

# Fighting COVID-19: One Radiology Department's Experience

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COVID-19 infections are spreading throughout the world; at this writing, they have increased exponentially in the United States, making the U.S. the current epicenter of the pandemic.<sup>1</sup> As a result, all U.S. health-care facilities and medical specialists have had to make adjustments to their workflows and practice.

Radiology is no exception. To date, most radiology literature on COVID-19 has focused on the imaging appearances of the infection<sup>2-4</sup> and on general department preparedness,<sup>5,6</sup> while comparatively little has described the role of radiology, and that of radiologists, in particular, during this pandemic.

The purpose of this article is to share our ongoing experience in identifying and implementing ways our radiology department and medical imaging personnel can contribute to the fight against COVID-19. Our hope is that our experience can help prepare other radiology practices to confront the outbreak.

## Recognizing the Radiologic Appearances of COVID-19

Santa Clara County is one of the country's largest centers of COVID-19

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cases, both in California and the U.S. as a whole. Upon recognition of the disease's spread to our region earlier this year, the thoracic radiologists at our medical centers assumed responsibility for educating our colleagues on the imaging features of COVID-19 on radiography and chest computed tomography scans.

Key images and their descriptions from the latest medical literature were distributed by email. In addition, an educational video provided by the Society of Thoracic Radiology was disseminated to all our radiologists.<sup>8</sup> These highlighted key imaging features of COVID-19, including the presence of bilateral, rounded ground-glass or consolidative opacities that are predominantly in a peripheral and basilar distribution.<sup>2,4,9-14</sup>

To further increase awareness of imaging appearances of COVID-19, we shared images of confirmed COVID-19 cases, with patient data de-identified. We also specifically instructed our radiologists to use chest computed tomography (CT) primarily to exclude alternate diagnoses, not to screen for COVID-19.<sup>15</sup>

## Improving Communication

As the pandemic continues to impact our region, any imaging examination that reveals findings suspicious for COVID-19 results in an immediate phone call or secure, encrypted text message to the referring provider; these steps are then documented in the radiology report. We emphasize to our radiologists the impor-

tance of not signing the report without real-time confirmation of delivery to the provider, whose absence potentially could create a public risk of infecting others. This rapid communication of results facilitates prompt triaging to determine whether the patient can be sent home to self-quarantine or sent to the emergency department for additional care.

We have established this same prompt communication protocol with medical care delivered in portable tents set up on the grounds of the hospital. Depending on their clinical presentation, a subset of patients is screened for COVID-19 with a nasopharyngeal swab, as well as a chest X-ray via a portable radiography machine in these tents. Our radiologists interpret these chest x-rays within 15 minutes and communicate positive results to the clinical providers.

Clear communication with our radiologic technologists is also necessary to ensure infection control. If CT scanning is requested on a COVID-19 patient or a patient under investigation, technologists are notified in advance to ensure appropriate personal protective equipment usage. In addition, other patients waiting in the hallways are transported elsewhere in the hospital to prevent the spread of infection. If a patient under investigation is scanned and subsequently confirmed to be infected with COVID-19, technologists are instructed to self-monitor for symptoms. A multidisciplinary group of physicians with expertise in infectious

disease, emergency medicine, and radiology has established these guidelines, which are continuously monitored and modified as needed as the medical community gains greater understanding of COVID-19.

### **Time Shifting to Decrease Redundancy, Increase Efficiency, and Expand Radiologist Roles**

Under directives from the Centers for Disease Control and Prevention, our county public health department, and our hospital, certain elective interventional and diagnostic examinations have been postponed to decrease hospital traffic and the risk of spreading the infection. These steps lessen the workload for our radiologists during normal business hours. Instead of having our routine staffing levels for radiologists during the daytime, we have shifted more radiologists from our routine daytime staffing levels to the evening hours to assist radiologists on call.

This has decreased staffing redundancy during the day but, more importantly, it has helped reduce reading turnaround times during the evening. Indeed, during the pandemic, we have been striving for 15- to 30-minute turnaround times for all diagnostic examinations. This helps our emergency medicine physicians determine patient dispositions more quickly, particularly for normal examinations, which can help trigger a more rapid patient discharge, thereby potentially decreasing infection risk and allocating care to more severely affected patients.

Our department has also encouraged radiologists to use their vacation and educational leave while examination volumes are low so that when the restrictions on elective imaging are lifted, more radiologists will be available to address the expected increase in imaging volume. We are also supporting our colleagues throughout the hospital by establishing additional roles for our radiologists, including aiding

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in COVID surge planning, fielding telephone calls related to COVID-19 for primary care doctors so that those providers can assist hospitalists, and working as ambassadors at hospital entrances to limit traffic into the medical center.

While some medical centers have reported directing their attending and resident radiologists to help provide care on their clinical wards,<sup>16</sup> our hospital has not engaged radiologists in this manner at this point, but the Permanente Medical Group is exploring the possibility of doing so in the event of an infection surge.

### **Greater Role in Examination Triage**

Prior to the COVID-19 pandemic, clinicians at our institution would normally select an imaging examination through an electronic decision support guide; most examinations were directly booked without the approval of a radiologist. In the event a referring provider was unsure which imaging examination or protocol was most appropriate, a radiologist would individually protocol these requests.

In the midst of the COVID-19 era, we have changed the ordering guide to specify whether a given examination is clinically urgent or can be delayed. The relevant subspecialty radiologists screen all imaging requests and label each request as either "COVID19-POSTPONE" or "COVID19-BOOK". This

permits schedulers to proceed accordingly. Furthermore, we take this same triaging approach with requests submitted prior to this intervention. The protocoling radiologist uses our electronic medical record system to obtain additional information as needed, and there is a low threshold for contacting the referring provider.

There are two vital objectives in this process: one, to ensure no imaging request is lost, and two, to ensure that any delays in imaging will not severely impact medical care. This practice of individually protocoling examinations is not new to radiology practice,<sup>17</sup> but it has become more crucial in these unprecedented times. Finally, we have established individual radiologist rotations to perform these newly implemented protocoling tasks.

### **Remote Reading Rotations**

In accordance with social distancing and shelter-in-place mandates in our county, we have designated many of our radiologists to work from home. The majority already have reading workstations in their home; therefore, we have established a schedule and rotation guide to designate when and which radiologists can work remotely.

Those performing interventional procedures, mammography, and fluoroscopy remain on site to address urgent cases and manage any reactions to contrast. These radiologists also meet with

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technologists and related staff to show support and answer questions. The ability of our radiologists to work from home likely helps to decrease the risk of infection to patients and to themselves.

### The Vital Role of Teamwork

During uncertain times like these, when recommendations and protocols often change daily with rates of infection, open communication among radiologists, other medical specialists, and hospital administration is of utmost importance. We have designated one senior radiologist to provide two-way communication with COVID-19 hospital committees.

Not only is this step imperative to ensure our department is up to date on the latest information, but it also demonstrates the value of the radiology department and the active role it plays in the crisis. In addition to meetings with other departments, our radiology department has frequent, if not daily, huddles both in person and virtually to address pressing COVID-19 care needs.

### Radiologists as Leaders

Radiology's role during the COVID-19 outbreak remains vital to establishing rapid diagnoses, initiating prompt communication, and demonstrating collaboration both within its own department

and throughout its institution. Radiologists can set an example by adhering to handwashing and social distancing mandates, as well as appropriately utilizing personal preventive equipment, given the national shortage of such vital equipment.<sup>18</sup>

Beyond the need to practice careful behavior to protect against the physical risks of the disease itself, however, the COVID-19 pandemic has also generated anxiety and uncertainty among many healthcare personnel. As physicians, radiologists are in a leading position to share encouragement and enthusiasm for our mission with all of our colleagues—radiologists, technologists, nurses, administrative assistants, and environmental service staff all included.

Indeed, such leadership is necessary during the best of times, but especially so during these uncertain and emotional times.

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