HealthCatalyst®

A Sustainable Healthcare Emergency Management Framework: COVID-19 and Beyond

Holly Rimmasch	Chief Clinical Officer	Health Catalyst
Ed Corbett, MD	Medical Officer	Health Catalyst
Anne Marie Bickmore	Senior Vice President, Operations	Health Catalyst

As the era of COVID-19 extends, healthcare systems face a daunting range of challenges. Scientific understanding of COVID-19 has been continuously expanding since the World Health Organization declared it a "public health emergency of international concern" in late January 2020. Global infection and disease progression rates, effective treatment, and theories on potential vaccines are continually fluctuating. The combination of unpredictable patterns and incomplete knowledge means that planning for and implementing both an immediate and sustainable long-term pandemic response is difficult—yet absolutely critical for the care of patients, employees, and organizational survival.

While organizations should focus on immediate data-supported tactics, such as improving case detection, reducing transmission, and managing supplies, the longer-term strategies of adjusting care delivery, risk contracts, and operational processes cannot be neglected. Systems must increasingly focus on planning resources to chart a sustainable course forward as providers and stewards of health in their communities.

COVID-19 response requires a flexible framework to guide health systems through critical phases seen in any communitywide healthcare emergency: prepare, prevent, recover, and plan for the future. Health systems can use the framework to respond to immediate challenges and the ongoing management demands of a forever-altered healthcare system.

A Framework for Short- and Long-Term Healthcare Emergency Management

Health systems can pivot to address changing pandemic needs with a cyclical framework. Organizations navigating a COVID-19 response will move in and out of four critical phases:

1. Prepare for COVID-19: Healthcare leaders can plan, train, and educate, readying their organizations to act in the event of an escalation of COVID-19.
2. Prevent COVID-19: Leaders and frontline staff take action to save lives without causing further stress to people or the system.
3. Recover from COVID-19: Operational, clinical, and financial leadership can begin efforts to adapt operations and restore a sense of normalcy to people and the system.
4. Plan for the Future: Organizations can build a crisis-ready, sustainable future across all levels, from executive leadership to frontline staff.

Health Catalyst designed its COVID-19 Solution Framework (Figure 1) around the four phases above. As a healthcare data and analytics organization, Health Catalyst responded by leveraging its Data Operating System (DOS™), a portfolio of emergency-ready products, widespread access to data from its health system partners, information-sharing capabilities, and the agile services expertise to understand and adapt to shifting demands.

To enable a robust pandemic data infrastructure, Health Catalyst provides continuous engagement with state and national leaders and third-party collaboration. For example, offering registries at the national and state level.
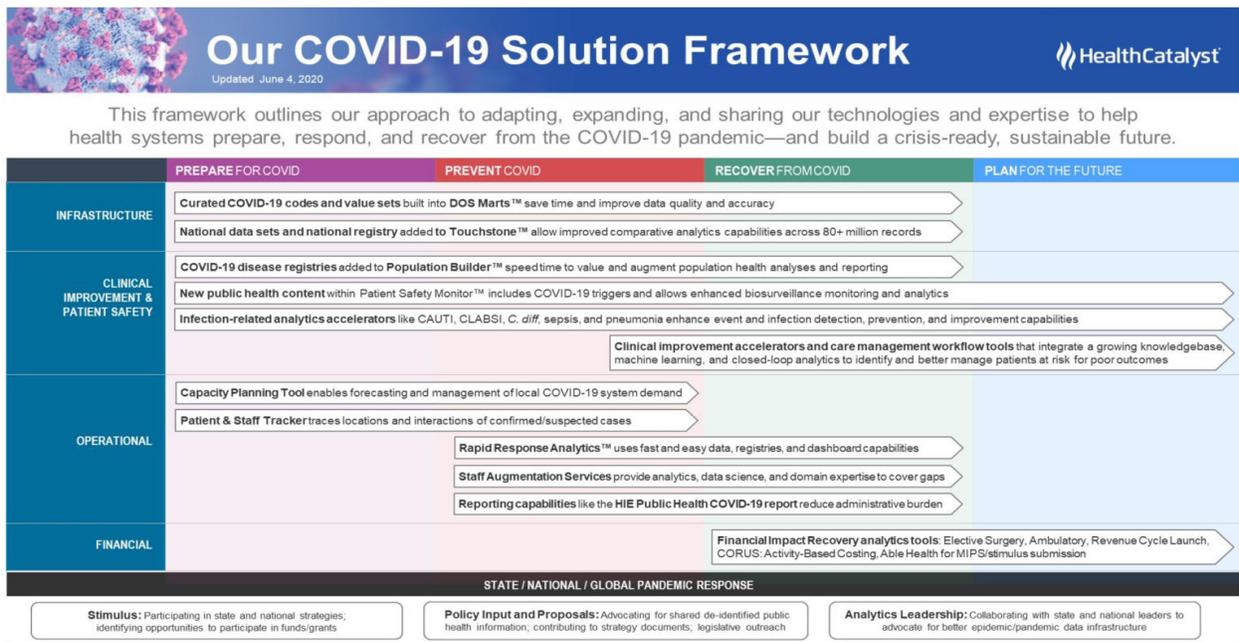

Figure 1: The Health Catalyst COVID-19 Solution Framework

The top capabilities of the COVID-19 response framework include integrating data from across the healthcare ecosystem, identifying variation and trends in patient volumes and cohorts, testing, disposition, staffing and outcomes; applying domain and quality-improvement expertise; and monitoring and managing performance in coordination with public health. The framework is an ongoing analytics-supported approach, positioned to support short-term needs as well as get providers through the phases and moving towards a sustainable, emergency-ready recovery.

A Framework to Navigate the Four Phases of COVID-19

In each of its four phases—prepare, prevent, recover, and plan—a COVID-19 solution framework addresses vital areas of action. These areas comprise infrastructure, clinical improvement and patient safety, operational, and financial. Various Health Catalyst solutions support each area across the four COVID-19 phases.

Phase: Prepare for COVID-19

- **Infrastructure**: Organizations need the following data and analytics infrastructure in place to prepare for COVID-19 with comprehensive, transparent information:
    - Curated COVID-19 content built into DOS Marts™ (data models that draw from multiple healthcare source systems to aggregate data into domain-specific marts) saves time and improves COVID-19 preparation data quality and accuracy.
    - National data sets and registry added to Touchstone® allow improved comparative analysis capabilities across 80 million-plus records for population-based research to prepare for COVID-19.
- **Clinical Improvement and Patient Safety**: Capabilities in clinical Improvement and patient safety further support preparation for COVID-19:
    - COVID-19 disease registries added to the Population Builder™: Stratification Module speed time to value and augment population health analysis and reporting for informed COVID preparation.
    - New public health content within the Patient Safety Monitor™ Application helps organizations prepare for COVID-19 with triggers for emerging threats and enhanced biosurveillance monitoring and analytics. The application monitors incoming patient data from multiple sources in near real-time.
    - Infection-related analytics accelerators—such as CAUTI, CLABSI, C. diff, sepsis, and pneumonia—enhance event and infection detection, prevention, and improvement capabilities as organizations prepare for COVID-19.
- **Operational**: Critical operational tools also support COVID-19 preparation:.
    - The Capacity Planning Tool enables forecasting and management of local COVID-19 system demand.
    - The Patient & Staff Tracker traces interactions of confirmed/suspected cases, helping organizations prepare for COVID impact.

Phase: Prevent COVID-19

- **Infrastructure**: Like the COVID-19 preparation phase, critical data and analytics infrastructure also supports the prevention phase:

- Curated COVID-19 content built into DOS Marts saves time and improves data quality and accuracy for prevention efforts.
- National data sets and registry added to Touchstone enhance prevention strategy by allowing comparative analysis across 80 million-plus records.

- **Clinical Improvement and Patient Safety**: Health systems can leverage data-driven clinical improvement and patient safety tools to prevent COVID-19 spread and poor patient outcomes:
  - COVID-19 disease registries added to the Population Builder: Stratification Module support prevention by speeding time to value and augmenting population health analysis and reporting.
  - New public health content within the Patient Safety Monitor Application supports prevention with COVID-19 triggers and allows enhanced biosurveillance monitoring and analytics.
  - Infection-related analytics accelerators—such as CAUTI, CLABSI, C. diff, sepsis, and pneumonia—enhance event and prevention capabilities.
  - Clinical improvement accelerators and care management workflow tools integrate a growing knowledge base, machine learning, and closed-loop analytics to identify and better manage patients at risk for poor outcomes.

- **Operational**: Essential operational tools further help organizations prevent COVID-19 spread:
  - The Capacity Planning Tool enables forecasting and management of local COVID-19 system demand to prevent a devastating impact.
  - The Patient & Staff Tracker traces interactions of confirmed/suspected cases to prevent further disease spread.
  - The Rapid Response Analytics Solution™ for COVID-19 helps organizations prevent the virus with fast and easy data, registries, and dashboard capabilities.
  - Staff Augmentation Support Services provide analytics, data science, and domain expertise to temporarily enhance prevention efforts.
  - Reporting capabilities like the HIE Public Health COVID-19 report reduce administrative burden, allowing organizations to direct resources to prevention efforts.
  - The Patient & Staff Tracker traces interactions of confirmed/suspected cases, helping organizations prepare for COVID impact.

Phase: Recover from COVID-19

- **Infrastructure**: Like the planning and prevention phases, recovering from COVID-19 relies on data and analytics infrastructure:
  - Curated COVID-19 content built into DOS Marts delivers recovery-focused data.
  - National data sets and registry added to Touchstone allow improved comparative analysis capabilities across 80 million-plus records, allowing communities nationwide to learning from each other's recovery efforts.

- **Clinical Improvement and Patient Safety**: Tools and resources to support clinical improvement and patient safety continue to be essential through COVID-19 recovery:
  - COVID-19 disease registries added to the Population Builder: Stratification Module enhances population health analysis and reporting during the recovery phase with key metrics, including COVID-positive rates and numbers, mortality, adverse events, and more.
  - New public health content within the Patient Safety Monitor Application allows enhanced biosurveillance monitoring and analytics to inform recovery.
  - Infection-related analytics accelerators—such as CAUTI, CLABSI, C. diff, sepsis, and pneumonia—add improvement capabilities for informed recovery.
  - Clinical improvement accelerators and care management workflow tools integrate a growing knowledge base, machine learning, and closed-loop analytics guide a recovery strategy.

- **Operational**: As organizations move through the recovery phase, operational solutions, services, and capabilities help restore activity:
  - Rapid Response Analytics Solution for COVID-19 supports recovery with fast and easy data, registries, and dashboard capabilities.
  - Staff Augmentation Support Services provide analytics, data science, and domain expertise to temporarily enhance recovery activities.
  - Reporting capabilities like the HIE Public Health COVID-19 report reduce administrative burden, freeing up resources to focus on recovery.

- **Financial**: Recovering from COVID-19 has a significant financial component for health systems. Data- and analytics-enabled financial tools and capabilities are a must as organizations reconcile backlogs of elective surgeries due to COVID-19, revenue losses due to surgery cancellation, and address strategic scheduling challenges:
  - A package of Financial Impact Recovery analytics tools support the financial area: Elective Surgery, Ambulatory, Revenue Cycle Launch, CORUS™ Suite: Activity-Based Costing, and Able Health™ by Health Catalyst for MIPS/stimulus submission.

Phase: Plan for the Future

- **Clinical Improvement and Patient Safety**: Capabilities in clinical improvement and patient safety will help organizations prepare for an emergency-ready future:
  - The Patient Safety Monitor Application makes safety analytics accessible within the workflow at the point of care, enabling proactive harm prevention, effective care, and timely public health response help organizations plan for a future large-scale health crisis.
  - Infection-related analytics accelerators—such as CAUTI, CLABSI, C. diff, sepsis, and pneumonia—deliver strategic insights for future planning.
  - Clinical improvement accelerators and care management workflow tools will help identify and better manage patients at risk for poor outcomes in future outbreaks.

- **Financial**: Financial Impact Recovery analytics tools support an emergency-ready plan for the future:
  - Elective Surgery, Ambulatory, Revenue Cycle Launch, CORUS™ Suite: Activity-Based Costing, and Able Health™ by Health Catalyst for MIPS/stimulus submission. 🔥

An Essential Framework for Healthcare's New Normal

Health Catalyst built its emergency response framework to support COVID-19, but the structure is also a long-term strategy for future outbreaks, whether COVID related or not. Pandemic management is an ongoing reality. Health Catalyst will support the continued development and expansion of its crisis-ready applications with industry experts and client partners as guides. The goal is to offer long-term, flexible, and agile support, creating a central guidance platform, giving health systems a universal yet customizable roadmap for a sustainable future.

About the Authors

Holly Rimmasch brings over 28 years of experience in bedside care, as well as clinical and operational healthcare management to Health Catalyst. She has spent the last 17 years dedicated to improving clinical care including implementation of operational best practices. Prior to joining Health Catalyst, Ms. Rimmasch was an Assistant Vice President at Intermountain Healthcare responsible for Clinical Services (Pharmacy, Laboratory, Respiratory, Case Management, Rehabilitation Services, Food and Nutrition, Patient and Provider Publications, Clinical Operations for Imaging, Patient Flow, Pain Services, Continuum of Care) and was integral in promoting integration of Clinical Operations across hospitals, ambulatory settings and managed care plans. Prior to her role in Clinical Services, she served as the Clinical Operations Director and Vice-Chair of Intermountain's Cardiovascular and Intensive Medicine Clinical Programs. She also was the co-founder of and Principal in HMS, Inc., a healthcare consulting firm focusing on assessing, developing strategies and implementing best practices for populations across the continuum of care (physician offices, managed care, hospitals, and long-term care). Ms. Rimmasch holds a Master of Science in Adult Physiology from the University of Utah and a Bachelor of Science in Nursing from Brigham Young University.

Edward Corbett, MD joined Health Catalyst in June 2014 as a medical officer. He earned his medical degree at the University of Texas Health Science Center in San Antonio where he also completed his residency in Internal Medicine. He is board certified in Internal Medicine. He started his career as a physician at the Cooper Clinic in Dallas, Texas specializing in preventive medicine. Prior to joining Health Catalyst he was a physician partner at Central Utah Clinic, a large multispecialty clinic which was the first Medicare ACO in the state of Utah. He has a special interest in improving patient care through the better use of technology and has been actively involved in clinical IT throughout his career.

Anne Marie Bickmore joined Health Catalyst in December 2012 and serves as the Senior Vice President of Company Operations. Prior to coming to Health Catalyst, she worked for Lantana Consulting as the lead Project Manager (2011-2012), Director of Informatics at Swedish American Hospital Rockford, IL (2010-2011), and Intermountain Healthcare serving in multiple leadership roles both clinical and IT (1999-2011). Anne Marie has dual Bachelor's degrees in Psychology and Nursing from the University of Utah.