

# Onsite telemedicine strategy for coronavirus (COVID-19) screening to limit exposure in ED

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## ABSTRACT

Coronavirus (severe acute respiratory syndrome coronavirus 2) outbreak is a public health emergency and a global pandemic. During the present coronavirus disease (COVID-19) crisis, telemedicine has been recommended to screen suspected patients to limit risk of exposure and maximise medical staff protection. We constructed the protective physical barrier with telemedicine technology to limit COVID-19 exposure in ED. Our hospital is an urban community hospital with annual ED volume of approximately 50 000 patients. We equipped our patient exam room with intercom and iPad for telecommunication. Based on our telemedicine screening protocol, physician can conduct a visual physical examination on stable patients via intercom or videoconference. Telemedicine was initially used to overcome the physical barrier between patients and physicians. However, our protocol is designed to *create* a protective physical barrier to protect healthcare workers and enhance efficiency in ED. The implementation can be a promising protocol in making ED care more cost-effective and efficient during the COVID-19 pandemic and beyond.

## INTRODUCTION

The WHO named the coronavirus (COVID-19) outbreak a public health emergency of international concern.<sup>1</sup> This outbreak is causing an overwhelming burden of illnesses that stresses health system capacity and adverse effects on healthcare workers including the risk of infection. Health agencies and the White House Coronavirus Task Force have urged hospitals to expand their use of telemedicine for patient evaluation.<sup>2</sup>

Telemedicine is defined as ‘the use of telecommunication technology to provide medical information and services’.<sup>3</sup> Prior studies have shown that telemedicine can be used to effectively overcome physical

barriers or distance between doctors and patients in rural areas.<sup>3</sup> In the past decades, telemedicine has traditionally been incorporated well in ED to facilitate specialty consultation or hospital transfer.<sup>4,5</sup> Before the COVID-19 pandemic, telemedicine was used for multiple medical emergencies, such as neurology consultation for acute ischaemic stroke. During the present crisis, telemedicine has been recommended to screen patients with suspected COVID-19 by the US government.<sup>2</sup> In the past, telemedicine was used to overcome the physical barrier between patients and physicians. Now we can use this strategy to create a protective physical barrier to protect medical staff in the ED.

Screening patients in ED for COVID-19 can present multiple challenges including increased risk of viral exposure to other patients and medical staff. Additionally, EDs nationwide are experiencing a shortage of personal protective equipment (PPE).<sup>6</sup> To limit the risk of exposure while maintaining quality of care, we used telemedicine to provide a protective physical barrier between patients and staff, and thus limit COVID-19 transmission in ED.

## INTERVENTION

We conducted a multiprofessional discussion with nursing and hospital leadership to create this telemedicine process. During the pandemic, we have limited PPE and N95 masks in our hospital. To provide appropriate protection to our ED staff and minimise the use of PPE, using onsite telemedicine has become a safer way for both physicians and nurses. We developed a telemedicine pathway that was approved by both hospital and nursing leaderships. In our usual ED workflow, our nurses would first screen patients with suspected COVID-19 in the exam room. During the screening process, the nursing staff can set up the telemedicine (iPad or phone) and explain the process to the patient. Both physicians and nurses can use telemedicine to communicate with patients in clinical practice. Physicians can focus on prioritising critically ill patients and manage ED flow more efficiently.

## SETTING

Baylor Scott & White All Saints Medical Center is a 377-bed urban hospital with annual ED volume of approximately 50 000 patients in North Texas. In ED, we have 30 patient exam rooms including three negative-pressure isolation rooms. Each patient exam room was equipped with intercom and can be used as an isolation room for suspected COVID-19 patients with enhanced droplet and contact precautions. In addition, we can use portable iPads with Microsoft Teams installed for telecommunication. The iPad can be moved to any room after proper decontamination procedure.

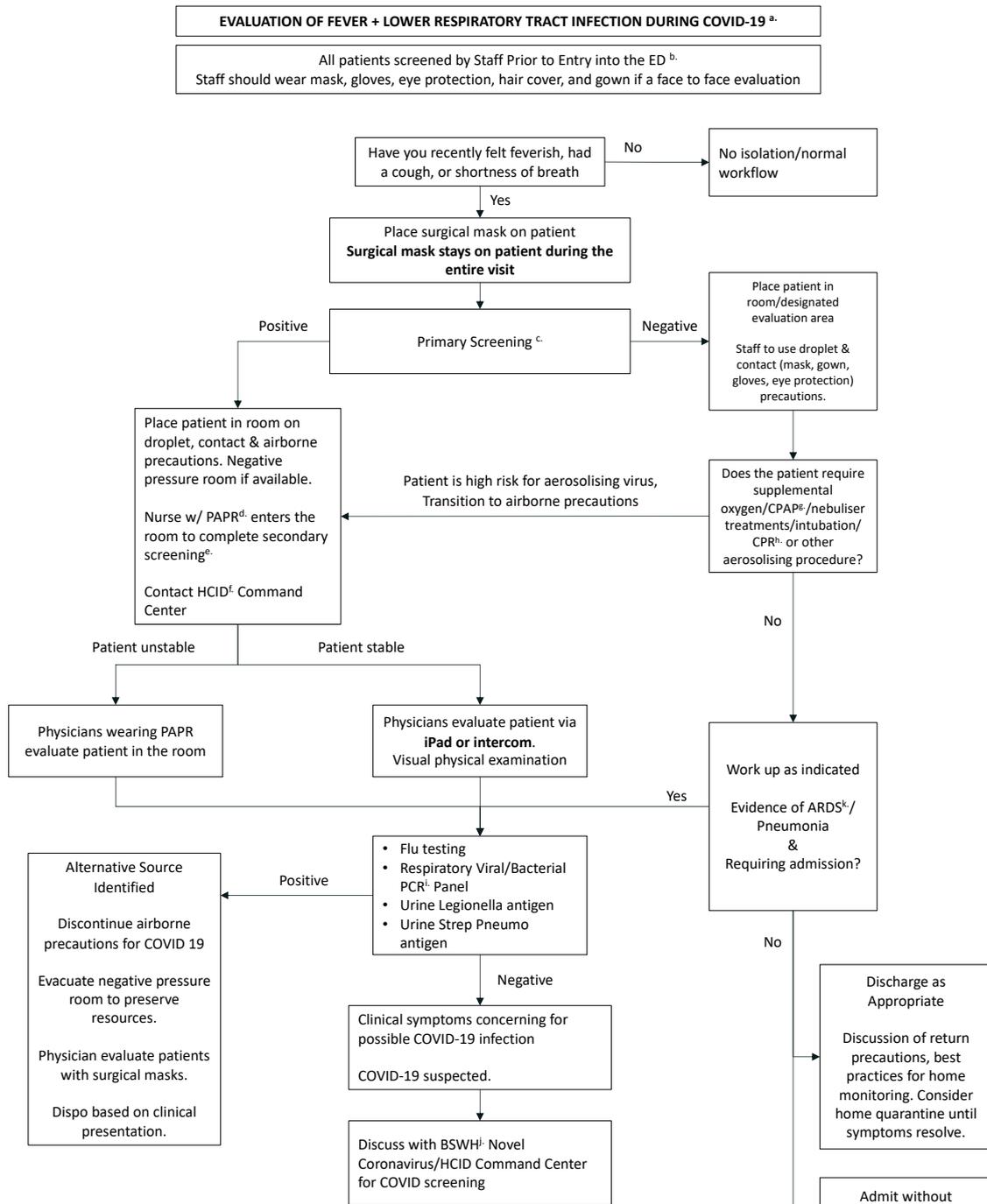
## PROCEDURES

Based on the protocol ([figure 1](#)), patients are screened for respiratory tract infection at the outdoor screening area before entering ED. Patients deemed high risk by our primary screening criteria are masked at the entry of ED and then placed in isolation rooms. A nurse with powered air-purifying respirator (PAPR) PPE enters the room to conduct a secondary screening, take vital signs and perform a focused physical evaluation, including lung auscultation, general appearance and mental status assessment. If the patient is unstable or ill-appearing, the physician enters the room with PAPR PPE to evaluate the patient. If the patient is stable, the physician can interview the patient and conduct a visual physical examination via intercom or videoconference through iPad ([figure 2](#)). The nurse in the room can assist patient during videoconference. When patient is considered a low suspicion for COVID-19 infection after negative screening process and test results, physician can enter the room with regular surgical mask and gloves to complete the evaluation before final disposition.

This onsite telemedicine method has numerous advantages. First, this protocol can be set up quickly and inexpensively with equipment currently available in most EDs. We were able to repurpose two iPads and implement this set up in less than 3 days. Second, this strategy significantly reduces PPE utilisation, an important factor given the PPE shortage being reported worldwide.<sup>6</sup> The protocol is cost-effective and saves physician’s time donning and removing PPE, thereby improving department flow and prioritising critically ill patients more efficiently when there are increasing patient volume and acuity in COVID-19.<sup>7</sup> We implemented this protocol in March. In a 2-week period, we screened approximately

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- a. COVID-19: Coronavirus Disease 2019
- b. ED: Emergency Department
- c. Primary screening: Yes to any of the question is defined as positive
  - a. Have you had a new rash over most of your body?
  - b. Have you traveled outside the United States in the last 21 days?
  - c. Have you recently been in contact with person who may be sick with novel coronavirus, Ebola, measles, middle east respiratory syndrome or tuberculosis?
- d. PAPR: Powered Air-purifying Respirator
- e. Secondary screening: Further detailed travel history, contact history, symptom and Person Under Investigation checklist from CDC
- f. HCID: High Consequence Infectious Disease
- g. CPAP: Continuous positive airway pressure
- h. CPR: Cardiopulmonary Resuscitation
- i. PCR: Polymerase chain reaction
- j. BSWH: Baylor Scott&White Hospital
- k. ARDS: Acute respiratory distress syndrome

**Figure 1** Protocol of onsite telemedicine strategy for coronavirus (COVID-19) screening. CDC, Centers for Disease Control and Prevention.



**Figure 2** A simulation of patient encounter with telemedicine system and visual physical examination.

500 patients with suspected COVID-19 symptoms, and around 140 of them were considered as high risk for COVID-19 infection and placed in isolation rooms. Approximately 30% of those patients had unstable vital signs such as hypoxia.

### LESSONS LEARNT

There are several challenges to the use of telemedicine. First, there was a technical issue of connectivity and Wi-Fi signal. The signal was not stable enough for video-conference at some areas of ED, and we had to use either the audio function or the intercom instead. Some physicians and nurses initially preferred phone interview due to this issue. This technical issue was fixed quickly, and the majority of our ED staff can use videoconference now. Second, several physicians had concerns about patient privacy policies, or whether the telemedicine exam would meet the standards for a full exam, according to the US Emergency Medical Treatment and Active Labor Act (EMTALA). Allowances from the federal government cleared the concern.<sup>2</sup> The telemedicine screening described here was approved by our

medial and nursing leadership and the hospital administration and also meets EMTALA and Health Insurance Portability and Accountability Act requirements.<sup>2,8–10</sup> So far, our patients can understand and agree with this telemedicine pathway after explanation and also have positive feedback to our care.

This telemedicine strategy has been broadly implemented to many other EDs and urgent care centres within our hospital system. The implementation can be a promising screening process during the COVID-19 pandemic and beyond.

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