



## On the Move

Mobilizing CT to Fight COVID-19

One lesson the COVID-19 pandemic has taught health care is the importance of being prepared and deploying all available resources efficiently and intelligently to address the crisis. With current challenges and shortages ranging from personal protective gear to medical equipment and staffing, health care facilities need to think ahead and plan for future infectious disease threats—which are inevitable, given the predicted resurgence of coronavirus during the upcoming fall and winter.

Studies have shown that CT is an extremely valuable tool for imaging many COVID-19 patients. A recent study published in *Radiology* found that, using CT, radiologists were able to identify a number of COVID-19 cases that DNA testing did not, even after a second test.<sup>1</sup> A growing body of literature is now helping to more specifically define the value of radiology imaging.

When it comes to efficiently mobilizing CT for COVID-19 imaging, a highly effective strategy can be literally mobilizing scanners to enable movement throughout the hospital. By adopting mobile CT equipment, facilities can keep infected patients apart from the general imaging population through a policy of CT distancing, so to speak.

Although rife with unknowns, the virus is likely spread through airborne respiratory droplets, traveling as far as six feet. Transporting infected patients to radiology departments can disperse germs throughout the hospital and even turn the radiology waiting room—which accommodates patients from across the hospital and beyond—into an extremely dangerous place. In particular, distancing is important for vulnerable intensive care patients, who are at higher risk for infection and often deadly disease progression.

Mobile scanners also provide a simple, fast, and relatively cost-effective way to expand CT capacity for the increased demands of infectious disease imaging without the complex and costly demands of siting and construction of additional

imaging suites. In addition, they can be more easily adapted to meet other imaging needs when the immediate need for infectious disease imaging decreases—and it will.

Along with distancing infected and noninfected patients, mobile scanning can help solve significant related challenges of altered workflow and scanner disinfection. The recommended, necessary disinfection of scanners and the imaging suite following a CT exam of a suspected COVID-19 patient is an arduous process—far more extensive and time-consuming than for general imaging procedures. If cleansing is not thorough, patients may become infected. This process significantly changes department routines and hampers patient throughput, which in turn affects exam scheduling for all patients, along with department revenues. Maintaining a coronavirus-dedicated CT will allow time for scrupulous cleaning without impacting routine department workflow on other devices.

### About Mobile CT

Today, the mobile CT category consists of two general varieties of scanners: traditional CT deployed in coaches and newer,

freestanding, go-anywhere devices that typically are battery powered and engineered for easy movement by a single operator. A CT coach typically consists of a standard scanner in a self-contained imaging environment that can be set up on hospital grounds or other locations that have a need for imaging. While adding flexibility, these scanners still come with relatively complex siting demands and conventional power supply requirements, meaning they are best suited for installations of weeks or months in duration. On the plus side, however, mobile CT vans are often available for rental.

By contrast, freestanding, battery-powered devices are built for easy movement almost anywhere within the hospital, including to patient bedsides. Typically, these devices are also self-shielding. They can be used to create an ad hoc imaging area inside or outside of a facility as well as deployed in a vehicle for true go-anywhere exams, even in areas without electric power supply. These scanners are significantly more affordable than traditional fixed equipment, with lower purchase price, installation costs, and hospital space requirements. Their purchase price is also much less than traditional van-deployed devices.

Because they remove most restrictions on location, these freestanding CT units offer flexibility for postvirus use. For example, they can be set up in radiation therapy brachytherapy suites, the operating room, and ICUs, and serve as back-up general scanners.

Today, their features and performance have come to rival most fixed scanners, and they are available in a wide variety of configurations for specific imaging needs. Depending on the facility's preferences, budget, and choice of device, mobile infectious disease CT distancing programs can be implemented in a variety of ways and locations.

### Dedicated Scanning

A straightforward COVID-19 implementation might involve a traditional CT coach or freestanding, battery-powered scanner dedicated to COVID-19 imaging, sited in a hospital parking lot or another outdoor campus location. For coach CTs, electric power requirements will pose some limitations on specific locations, and siting demands will limit their mobility.

In this scenario, COVID-19 patients never need to enter the hospital for outpatient imaging, eliminating the risk of infection spread within the facility. Transport of hospitalized patients to scanners must be carefully planned to minimize the risk of hospital contamination; however, this can be as simple as placing the scanner near a designated COVID-19 treatment area with easy exit to the outdoor imaging area.

An option for facilities that have created dedicated COVID-19 patient treatment areas is deploying a freestanding battery-operated scanner directly in those locations to maintain complete patient isolation. This is also an effective choice for ad hoc COVID-19 treatment facilities, such as the converted convention centers and military ships being used today. Many of these facilities do not have a fixed CT on site and have limited space, making easy device navigation important. As patient loads and needs change, freestanding mobile scanners can be relocated with minimal effort. For example, some facilities may find that the best option is to image critically ill patients at their bedside.

Another strategy is to maintain COVID-19 imaging in the radiology department on designated devices but bring specialized CT units to the bedsides of vulnerable patients in the ICU, neonatal, pediatric ICUs, and similar areas. This minimizes those patients' exposure to other potentially infected patients, visitors, and the general hospital environment by eliminating transport to radiology. For example, freestanding mobile head and neck CT scanners are available for noncontrast CT, CT angiography, and CT perfusion exams to support applications, including tumor and stroke assessment. These and other specialized CT units are less costly than full-body units and generally are available with less lead time, making them the appropriate choice for some hospitals.

### The Future of COVID-19 CT

While COVID-19 testing has gradually become more available and reliable, the *Radiology* study authors cited earlier note that CT imaging meets a need for better screening for early-stage disease to prevent transmission and speed

treatment. CT has been shown to be highly effective for tracking disease progression and treatment planning. While cautioning against use of imaging as a first-line tool, current ACR guidelines highlight its appropriateness "on a case-by-case basis for hospitalized, symptomatic patients to guide their care and management." In addition, AI algorithms are emerging to help evaluate CT images. New research on the use of CT abounds.

"Imaging is critical in assessing severity and disease progression in COVID-19 infection," comments lead author Soheil Kooraki, MD, of the Keck School of Medicine, University of Southern California, in a recent *Journal of the American College of Radiology* article. Kooraki concludes that "... radiology will continue to play a pivotal role in containing the outbreak."

### Evaluating Equipment

If you're considering making a move to a freestanding mobile CT unit, experts suggest you look for such key attributes as the following:

- high-quality images suited to facility needs today and in the future;
- self-shielded design to protect hospital staff and reduce cost of installation;
- wireless communications with the hospital network;
- an internal drive system to streamline transport and setup;
- battery operated and charged using a standard wall outlet;
- 2D, 3D, and multiplanar reconstruction for versatile use; and
- easy disinfection.

Going mobile can not only help facilities in the fight against COVID-19 today, it also may broaden capabilities and move radiology deftly into the future. ■

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### Reference

1. Xie X, Zhong Z, Zhao W, Zheng C, Wang F, Liu J. Chest CT for typical 2019-nCoV pneumonia: relationship to negative RT-PCR testing [published online February 12, 2020]. *Radiology*. doi: 10.1148/radiol.2020200343.



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