



Pediatric Radiology

Learning from COVID-19: Sub-specialty radiologists should maintain general radiology skillset^{☆,☆☆,☆☆☆}Arvind Vijayasarithi^{a,*}, Faisal Khosa^b^a UCLA Department of Radiology, Neuroradiology Section, Los Angeles, CA, USA^b University of British Columbia Faculty of Medicine, Vancouver, BC, Canada

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ABSTRACT

The recent COVID-19 pandemic has impacted every facet of life and placed a significant strain on healthcare resources worldwide. One of the emerging themes of medicine's response to the outbreak is doing more with less. In certain parts of the world, the toll on healthcare workers has been immense, and practicing outside one's traditional scope and comfort zone has become the rule rather than the exception. For Radiology as a discipline, the stress of COVID-19 may be comparatively small when measured against the frontline physicians and nurses in the Emergency Department and Intensive Care Unit. Still, it is incumbent upon all disciplines to learn and grow from the challenges encountered during this crisis.

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As of mid-June 2020, there are nearly 2.2 million confirmed COVID-19 cases in the United States, and just under 8 million confirmed cases worldwide [5]. These cases have not been distributed in a uniform fashion with regards to place and time, as New York City was initially the epicenter in the United States, and more recently several states (AZ,

FL, OK, OR, TX) have seen substantial spikes in new cases as restrictions ease [2,6]. Perhaps one of the most important elements of the physician response to COVID-19 has been flexibility and the willingness to re-deploy the workforce to meet rapidly changing needs. While it may be far-fetched to expect a radiologist to feel comfortable intubating or clinically managing critically ill patients, it is not all too much to ask a seasoned Neuro-radiologist to interpret chest CTs or wrist radiographs from the ER. To the non-radiologist physician, this would likely seem a relatively minor imposition, as subspecialty radiologists are trained to interpret all types of general imaging during a rigorous residency training program and board certification process.

While in most Radiology private practices this flexibility leading to a jack of all trades is not unusual, however in the large academic medical centers, many subspecialty radiologists have not read a case outside of their subspecialty since completion of their fellowship. Some who have entered an academic job straight from fellowship may have never signed off a chest radiograph or abdominal ultrasound on their own. This level of ultra-specialization is no doubt of great benefit when an Orthopedic surgeon wants the expert musculoskeletal radiologist to review the professional athlete's elbow MRI, or when the head and neck tumor board is deciding between surgery and radiation based on the presence or absence of subtle perineural tumor spread. Academic

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Radiology departments are able to carefully tailor their faculty to address the specific needs of referrers across the health system and thereby play an integral role in subspecialty care delivery. Unfortunately, in times of crisis, the workload may disproportionately affect one clinical area (i.e. chest radiology for example), while causing a significant downturn in other service line volumes (i.e. elective musculoskeletal imaging). This potential disparity could be further magnified in the setting of a viral outbreak such as COVID-19, if members of a specific section belonged to high risk groups or if the infection was spread through surface contamination in shared work settings i.e. the Abdominal Radiology reading room. The ability of a system to leverage its existing resources, perhaps most importantly the staff, in order to respond to the stressor is paramount to the welfare of the community it serves.

Crises of any type share key traits: periods of uncertainty/destabilization, threats to the existence of the system, and a potential for escalation of errors [7,8]. During times of crisis, the members of any organization must be able to persevere, adapt and quickly recover in order to survive [9]. Crisis management has been distilled into a three stage process, each with two sub-stages: pre-crisis (prevention and preparation), crisis (recognition and containment), and post-crisis (evaluation and future-planning) [10].

Applying this general framework during and after the COVID-19 pandemic may help Radiology departments adequately respond to future healthcare crises. In the pre-crisis stage specifically, the goal should be to mitigate risks and exposures that could either cause or become magnified during a crisis, one of which is a staffing shortage. This is why it is important for healthcare providers to maintain versatility and do some level of cross training that may allow them to cover for others in times of need. For radiologists, at a minimum, we should be ready and able to handle the challenge of interpreting diagnostic imaging outside of our chosen subspecialty. Radiology departments should seek opportunities to help individual radiologists address this challenge through the creation of inter-section case conferences, promotion of continuing medical education programs, mentorship opportunities outside of one's section, emerging machine learning support

solutions, and educational resource tools aimed to help radiologists arrive at diagnoses in real time. Perhaps even more importantly, departments should incentivize subspecialty radiologists to maintain their general skillset by offering internal moonlighting opportunities in acute care imaging settings. By providing educational resources, clinical support, and financial incentives, Academic Radiology departments can help insure that our workforce is better prepared to meet the needs of a future healthcare crisis.

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