the economy during the COVID-19 pandemic.

About this Report

The Phase 3 CDL RSC Final Report is the culmination of a monumental effort to develop, implement, and scale a rapid antigen screening (RAS) program across and beyond Canada during the COVID-19 global pandemic.

The CDL RSC project was delivered in four phases, allowing the operational structure to evolve at different points in time. Throughout the phases, project scope complexity decreased while the number of Participating Organizations increased, as Standard Operating Procedures (SOPs) were developed, tested, and scaled, all while operating under a unified project mission.

This Report covers **Phase 3 - CDL RSC's Pilot Phase**, which spanned from **November 1, 2020 to April 15, 2021**.

CDL Rapid Screening Consortium Founding Members

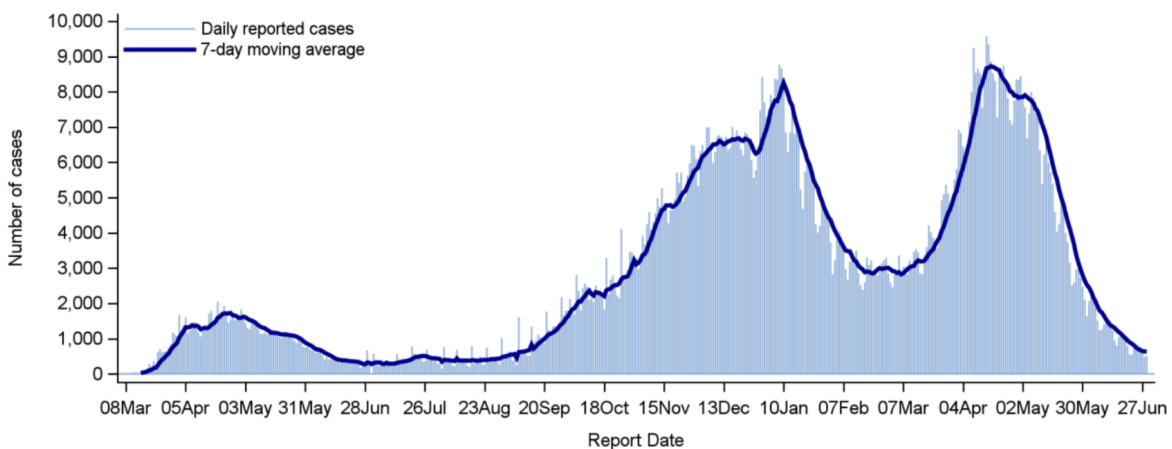


Rationale for Rapid Antigen Screening during Phase 3

The Pilot phase of the CDL RSC program roughly overlapped with the second and third waves of COVID-19 in Canada. These waves followed the easing of public health restrictions as people gathered indoors, with the peaks in January 2021 and April 2021 seeing approximately 9,000 daily cases. At the time, Rapid Antigen Tests (RATs) were a relatively new concept for many, as the general public had been utilizing polymerase chain reaction (PCR) testing at public health clinics across the country for diagnostic purposes. In particular, the idea of using a RAT for screening in conjunction with other public health and infection control measures had little precedent. While polymerase chain reaction (PCR) testing capacity was gradually expanding across the country and vaccine rollout was underway, the third wave was

primarily driven by the emergence of new variants of concern, which were more contagious than the original SARS-CoV-2 strain, and certain variants were associated with an increased risk of hospitalization and death. The rapid increase in cases overwhelmed the capacity of acute care and led to reinstatement of public health measures, including school closures, indoor capacity limits and other closures. Public health restrictions covering large portions of the population were worsened by not being able to identify and isolate all infected individuals, especially those without symptoms early on or during the course of their infection.^{1,2} This information problem reinforced the need to seek out additional layers of protection in order to keep the economy open.¹ Quickly identifying asymptomatic cases to prevent onward spread was paramount and rapid antigen screening (RAS) was emerging as a promising approach for early detection and isolation of infectious cases in high-risk settings such as workplaces.³

Figure 1. Daily number of COVID-19 cases in Canada (and seven-day moving average), as of June 26, 2021



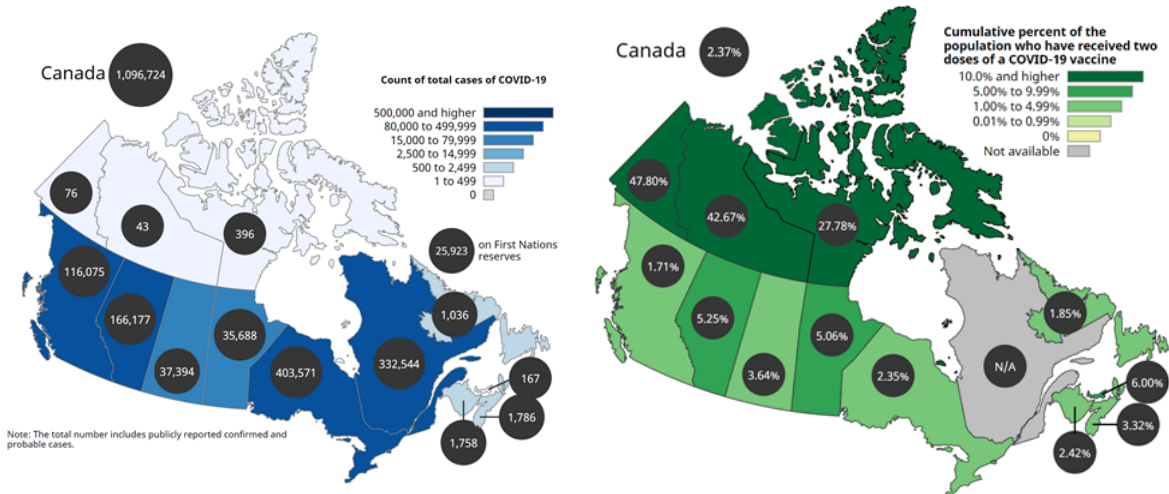
Source: Public Health Agency of Canada. COVID-19 Weekly Epidemiology Report (April 25 to May 1, 2021). <https://health-infobase.canada.ca/covid-19/epidemiological-summary-covid-19-cases.html>

¹ Gans, J.S. (2020), *The Pandemic Information Gap: The Brutal Economics of COVID-19*, MIT Press: Cambridge.

² Oran DP, Topol EJ. The proportion of SARS-CoV-2 infections that are asymptomatic: a systematic review. *Annals of internal medicine.* 2021 May;174(5):655-62.

³ Crozier A, Rajan S, Buchan I, McKee M. Put to the test: use of rapid testing technologies for covid-19. *bmj.* 2021 Feb 3;372.

Figure 2. Total number of COVID-19 cases (left panel) and number vaccinated (right panel), April 15, 2021 (peak Wave 3)



Source: Public Health Agency of Canada. COVID-19 daily epidemiology update. <https://health-infobase.canada.ca/covid-19/epidemiological-summary-covid-19-cases.html>

Phase 3 (Pilot) at a Glance

The COVID-19 pandemic presented a health and safety problem that many organizations had not dealt with before. Organizations of every size and industry worldwide were tasked with creating a safe in-person environment without disrupting core business functions. Decision-making challenges were intensified by profound variability in COVID-19 policies across geographic regions and a dynamic regulatory environment. Implementing an infectious disease screening system was a novel undertaking for most organizations. Furthermore, many leaders had limited experience executing a multi-organization, time-sensitive, innovative, employee-facing project. This was the starting point for a conversation with 12 CEOs of multinational employers: *Could we develop a workplace RAS system faster if we worked together? Is it possible for large organizations to collaborate on innovation activities for a common high-risk, global purpose?* The CDL RSC was thus formed in August 2020 as a cooperative, not-for-profit initiative to help workplaces manage the COVID-19 crisis.

The CDL RSC project was delivered in four phases (**Figure 3**). In the Exploratory phase (Phase 1), CDL RSC established specifications for potential pilot options. The Feasibility phase (Phase 2) then provided Consortium members with the necessary information on operational effectiveness and efficiency to design pilots, and later facilitate full-scale deployment. During the Pilot phase (Phase 3), CDL RSC also designed, tested, and iterated on a scalable central data system that satisfied mandatory case reporting to all federal, provincial, and regional authorities. In parallel, federal funding was obtained, allowing the onboarding, project management, and data system to be offered without additional costs to any Canadian organization, thereby enabling the program to scale nationally with organizations of all types and sizes, including non-profits, schools, small- and medium-sized businesses, and large corporations in the Implementation phase (Phase 4).

Figure 3. Phased implementation of the CDL RSC project

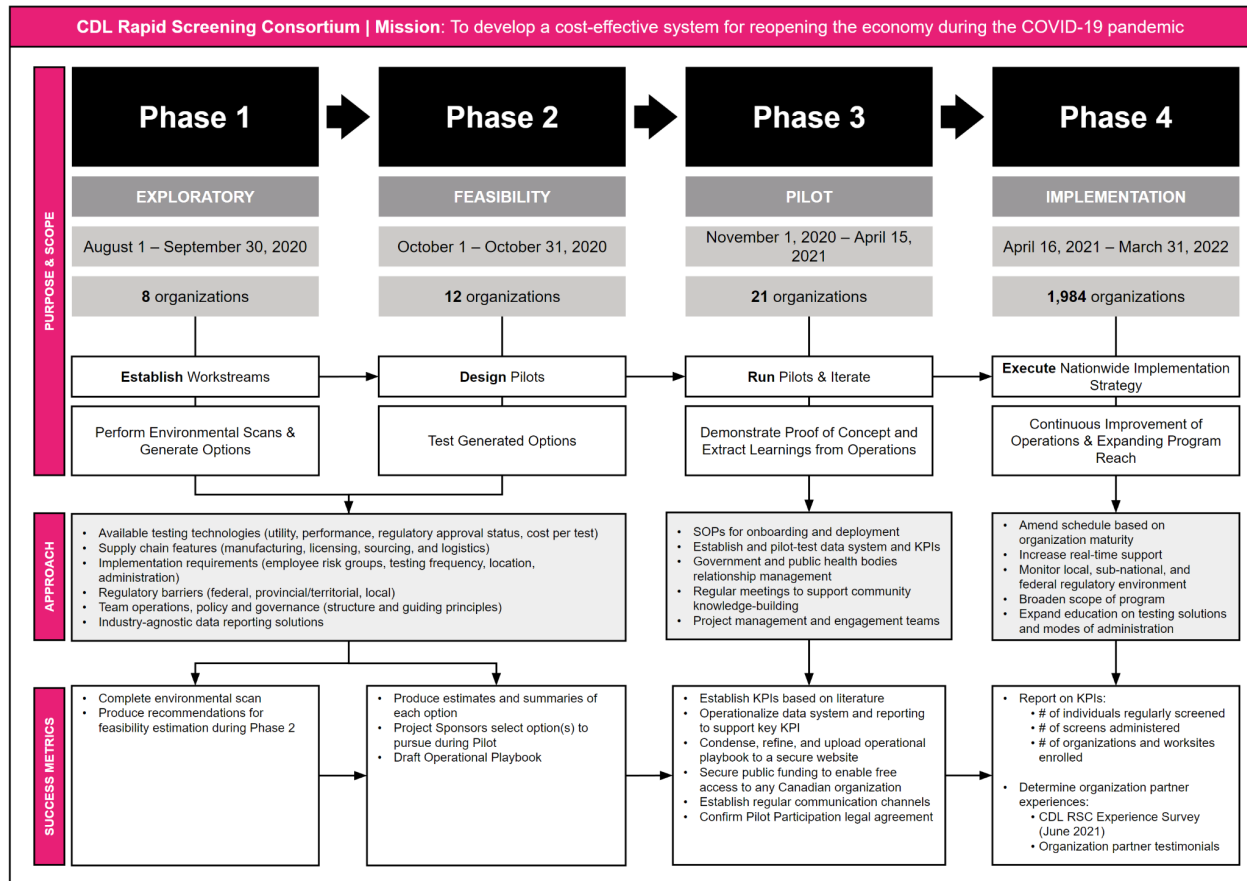
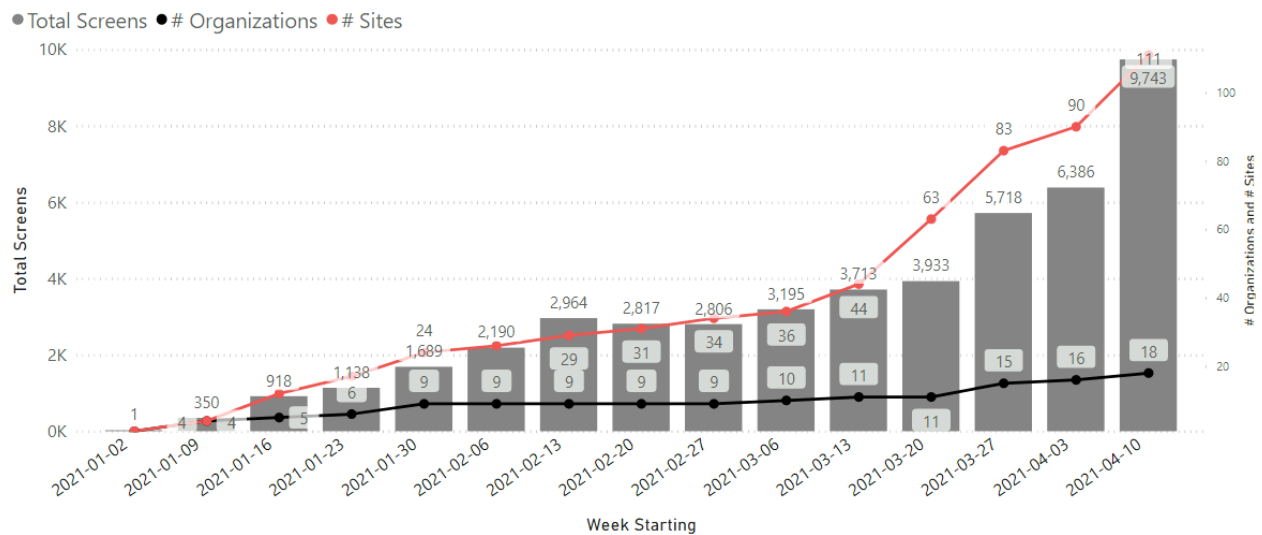


Figure 4. Cumulative number of organizations and sites enrolled in CDL RSC, and number of screens, weekly, Jan 3, 2021 to May 3, 2022



Impact of Rapid Antigen Screening during Phase 3

Founding Members and early participant organizations were innovators that used insights from Phases 1 and 2 (the Exploratory and Feasibility phases) to design and launch pilots. These early Consortium members were instrumental not only in building networks that attracted new participants, but also in facilitating discussions for policy innovation to address challenges (e.g. screen ordering) and promote new and efficient modes of RAS, including moving away from costly in-person screening at worksites with a trained health-care professional and towards self-administration and at-home screening, acting as initial use-cases for government entities to evaluate.⁴ At a time when the epidemiology of COVID-19 was changing, with new variants of concern emerging and new evidence on vaccine effectiveness, breakthrough infections, and asymptomatic transmission, the work of these pioneering organizations provided initial evidence of RAS effectiveness for keeping workplaces open through frequent, twice-weekly screening. Business leaders were navigating uncharted territory both with their employee-base (privacy concerns around data-sharing, varied comfort levels around COVID-19 testing) and public health authorities (legal obligations to support contact tracing). Data collection was therefore an integral aspect of the CDL RSC mission and approach to RAS.

At the organization level, it was necessary for managers to have high-level access to their organizations' RAS results, in order to isolate any positive cases and prevent further workplace transmission. At the community level, information was needed for organizations to better understand the transmission and severity of the waves throughout the pandemic. During Phase 3, the three data solutions (CDL RSC Enterprise App (Microsoft), CDL RSC Standard App (Powered by Thrive), and CDL RSC Excel Templates) were developed and iterated upon, ironing out access, data management and quality, and solidifying a robust privacy and security framework. Using the best available research evidence to inform key performance indicators (e.g. number of individuals screening twice-weekly),⁵ the CDL RSC database supported regular reporting both internally to Consortium members, and externally, enabling data flow from Consortium operations to federal, P/T, and regional public health entities, which enabled future

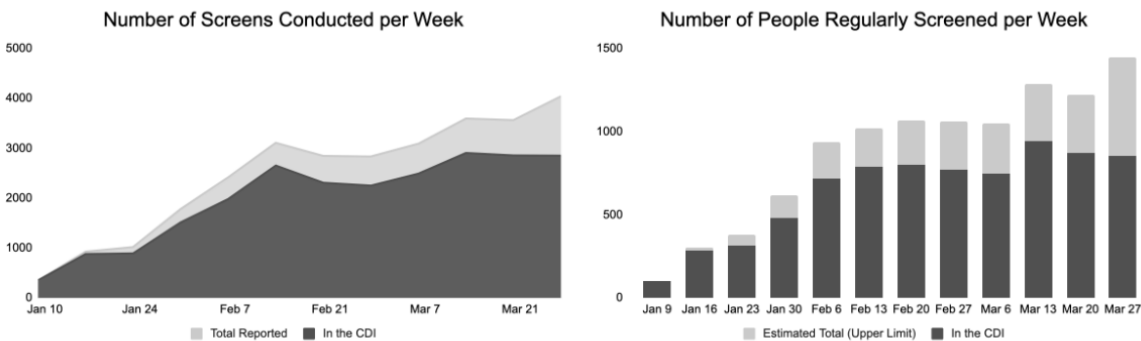
⁴ Rosella LC, Agrawal A, Gans J, Goldfarb A, Sennik S, Stein J. Large-scale implementation of rapid antigen testing system for COVID-19 in workplaces. *Science advances*. 2022 Feb 25;8(8):eabm3608.

⁵ Larremore DB, Wilder B, Lester E, Shehata S, Burke JM, Hay JA, Tambe M, Mina MJ, Parker R. Test sensitivity is secondary to frequency and turnaround time for COVID-19 screening. *Science advances*. 2021 Jan 1;7(1):eabd5393.

efficiencies during implementation-at-scale.

The Project Leads and Operators from organizations participating in the Pilot were highly engaged and motivated. This created an open, community-centric culture that fostered collaboration and innovation. During this period, CDL RSC developed a structure for organizations to share lessons learned with the Consortium to improve their site operations. Innovation was fostered through weekly meetings that saw high attendance, covering a range of topics: (1) Public health updates provided by a public health expert, which enabled leaders to make evidence-informed decisions; (2) Impact on business and economics; (3) Operational discussions (including issues related to screen ordering and performance), insights from early pilot data, and updates on current screening regulations across the country; (4) Data science, particularly with regards to developing a standardized data collection and reporting system, including easy to use data visualizations. Both within and outside of these meetings, organizations laid the groundwork for the CDL RSC Playbook, a comprehensive operational manual to be used as a resource for new and existing Consortium members. Initially 900 pages in length, the manual was then refined into a 70-page guide, and further distilled into a two-page Quick Start Guide that was subsequently utilized by almost 2,000 organizations onboarded in Phase 4 (Implementation). By the end of Phase 3 in April 2021, CDL RSC organizations had 61 operational sites with 32,469 total screens and 21 positive results (confirmed through PCR) in the Central Data Infrastructure. Through the tireless efforts of organizations within the consortium, CDL RSC was able to establish the proof of concept for workplace rapid screening programs across Canada and begin efforts to scale the program nationally.

Figure 5. Summary of screening data as of March 24, 2021 (source [file](#))



Impact of the CDL RSC Pilot on Outbreak Management

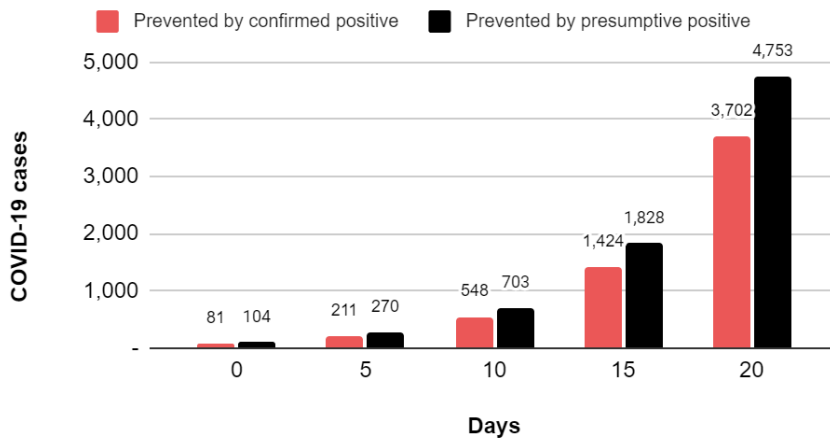
During the Pilot phase, CDL RSC developed the framework for organizations to run asymptomatic COVID-19 screening programs in the workplace. Organically, consortium members started to foster knowledge and information sharing on how to implement RAS as a strategy for outbreak management. Companies being willing to share their operational experience was critical at this stage, as scientific evidence and public health guidance on COVID-19 was changing frequently. The use of RAS was not yet widely accepted or implemented, presenting a knowledge gap for best practices.

CDL RSC provided a credible platform for participating pilot organizations, government, and Public Health stakeholders to collectively share insights, ask questions, and develop operating procedures for outbreak management. CDL RSC was then able to create guidance through SOPs, and share these emerging strategies with new cohorts to accelerate preparedness in the event of COVID-19 transmission in the workplace, and reduce the potential threat of outbreaks and resultant operational shutdowns.

Early pilot data suggested that asymptomatic screening helped to break chains of COVID-19 transmission within the workplace. As of May 3, 2021 (following the end of Phase 3), 63,401 screens were deployed across 101 CDL RSC workplaces, with 104 presumptive positive cases detected using RAS, of which 81 were confirmed via PCR (**Figure 6**). Given what was known about the transmissibility of COVID-19 at the time, and using established methodology for determining the number of people that needed to be screened for a given duration (e.g., weeks) to prevent transmission,⁶ it was ascertained that each detected case would have averted, on average, 2.6 additional infections, illustrating the significant impact rapid screening had on preventing secondary infections within workplaces.

⁶ Rembold CM. Number needed to screen: development of a statistic for disease screening. *BMJ*. 1998 Aug 1;317(7154):307-12. doi: 10.1136/bmj.317.7154.307. PMID: 9685274; PMCID: PMC28622.

Figure 6. Estimated secondary infections prevented from detecting 81 confirmed and 104 presumptive cases as of May 3, 2021 via the CDL RSC system.



Taken together, Phase 3 was characterized by an intense period of learning for Consortium members, who developed processes, SOPs, and best practices in real-time, both for workplace outbreak management via RAS, and for data collection and reporting. At a time of significant uncertainty around COVID-19 guidelines, and in the context of a dynamic regulatory environment that varied substantially across Canada, the work of both Founding Members and early Participating Organizations proved the efficacy of the CDL RSC system and unlocked federal funding through impactful relationship-building with Public Health entities, culminating in the development of a national, standardized data system that satisfied both internal and external data reporting requirements. This bravery of innovating during extreme uncertainty created a momentum that facilitated the exponential national scaling of the CDL RSC in Phase 4 (Implementation).