

## **Innovation Final Report**

### **COVID-19 Primary Care Wave 55: April 2020**

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#### **Intent and Aim**

During this 30-day innovation cycle, the research team sought to understand early warning systems and on-going monitoring for COVID-19 individuals who are at home but are at risk for escalating COVID-19 severity, for needing hospitalization, or for extended monitoring at home or in community settings. The purpose of answering this question is to understand if any difference in outcomes could occur if patients can be identified and routinely monitored through primary care systems.

#### **Background**

Early evidence out of Heidelberg, Germany suggests that early intervention for individuals who may develop COVID-19 contributes to a low death rate overall for the German population. Many factors contribute to Germany's relatively low death rate including population characteristics (i.e. a lower average age for COVID-positive individuals), robust testing, aggressive contact tracing, and a strong public health and social services system which results in a trusting public willing to following guidelines like social distancing.<sup>1</sup> Germany's "corona taxis" illustrate how these characteristics come together. In Heidelberg, medics visit patients at home who are 5-6 days into being sick with coronavirus to evaluate the patient's status including a blood test. The purpose is to intervene with hospitalization when necessary, even if a patient only has mild symptoms, to avoid a steep decline in health status outside of the hospital. This type of monitoring allows the German care providers to be more proactive in treating individual patients and managing overall patient treatment.

Efforts like these may begin to show characteristics that matter for selecting the patients who should be monitored and who may be best served by early interventions. The Center for Disease Control identified key underlying medical conditions and symptoms for patients admitted to hospitals.<sup>2</sup> Nearly 90% of patients had one or more underlying conditions. The most commonly reported conditions include: hypertension (49.7%), obesity (48.3%), chronic lung disease (34.6%), diabetes mellitus (28.3%), and cardiovascular disease (27.8%). And, the most common symptoms included cough (86.1%), fever or chills (85%), and shortness of breath (80%). Additionally, the CDC recently published refined symptoms for COVID-19, noting their appearance after 2-14 days of exposure to the virus. Those symptoms include coughing and shortness of breath or difficulty breathing. Additionally, having a least two of the following symptoms is an important indicator: fever, chills, repeated shaking with chills, muscle pain, headache, sore throat, and new loss of taste of smell.<sup>3</sup>

More recently, the importance of days 5 to 10 after the first signs of illness is emerging as a key timeframe for monitoring and decision making. Most patients recover from COVID-19 in a week or two. And, a significant minority enter a significant worsening of the disease at that time. This window presents the most worrisome time for the development of respiratory complications for COVID-19, especially for at risk populations like older adults and those with underlying conditions.<sup>4</sup> The importance of monitoring at this early stage is to prevent avoid patients' developing sever pneumonia which can be better managed with early medical intervention.

As with every facet of our health care system, inequities tied to systemic racism and inequality are causing a disproportionate burden on populations of color and the poor. In the CDC's analysis of

individuals who tested positive for COVID-19 in March 2020, 18% were Black and 14% were Hispanic. Yet, of the individuals requiring hospitalization, 33% were Black and 8% were Hispanic. This suggests that Black Americans are more severely impacted by the disease.<sup>5</sup> However, limited reporting and the baseline inequities that exist in our care systems and communities at large make understanding the impact of the of COVID-19 across populations difficult. Further study on this equity issue is necessary and will have important implications for how best to deploy resources for monitoring and patient identification across populations in a more equitable way.

This information implies an important opportunity for the primary care system to engage with their patient populations in a proactive way to better manage individuals with COVID-19.

## **Methods**

Given the nature of this 30-day innovation cycle, the research team relied on regular check-ins, conversations with thought partners and IHI stakeholders, and a review of the emerging literature on COVID-19.

## **Key Learning**

During this 30-day wave, several examples of successful monitoring were uncovered. An overview of some key learnings follows.

Identifying and monitoring symptoms of COVID-19 positive/suspected individuals is an important element of treatment. This is particularly important for timing the escalation of medical intervention as the disease progresses. The primary care system can work with patients for effective self-monitoring of their respiratory rate, pulse levels, fever, and blood oxygen saturation. The use of pulse oximeters was noted as an important tool for patient monitoring. With access to a pulse oximeter, patients can regularly monitor oxygen saturation and connect with their care provider if their saturation level drops below 92%.<sup>6</sup> Providers at Mount Sinai hospital in New York City reallocated their pulse oximeter resources in response to COVID-19. Prior to the pandemic, Mount Sinai's pulmonology department utilized a telemonitoring system for their patients. This system included deploying pulse oximeters into patients' homes while using a remote monitoring system. These resources are now deployed for monitoring of patients with COVID-19 symptoms to better determine when to intervene and escalate treatment. As with any element of monitoring, monitoring oxygen saturation is just one piece of information and should be used in conjunction with monitoring of other symptoms – especially coughing and shortness of breath.

Several examples of patient identification and monitoring were discovered during this innovation cycle.

- **The Cambridge Health Alliance** utilizes a community management system outside of Boston.<sup>7</sup> The program aims to provide patient-centered care across the continuum of COVID-19 care, avoid unnecessary medical treatment and exposure non-COVID-19 individuals seeking primary care, and a reduction of strain on CHA's resources. CHA uses a primary-care based model for telephonic primary care delivery, telephone triage, a community management group, and a respiratory clinic. When patients call the primary care system and are identified as possibly COVID-19 patients, they are triaged to a trained nursing staff who can best determine the right course of action based on described symptoms. They also coach patients in preventing the spread of the disease in their homes and community. For patients at low risk for severe disease development, primary care teams provide continued support over the phone with telemedicine services. And, those at high risk of developing severe COVID-19 symptoms are managed by the

community management group. This group consists of primary care physicians who are focused on COVID-19 management and treatment. This team manages COVID-19 patients from their first call to the triage center to on-going telemonitoring during the disease process. The team is particularly interested in the fourth, seventh, and tenth days after symptoms first emerge as times noted for sudden changes in clinical course. They pay special attention to respiratory symptoms like difficulty breathing. Physicians may administer breathing tests over the phone. When the care team determines escalation is necessary, patients are referred to a dedicated, in-person respiratory clinic within the CHA system. Treatment includes medication for symptom management, treatments for comorbidities, connection to resources for other determinants of health (i.e. housing, crisis counseling, domestic violence counseling), and creates follow-up plans. Through on-going monitoring, education, and support, the care team can better determine when a transition to the hospital setting will have the best impact. CHA reports the results of their efforts include:

- Managing most of their patients without the need for hospitalization. Nearly 50% of the first 1,100 patients referred to the respiratory clinic had moderate-to-sever symptoms. Yet, 92% of them were managed in the outpatient setting and 8% had an emergency department visit or hospitalization.
  - Emergency department use is low. Only 5% of patients managed in this system were evaluated in the emergency department and half of them were discharged home.
  - Using the Community Management System prevented a significant number of hospital visits. Those treated by telemedicine triage and in-person respiratory services stayed in the hospital for fewer days than admitted patients who were not treated by the Community Management System. A conservative estimate from CHA indicates that length of stay is two days shorter for COVID-19 patients treated by the Community Management System.
  - Personal Protective Equipment is conserved by limiting use in early stages of the disease development by primarily monitoring and treating using telemedicine and by limited hospital stays for patients in the Community Management System.
- **The University of Pennsylvania** developed a telecommunication tool called COVID Watch which is a simple text-based program that checks in on patients to monitor symptom development.<sup>8</sup> Patients enrolled in any of the University of Pennsylvania medical system – ranging from primary care to the emergency department to hospital care – can enroll in the program through the electronic medical platform. The program is recommended for patients who have tests COVID-19 positive, are waiting COVID-19 test results, or those how have respiratory symptoms concerning for COVID-19. Once enrolled, COVID Watch checks in with patients two times a day with text-based questions regarding symptoms. Based on responses to these prompts, the program automatically escalates individual patients to a human care provider who can provide specific guidance to patients based on a standard escalation pathway (Figure 1).

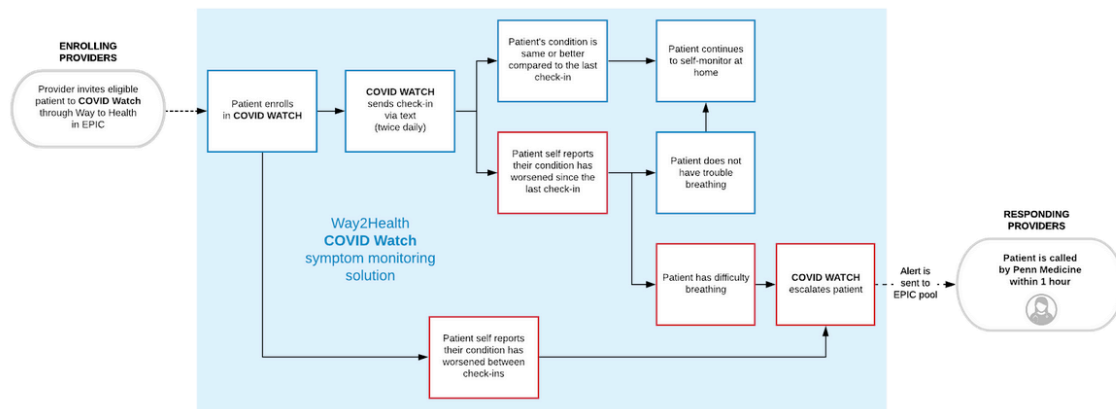


Figure 1. Escalation Pathway for COVID Watch, University of Pennsylvania

- **Twistle** is a platform to support public health and population health initiatives by automatically checking in with patients and health care works to educate, provide information, and conduct assessments.<sup>9</sup> Twistle provides several pathways for interacting including prevention, screening, self monitoring, Register Nurse monitoring, and healthcare worker self monitoring. For self monitoring, patients who have been determined healthy enough to self monitor at home after a phone or in-person consultation can interact with the Twistle platform for symptom surveillance until escalation is necessary. Similarly, for those who require more direct monitoring are enrolled with the RN Monitoring Pathway until and if hospitalization is required.
- **Masimo SafetyNet** developed a patient management system designed to aide remote monitoring and management of patient care. Masimo combines monitoring devices like pulse oximeters and an smart phone interface to collect patient information. The intent of this services is to accurately monitor patients and identify the appropriate time to escalate care while limiting the in-person burden on the health care system. This approach is rolling out in health systems include a pilot test at University Hospitals in Northeast Ohio.<sup>10</sup>
- **The Mid-Atlantic Telehealth Resource Center** provide a Remote Patient Monitoring Toolkit which provides guidance for using a remote monitoring system and the roles and responsibilities of different team members within a monitoring system.<sup>11</sup> This resource provides step-by-step process for executives, providers, nurses, technicians, and billing department to effectively run a monitoring system.

## Conclusion

Primary care providers currently play a key role in triaging, referring, and monitoring patients. The Primary Care Collaborative has conducted weekly surveys for the last seven weeks to understand concerns of the primary care community.<sup>12</sup> In week one, approximately 250 primary care clinicians complete the survey. By week seven, respondents grew to over 3,100. Through out these surveys, the results were clear: primary care physicians are consistently concerned with meeting patient needs due to limited operational ability due to staff shortages and office closure and limited familiarity with providing care services remotely. As primary care physicians gain more familiarity with operating in the COVID-19 environment, their responses show an increased participation in the monitoring and triage of COVID-19 patients. In the most recent survey, over 20% of primary care physicians report that they have triaged or referred “a lot” of COVID-19 positive patients. Nearly 25% report active monitoring of patients at home.

Understanding the right set of patients to engage with, when to engage with them, and how to escalate or descale their treatment can provide increased efficacy of the primary care field in handling the COVID-19 pandemic.

<sup>1</sup> [A German Exception? Why the Country's Coronavirus Death Rate Is Low](#), New York Times, April 4, 2020

<sup>2</sup> [Hospitalization Rates and Characteristics of Patients Hospitalized with Laboratory-Confirmed Coronavirus Disease 2019 — COVID-NET, 14 States, March 1–30, 2020](#), Centers for Disease Control and Prevention, April 17, 2020

<sup>3</sup> [Symptoms of Coronavirus](#), Centers for Disease Control and Prevention, updated April 28, 2020

<sup>4</sup> [Why Days 5 to 10 Are So Important When You Have Coronavirus](#), New York Times, April 30, 2020

<sup>5</sup> [Who gets hospitalized for Covid-19? Report shows differences by race and sex](#), STAT News, April 9, 2020

<sup>6</sup> [Coronavirus FAQS: What's a Pulse Oximeter? Is it a Good Idea to Buy One?](#), NPR, May 1, 2020

<sup>7</sup> [Our hospital's community management strategy for Covid-19 works. Yours can, too](#), STAT News, April 23, 2020

<sup>8</sup> [COVID Watch](#), University of Pennsylvania

<sup>9</sup> [COVID-19 Pathways](#), Twistle

<sup>10</sup> [Masimo and University Hospitals Jointly Announce Masimo SafetyNet™, a New Remote Patient Monitoring Solution](#), University Hospitals News Release, March 20, 2020

<sup>11</sup> [Remote Patient Monitoring Toolkit](#), Mid-Atlantic Telehealth Resource Center

<sup>12</sup> [Primary Care & COVID-19: Weekly Survey](#), Primary Care Collaborative, updated April 30, 2020