

# Special Report of the RSNA COVID-19 Task Force: Crisis Leadership of Major Health System Radiology Departments during COVID-19.

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This article is made available via the PMC Open Access Subset for unrestricted re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for the duration of the COVID-19 pandemic or until permissions are revoked in writing. Upon expiration of these permissions, PMC is granted a perpetual license to make this article available via PMC and Europe PMC, consistent with existing copyright protections. Severe acute respiratory syndrome coronavirus 2 has spread across the world since December 2019, infecting 100 million and killing millions. The impact on health care institutions during the coronavirus disease 2019 pandemic has been considerable, with exhaustion of institutional and personal protective equipment resources during local outbreaks and crushing financial consequences for many institutions. Establishing adaptive principles of leadership is necessary during crises, fostering quick decision-making and workflow modifications, while a rapid review of data must determine necessary course corrections. This report describes concepts of crisis leadership teams that can help maximize their effectiveness during the current and future pandemics.

Crisis leadership during coronavirus disease 2019 requires streamlined, communicative leadership teams that can implement rapid change while analyzing data on a continuous basis to determine the need for course correction.

■ Multithreaded and repeated communication from leadership to radiology teams is necessary for rapid communication of deployed changes during a crisis.

■ Effective and frequent departmental, hospital, and enterprise-wide communication is valuable for conveying new policies, procedures, training, and workflows, and interaction with patients regarding how these changes improve their protection is also key.

■ Creating an effective, streamlined, adaptive, and diverse leadership team and fostering a positive culture within the department can help navigate crises with success.

During the past several months, the coronavirus disease 2019 (COVID-19) pandemic has quickly spread across the world. The pandemic has infected 100 million and killed millions, with substantial impacts on financial markets, social interactions, and daily living. These impacts have extended to health care systems, requiring restructuring and rethinking of approaches to care delivery. COVID-19 has led to arising crises in radiology departments, stemming from needs to restructure workflows ( 1 ) and departmental financial strategies ( 2 ), with rapidly changing information regarding the disease and its spread and evolving financial impacts from institutional, state, and national mandates on imaging and procedural moratoriums. This environment requires dynamic leadership to navigate the needed changes. The leadership structure implemented may also help with better management of future pandemics and other crises. Well-executed crisis leadership in the setting of a pandemic can prevent potential physician, staff, patient, and general community exposures; provide efficient, timely, and appropriate diagnosis and care for patients; maintain health care worker and patient morale and confidence; and protect the operational and financial health of the department and medical institution. Previous commentaries on radiology leadership during crises ( 3 – 5 ) have focused on leadership qualities and approaches that translate to appropriate management. The current report addresses large health care system radiology department organizational structure and approaches in crisis leadership, focusing on communication, the organization and structure of leadership teams, and solution review processes to facilitate course corrections.

Effective internal communication has proved to be an essential tool in the guidance of all radiology personnel and the maintenance of good patient care during the pandemic. Communication goals considered essential during the crisis include (a) leadership for internal communication, (b) departmental communication, (c) communication with patients, and (d) fundraising.

Establishing and leaning on an institutional crisis advisory committee and a departmental crisis committee have been critical during the pandemic ( 1 ). The radiology department crisis committee, which can include the director, executive administrator, department chair, section heads, and nurse and technologist leadership, can hold standing meetings to share information and structure departmental workflow. Together, these meetings serve to forge channels of communication between personnel across the radiology department from geographically dispersed hospitals, allowing rapid dissemination of new information, collaboration on the development of new workflows, and sharing of hospital- or institution-wide policy changes. Communication leadership should also bridge discussions with hospital leadership and other departments to ensure radiology policies are in line with institutional guidelines.

Weekly faculty meetings can communicate policies and updates for dissemination to the department at large, with updates from the crisis committee leadership ( 6 ). These meetings have gone from in-person to virtual. Maintenance of comprehensive policies on the department website and specific instructions posted in reading and/or procedural rooms can also provide readily accessible information throughout the workday. Instructional videos and policy documents can guide employees on safety measures and appropriate use of protective equipment ( 7 ).

Many hospital systems have created their own materials for patient communication through institutional websites and social media, but radiology departments can also provide their own patient communication marketing materials to build or rebuild trust with patients and instill confidence in patient safety during imaging and/or procedural services ( 8 ). Different media can be used to disseminate these materials, including the department website, video monitors in waiting rooms or signs throughout the department, social media platforms, and direct patient communication portals, such as automated texting systems. Human success stories can also be published online. One institution created and shared a photo album featuring images of patients and staff alongside positive messages, which improved morale for health care workers and patients alike.

Communication of the fundraising needs to donors is crucial to an institution's ability to raise money. Postponement of outpatient studies and increased costs for acquisition of equipment may spur institutional efforts to increase fundraising during the pandemic. Community members and private and public institutions may be willing participants in the fundraising campaign, buoyed by the desire to support health care institutions that have become exhausted while caring for the mounting number of critically ill patients with COVID-19. An example of this is community donations of tablets for communication between patients and their families, personal protective equipment, and food for health care workers. These community efforts can allow the community to come together, support health care workers, and boost hospital staff and patient morale. Another example is Hospital Clínic Barcelona, which has actively sought community donations for COVID-19 research ( 9 ). These efforts led to €5 million (approximately \$6 million USD) of funding from Cellnex Telecom (Barcelona, Spain) for a project focused on better understanding of T-lymphocytes that target severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).

The key for appropriate communication during a crisis is the implementation of dynamic continuous updates and discussion using brief, clear, and focused messages that address the different working environments across the hospital enterprise, specifically within radiology at all levels.

Academic radiology departments, like their parent academic medical centers, are complex organizations with considerable management challenges. Typically, academic radiology departments will contain multiple axes of organization, including radiology subspecialties, imaging modalities that cross subspecialties, physical facilities encompassing hospitals and outpatient centers, and mission-based organizations, including research, clinical, education, faculty development, and others. These axes create the framework for department organization. An institution can create an organizational matrix across these axes, with extensive interaction between leaders. For most academic radiology departments, the fundamental faculty and/or radiologist organizational unit is the subspecialty divisions. A triad of a chief technologist, radiologist

modality director, and technologist educator form the leadership team in charge of individual modalities. The technologist educator trains on protocols and implements quality systems across physical locations. In addition, a dyad of a technical director and a radiologist site director leads each hospital or clinic. A vice chair leads each mission area. Supporting effective programming requires extensive collaboration among leadership across the organizational framework.

Strong leadership is critical to the effectiveness of a matrix organization. In academic medical centers, we traditionally advance individuals into leadership positions based on demonstration of technical competencies (clinical skill, impactful publications, grants, teaching scores, and operational or administrative accomplishments) and may undervalue the behavioral competencies important for effective leadership (social intelligence, team-building, and collaborative skills). We also underestimate the need to train and support leaders in their leadership positions. Leadership development programs aimed at enhancing their leadership skill set can achieve great success in raising the effectiveness of leadership teams. Programs can include faculty, technical, and administrative leadership, along with individual coaching and quarterly group sessions covering topics including communication, feedback, difficult conversations, financial management, recruitment, talent development, and more. These programs can also help bolster the behavioral competencies necessary for effective leadership. An added benefit is the esprit de corps developed across the leadership team.

Once an organizational framework is established, it is critical to develop a plan for effective communication across the department. A common mistake is to assume that a single form of communication is effective in conveying important messages. Research shows that multiple forms of communication increase the effectiveness of conveying a message across an organization ( 10 ). A multithreaded communication strategy can be most effective. This includes electronic communication through e-mail and other media, communication at virtual department meetings, use of the formal organizational tree by communicating through organizational leadership, and communication to individual influencers during department rounds. Performing daily rounds is an effective approach to target communication to the informal department leaders who will use their sphere of influence to disseminate important messages. Virtual meetings have become the standard for most meetings during the pandemic, including department meetings, due to the need for social distancing and reducing potential exposure. The virtual gatherings have improved the reach of these meetings, facilitating increased engagement from faculty and staff who may otherwise be unable to be physically present. During the COVID-19 pandemic, the importance of multithreaded and repeated communication has been further amplified to communicate rapid changes and course corrections implemented from leadership and evolving knowledge and information.

Organizational culture may be the most important asset driving department performance. Academic radiology departments are large enough that culture may vary across the organization, but it is important to have an overall approach to department culture. Schein ( 11 ) provides a framework with which to think about organizational culture in layers: organization values, behavioral norms, and tangible artifacts (rituals, physical workspace arrangement, and language). An established and healthy organizational culture can foster an organized, unified, and coherent response to a crisis, including the COVID-19 pandemic. Leadership must be intentional in developing and maintaining organizational culture. Three major leadership activities establish and promote organizational culture: message, model, and manage. Both internal and external department communications should include organizational vision and expected behavioral norms. Leadership should model expected behavioral norms. Finally, the workforce development program should include aspects of organizational culture, including yearly reviews, incentive plans, and recruitment. It is particularly important to recruit for cultural fit, which may be prioritized over technical skill. Clear external communication of a positive and inclusive culture will attract trainee, faculty, and staff applicants who resonate with the department culture, facilitating recruitment of individuals who will contribute to the established culture.

In conclusion, creating the strong foundation of an effective organization includes an organizational framework, an effective leadership team, a multithreaded communication strategy, and a positive departmental culture consistent with the values of the institution. This foundation will serve the department well in navigating external pressures, including those related to the COVID-19 pandemic.

We narrow our focus when encountering a threat, which may be both an advantage and a disadvantage ( 12 ). As departments and medical institutions addressed the pandemic, health care workers and administrators narrowed their focus on COVID-19, resulting in alignment of common goals across radiology departments and facilitating increased acceptance and more rapid incorporation of major changes in workflow. These changes also more closely aligned with the efforts and missions of the parent medical centers. When forming a leadership team to address the novel threat of the COVID-19 pandemic, the alignment of energy and efforts on the situation at hand facilitates nimble decision making. Yet the lure of making all decisions flow from a single central leader is a pitfall that can impede high-quality decisions. Framing the threat as both serious and surmountable will motivate individuals to be “all in.” Should the crisis continue for a long period, leaders must be able to engage for the medium to long term and address the toll of continuous uncertainty on a workforce unit.

Effective crisis leadership teams must be grounded within a foundation of an organizational leadership structure that fosters collaboration, empowerment, and role clarity ( 13 ). Diverse and inclusive organizations or departments will have a further advantage in that they may be less susceptible to the groupthink ensnaring more homogeneous and hierarchical entities ( 14 ). In addition, ensuring that leader expertise is appropriately represented among the crisis leadership team is of critical importance. In the setting of COVID-19, a leadership team comprised of dyads and triads of physician, nursing, and administrative leader subunits can bring a balanced view to decision making, with both clinical priorities and implementation realities considered. The internal dynamic tension of taking charge while assuming a state of humble inquiry is especially challenging to reconcile. Some decisions need a quick response, but the limited availability of data requires a keen ear to continuous input from the frontlines and the humility to reflect and correct course if necessary.

The installation of a lean operating system can provide a critical framework for efficient leadership through the COVID-19 crisis. Tiered huddles facilitate rapid communication of workflow challenges, supply chain shortages, and equipment needs from the frontline workforce to the department crisis leadership team and, where appropriate, to the system-wide incident command center. Tiered huddles represent a series of brief, focused meetings (15 minutes) that take place across an enterprise, foster open bidirectional lines of communication—from executive leadership to technologists and nurses—and facilitate rapid dissemination of information. Critical issues can be escalated to senior levels of leadership within hours through the different tiers ( 15 ). Decisions often taking months to work their way through the usual committee structure—such as investing in additional home workstations for radiologists with pre-existing conditions and/or added caregiver burdens—could be swiftly authorized to shift diagnostic interpretations out of health care facilities.

Crisis leadership teams require that moral leadership, trustworthiness, integrity, and empathy guide core principles for setting the course of action. The direct threat of SARS-CoV-2 to health care workers places an enormous stress on health systems. While “the patient always comes first” is a common mantra in medicine, leaders must acknowledge that patients are not best cared for if the providers of that care are not well. Therefore, the health and safety of our workforce must be the first priority in order to provide optimal care for our patients. Unless the crisis leadership team, and especially the senior-most leader, appreciate the understandable concerns of providers and staff and commit to putting themselves in a similar high-risk situation, defection may result. This is particularly important as the second wave of rising cases and deaths is sweeping across the world. As health care workers witness their colleagues succumbing to the disease, their grief and distress rise. Leadership must communicate authentic empathy, caring, and support in a consistent and clear way. Within a fair and just culture, all should be inspired to model the behaviors that

demonstrate appreciation for each other; this includes vigilance to early signs of burnout, depression, and/or addiction ( 16 ).

During the COVID-19 pandemic, radiologists providing diagnostic imaging interpretation were in some circumstances permitted to work from home or from remote reading rooms, while frontline radiology workers, including procedural radiologists, technologists, and nurses, had to engage with patients, which could potentially expose them to COVID-19. At some institutions, trainees on diagnostic imaging rotations worked in the hospital while their faculty worked remotely. This split environment of on-site and off-site workers can create a sense of inequity and heighten concerns of unequal exposure risk. In this setting, it is the responsibility of leadership to encourage the department as a whole to show their appreciation and gratitude to these frontline health care workers while also providing clear descriptions of on-site and off-site responsibilities and the reasoning behind allowing some radiologists to work remotely. For on-site diagnostic imaging coverage, rotating coverage to ensure all members of a section equally provide coverage, unless there are health-related limitations for some, ensures a sense of equitable coverage and risk.

Decision making during a crisis, including the COVID-19 pandemic, must be rapid, often with incomplete information; the workflows implemented are often partial. In addition, the multiple new measures implemented concurrently would normally undergo a more gradual or sequential implementation. Therefore, it is important to have a systematic process for review after each implementation to apply course corrections when necessary as the situation evolves and/or knowledge changes.

Radiology department leadership teams can be restructured into lean task forces based on a military model ( 17 ), in which a small leadership task force is divided into domain groups, with each group addressing a particular focus, specifically personnel, operations, intelligence, logistics and mid- to long-term planning, communication, financial management, and external communications. The domain groups update the leadership task force during daily meetings on new developments in their respective spaces and provide possible solutions and new workflows to overcome any potential issues. The decision-making process incorporates analysis and discussion of various proposed courses of action for a specified task before deciding on the best plan. After an initial period of implementation of the new workflow, the same task force performs a rapid review process based on data collected, newly emerging COVID-19 knowledge, and feedback from the ground ( 18 ).

Data collection should include workload statistics that are as current as possible given the dynamic situation of a pandemic, along with comprehensive, multisource feedback from all stakeholders. When there is limited time for or access to comprehensive evaluations, engaging key stakeholders (including staff, radiology faculty, and/or ordering providers) in providing important feedback on new operational changes may be sufficient. New workflows are then reanalyzed with these new data, and a decision is then made as to whether course corrections are necessary and to what extent. After implementation of a course correction, the cycle of rapid review must follow, and adjustments are again made when needed. This compressed cycle of decision making followed by course corrections can be illustrated by the following three examples from Singapore General Hospital. An example of a departmental crisis leadership model is shown in the Figure .

Diagram shows an example of crisis leadership team structure. The example crisis leadership team has the chair in an oversight position, with the vice chair of clinical operations and the operations director managing the leadership team. They are responsible for incorporating information and data from the leadership team and generating cohesive policies. These policies are then reviewed by the leadership team, which includes leaders in all workforce and operational spaces. Modifications are made to the new policies and workflows from the discussions and then communicated to the target audiences, including the department and clinical services that order imaging examinations through multithreaded communication. The workforce and operational leaders gather feedback from their teams and bring this back to the crisis leadership team to discuss what is and is not working and to facilitate course correction. All communication is bidirectional, with ground-up feedback.

When the evidence for presymptomatic and asymptomatic transmission of SARS-CoV-2 emerged ( 19 , 20 ), it became necessary to implement physical distancing across the department. Identified vulnerable spaces were staff rest areas where staff being unmasked during meals and social interactions could lead to high rates of virus transmission ( 21 ). The immediate decision from the task force was to reconfigure the tables and chairs in the main staff rest area so that only two staff members could sit at a single table to limit interaction and employee gatherings. However, this led to a shortage of staff eating areas, and staff started using other areas for eating. This, in turn, created issues with employee congregation in other areas, leading to other risks and inconveniences. In addition, the issue of limiting interactions and maintaining distancing still remained. The team sourced and converted additional vacant space for staff use. With this increase in space, there was then further reconfiguration of all the areas to allow only one staff member to a table, while also providing adequate space for all staff to use the common rest and/or eating areas ( 5 ). This improved staff isolation and protection during meals while also improving employee mealtime experiences and morale.

During the COVID-19 pandemic, it has been critical to build up imaging capacity, as each procedure takes longer to perform due to strict infection control measures. The department was offered a showroom CT scan unit and, by serendipity, had a vacant lead-lined room available. A quick decision was necessary without time to perform a full assessment of the CT unit, as it was believed that this unit could be used exclusively for patients with COVID-19. From conception, it took just 41 days for this new facility to be operational. At that time, this new unit underwent a rapid review of its location and operational protocols, and the department realized that there was not a need for resources dedicated exclusively to scanning patients with COVID-19. We modified our plan and focused this new resource on scanning the backlog of patients without COVID-19. The resource reallocation allowed the department to catch up on postponed cases that otherwise would have continued to be delayed.

The radiology department needed to provide imaging support for a multistory parking garage converted into an on-campus COVID-19 screening facility. We quickly deployed bedside radiography units from existing clinical environments to support this facility. However, with the introduction of federal community screening sites, there was no need for the screening facility or the deployed bedside radiography units. We reviewed and discussed the recent developments and decided to close the imaging spaces in the makeshift screening facility and redeploy the bedside radiography units to sites where there was a need, including a new isolation facility built in an open-air parking lot. The bedside units can be returned quickly should the COVID-19 screening facility reopen.

These examples illustrate the importance of being flexible and nimble yet systematic in reviewing every process within radiology. With this disciplined approach, it is possible to apply course corrections and move all members of the imaging service in the same direction.

The coronavirus disease 2019 pandemic, like other crises, requires dynamic and mobilized leadership prepared to manage adversity in a swift manner, with the flexibility to correct course. Appropriate and frequent communication through multiple approaches and streamlined, diverse leadership teams can optimize the teams' performance and the department's ability to best navigate the challenges of the pandemic.

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Abbreviations: COVID-19 coronavirus disease 2019

severe acute respiratory syndrome coronavirus 2