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Medical Students to the Rescue: Fighting COVID-19 with an Outpatient Pulse Oximetry Monitoring Protocol

Oren Mechanic, MD, MPH;[1] David Benjamin Gootenberg, PhD;[2] Alon Dagan, MD[3]

Affiliations: [1]Harvard Medical Faculty Physicians, Beth Israel Deaconess Medical Center, Boston, MA, USA; [2]MD Candidate, Harvard Medical School, Boston, MA, USA; [3]Harvard Medical Faculty Physicians, Beth Israel Deaconess Medical Center, Boston, MA, USA; Faculty, Harvard Medical School, Boston, MA, USA

Corresponding Author: Oren Mechanic, Email: Oren.mechanic@gmail.com

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The coronavirus disease 2019 (COVID-19) pandemic and the accompanying influx of ill patients have placed significant strain on health infrastructure, driving hospitals to develop strategies for efficiently delivering patient care and conserving limited healthcare resources.[1] Vital to many of these plans is the need to conserve scarce inpatient capacity and avoid unnecessary admissions. The emergency department (ED) is a key point of entry for most of these patients.[1] In the setting of an ongoing pandemic, emergency medicine clinicians are forced to make disposition decisions with incomplete information and significant uncertainty regarding the disease course both on an individual and community level.[2] From clinical experiences in China, Italy, and New York, it is clear that patients with minor symptoms could subsequently develop severe hypoxia with rapid progression to respiratory failure days to weeks later.[3] Furthermore, while certain population-based risk factors for serious illness were known (advanced age, obesity and hypertension), there are no definitive guidelines to identify which of the patients are at highest risk of disease progression, and therefore, warranting early hospital admission.

In the case of these uncertainties, at the start of the pandemic, physicians were hesitant to discharge patients home, particularly when the outpatient follow-up was variable. It was in this setting that our ED at Beth Israel Deaconess Medical Center (BIDMC) searched for ways to implement an outpatient protocol, for monitoring patients being discharged with COVID-19. As with much of the healthcare system during this time, our medical workforce was already stretched thin.

In March 2020, in-person clerkship rotations for medical students across much of the world were suspended to ensure student safety and to limit personnel exposure to patients.[4] Students, however, still expressed their desire to assist with patient care and were eager to find ways to contribute during this difficult time. Medical students at Harvard Medical School reached out to the ED looking for ways to contribute to patient care. It was this convergence of unmet needs that allowed us to move forward with deploying outpatient pulse oximetry monitoring for patients with COVID-19.

We developed and implemented an outpatient monitoring protocol in a manner, which did not significantly increase the work burden of clinical staff. The COVID-19 Outpatient Pulse Oximetry Protocol (CO-POP), which is led and co-designed by medical students, allowed for structured outpatient pulse oximetry monitoring of COVID-19 patients who are at risk for clinical decompensation without adding workload to the already limited healthcare workforce resources.

Our workflow was structured, such that patients with confirmed or suspected COVID-19 were enrolled in CO-POP at the time of discharge if the emergency physician team determined that there was a risk for outpatient decompensation (based on vital signs, comorbidities, or overall clinical picture). An order placed in the electronic medical record alerted the discharging nurse, electronically attached appropriate discharge instructions, and added the patient to a follow-up list. At the time of discharge, the nurse gave basic instructions regarding the use of the at-home pulse oximeter, and then the patient was discharged with a battery-powered pulse oximeter and a log sheet. Patients were instructed to check their vital signs three times daily and to document their heart rate and oxygen saturation in the provided log. On post-discharge days 1, 3, and 7, patients were contacted by a medical student who volunteered to review logged vital signs, document an additional set of vital signs, including ambulatory saturation, and identify whether patients were subjectively feeling generally better, worse, or the same as when they were discharged from the ED. Based on the information collected, medical students followed a consistent algorithm for directing patients whether to seek care. Emergency medicine physicians were on-call to answer any questions that might arise during these calls and could provide the students with additional medical oversight if needed.

The CO-POP leveraged the availability of medical students withdrawn from clinical rotations to provide emergency medicine physicians an opportunity to discharge patients with COVID-19 with the outpatient pulse oximetry monitoring protocol and close structured follow-up. Over 500 phone calls and 2,500 pulse oximeter recordings have been made using our medical students. This allowed for patients without clear indications for admission to be discharged home safely and to continue to undergo monitoring for hypoxia. We have quickly learned that as the pandemic persists throughout the year, and in preparation for another surge of COVID-19 infection, students are motivated to remotely contribute to patient care, even when physically distant from the hospital. In fact, we have identified the medical student body as one of the few resources that has become more available as pandemic volumes increase. As medical schools contemplate and plan for “new normal” clinical semesters, this model can be extended to other medical schools and academic medical centers to provide a valuable educational clinical role for medical students physically outside of the hospital and to provide a much-needed service on the front lines of patient care.

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