IMAGING 3.0 IN PRACTICE
November 2020 | Vol. 2 | No. 3

IMAGING3.0®

MEETING THE MOMENT

Taking decisive action in uncertain times

ACR® American College of Radiology

IMAGING 3.0 IN PRACTICE

Meeting the Moment

Taking decisive action in uncertain times

"In any moment of decision, the best thing you can do is the right thing. The worst thing you can do is nothing."
– THEODORE ROOSEVELT

How do we respond to a virus or other crisis that we've never encountered before? At times, we need to make decisions with incomplete information, weigh risks that are impossible to quantify, and attempt to navigate a stream of cascading events toward a desired objective.

As physicians, we feel most comfortable making decisions supported by "good data," resulting from investigation and analysis. But what if we do not know the relationship between a specific cause and effect? Worse, what if we are not aware of all the variables affecting our outcomes, the so-called "unknown unknowns"? During emergent crises, organizations are at risk for "analysis paralysis," but in the end, we may understand why things happen only in retrospect.

In the moment, leaders must act decisively, but rather than making broad, sweeping decisions with far-reaching effects, we must make smaller, more frequent decisions. Like baby steps along a hidden path, we must make the best decisions we can with available data while also relying on our experience. We will count on experts but must also avoid "entrained thinking" in which innovative solutions by non-experts are overlooked or dismissed. And perhaps most importantly, we must recognize that we will sometimes be wrong and be able to learn from our mistakes.

This collection of Imaging 3.0 case studies focuses on crisis management and the COVID-19 response. In it, you will find examples of how leaders have leveraged experience and creativity in the face of incomplete data to enable organizations to act decisively in these uncertain times.

While we can't anticipate every crisis that will come our way, we can put solid processes and plans in place to make sure that we're ready when the time comes to meet the moment.

U.S. Army Col. Eric Roberge, MD
Chief of radiology at Madigan Army Medical Center

Case Studies

SHARE YOUR STORY
Have a case study idea you'd like to share with the radiology community? To submit your idea, please visit acr.org/Suggest-a-Case-Study.

QUESTIONS? COMMENTS?
Contact us at imaging3@ACR.org

VISIT THE ARCHIVE
View *Imaging 3.0 in Practice* online at acr.org/InPractice

Case Study Published September 2020

Overcoming Adversity

As COVID-19 flared in New Orleans after Mardi Gras, one radiology department took swift action to deploy new strategies and rethink processes to keep people safe and boost morale.

KEY TAKEAWAYS

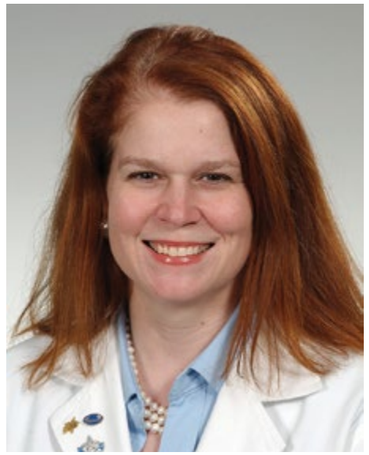
- A radiology chair and her team adopted rapid process improvements to respond to one of the nation's first COVID-19 hotspots.
- Clear communication that leveraged every channel available — like rounding, phone calls, EHR secure chat, and texting — was key to navigating the crisis.
- The team prioritized safety first for radiologists, technologists, and patients, implementing at-home workstations, staggered shifts, and revamped workflows.

Dressed in feathered costumes and sequins, throngs of revelers in New Orleans danced to the beat of marching bands, cheered flamboyant floats, and collected strands of gleaming beads as they celebrated the end of Mardi Gras on Tuesday, Feb. 25, 2020.

Not far away, in Ochsner Health System's 19 owned and operated hospitals across Louisiana and Southern Mississippi, frontline caregivers didn't realize that they were just weeks away from a tsunami of COVID-19 patients coming from the superspreader event on Fat Tuesday. The first Louisiana patient with COVID-19 was identified on March 9. By the end of April, there were nearly 30,000 cases and almost 2,000 deaths from COVID-19 in the state.

Dana H. Smetherman, MD, MPH, MBA, FACR, chair of the department of radiology at Ochsner Medical Center in New Orleans, led her radiology team through a deepening crisis as COVID-19 ravaged the region. "We didn't know it at the time, but Mardi Gras was a petri dish, and we started to witness epidemiology in real time," she says. "This virus moved through our community with mathematical precision. Before long, our mid-sized city was third in the country in both the number of confirmed cases and deaths per capita."

Smetherman has experience leading through crisis. She was on the front lines when Hurricane Katrina hit in 2005, breaching levees and causing widespread damage and deaths. She led her team of radiologists, technologists, and staff through the natural disaster's peak and its aftermath — ultimately guiding her department back to normal. These days, the U.S. is in the middle of a different type of crisis, and it is unclear how long it will last or what its final toll will be. And Smetherman is once again on the front lines of disaster, forging a new path forward for imaging services.



After the Mardi Gras COVID-19 superspreader event in New Orleans, Dana H. Smetherman, MD, MPH, MBA, FACR, led her radiology team in responding to the public health emergency.

Crisis Unfolding

Smetherman remembers the moment she first realized the magnitude of the health crisis sweeping her community. "I am a breast imager, but I still cover some general radiology shifts. I was on call the weekend before St. Patrick's Day. As I was reading, I was seeing one chest radiograph after another to rule out COVID-19," she recalls. "For me, it was then that I realized, 'This is going to be very different.' It was blowing up before my eyes."

Smetherman called on her experience working through the Hurricane Katrina disaster to rapidly develop a plan, marshal necessary resources, and galvanize her team to action. "As a member of the lead response team for Hurricane Katrina, I had familiarity with this feeling of waking up to a whole different world than what it was a few days ago. Some of the same skills — focusing on communication and safety and maintaining optimism — kicked in quickly," she says. "We knew it wasn't going to be easy and that we needed to quickly rethink many things we had been doing. But we decided: Let's focus on safety first and the other things will fall into place."

> "We knew it wasn't going to be easy and that we needed to quickly rethink many things we had been doing."
>
> –Dana H. Smetherman, MD, MPH, MBA, FACR

To advance that goal, Smetherman convened a meeting with hospital colleagues to devise a plan to optimize patient care. "I'm not only chair of radiology at our flagship hospital, I'm also associate medical director for several specialties, including emergency medicine, hospital medicine, and pulmonary critical care," she says. "As such, I was in close contact with other departmental leaders, and we realized it was not going to be business as usual. We worked together to think processes through and build a plan to safely provide imaging for every patient in the emergency department (ED) and hospital. We were fortunate to have existing strong relationships with other departments, so there was no question of getting buy-in. Everybody was on the same page." (Read more about Ochsner's success in the Imaging 3.0 case study "Collaborating Through Crisis" at acr.org/Collaborating-Through-Crisis.)

Rapid Process Improvement

When cases peaked in Louisiana, the hospitals in the Ochsner Health System were caring for more than 60% of the COVID-19 inpatients in New Orleans and more than 30% in the state. At Ochsner's flagship hospital, Ochsner Medical Center, cases initially doubled every two days. In the first two weeks, the hospital added a new COVID-19 service every day, and it quickly had to double its number of intensive care unit beds, build isolation rooms, and establish separate areas for negative and positive coronavirus patients in the EDs.

"Candidly, our situation was pretty dire, and we needed incredibly rapid process improvement to develop strategies to get through this crisis," Smetherman says. "We had to immediately figure out how the radiology department could get our density of outpatients down and still conduct urgent imaging tests safely, without further spreading the virus."

One challenge the radiology department faced was to institute a new ordering process and triage the outpatient schedule. "We've got patients scheduled for months out. Some are cancer follow-ups and others are people who've had back pain for six weeks and who don't have urgent imaging needs," Smetherman explains. "It was an all-hands-on-deck situation to figure out how to contact all of our patients and work with their providers to ensure we were only seeing stat patients, some of whom we knew were going to be COVID-19 positive."

With this in mind, Smetherman and her team immediately looked to secure additional personal protective equipment (PPE). But, as with health systems around the country, obtaining enough equipment for care providers was an urgent challenge.

"We leveraged our innovationOchsner partners to start 3D printing face shields, and we leveraged our community connections to get more PPE," Smetherman recalls. "We worked with state, local, and national governments to ensure that we had enough resources. As a system, we have robust analytics that we shared with government officials, so we could look at ventilator management across the whole city. We also have an active supply chain, so we started requesting additional ventilators before we even had the first case in the state."

Focus on Safety

At Ochsner, much of the change brought to bear under the stress of the crisis involved keeping people safe. To reduce the risk of infection among radiologists, the department was eager to deploy at-home workstations.

Staff radiologist Stephen I. Johnson, MD, says that keeping staff safe and continuing to provide top-quality, responsive service to referrers was key as COVID-19 ravaged the New Orleans region.

Initially, they deployed 15 remote workstations for a department of about 70 radiologists. Since they couldn't get at-home workstations for everyone, they staggered schedules, implemented social distancing in the reading rooms, and deployed virtual communications with technologists and referring clinicians to minimize the number of people coming in and out of the department and reading rooms.

"We first redeployed existing workstations from reading rooms with the highest density of radiologists and residents," explains Smetherman. "We prioritized those whose usual work assignments were most easily adapted to remote work — for example, those who did not need to do fluoroscopy, supervise contrast injections, or perform interventional procedures. Over time, we were able to purchase additional workstations, and every radiologist who wanted a home workstation was able to get one."

Despite uncertainty under highly stressful circumstances, the radiology department was committed to maintaining the quality and service that partners and patients trusted. Staff radiologist Stephen I. Johnson, MD, says, "When this public health emergency first started, there was a concern that we might lose quality as we shifted to remote reading, but that hasn't been the case. We've kept our staff safe while

> "We've kept our staff safe while delivering the same level of quality service and remaining responsive to referrers."
>
> –Stephen I. Johnson, MD

delivering the same level of quality service and remaining responsive to referrers."

Protecting the department's technologists was another critical goal. As section head of Ochsner's ultrasound department, Johnson's immediate concern was for the safety of the technologists who would be in prolonged close contact with COVID-19 patients. "Ultrasound studies typically take 30 or 40 minutes, and our techs are within an arm's reach of patients," he says. "Initially, the techs were apprehensive about getting COVID-19, but we had PPE, face shields, and safety measures. After we got through the worst of it, none of our techs tested positive for antibodies. Obviously, that means we did something right."

Johnson says that taking care of staff and listening to their concerns has been key to navigating a crisis of this magnitude. "We're asking our staff to do things that are scary and stressful. We have to make sure we're doing everything we can to protect them and also put them in a position of success," he says.

Communication Essentials

One of the most critical ways to ensure staff success during a crisis is what Smetherman calls over-communication. "You have to use virtually every channel available to you," she says. "I round a lot. I make sure I'm seeing everyone, and I ask them what they need. I'm on the phone, and I'm texting people. When I think about how I have approached leadership in this crisis, it's: communicate, communicate, communicate."

Smetherman and her team hold virtual staff meetings at least once a week, and they use the hospital's electronic health record secure chat capability to communicate with technologists and colleagues across the system. The health system is also using video conferences for leadership calls and multidisciplinary meetings.

The use of technology has helped the team stay in touch while limiting personal interaction that can put people at risk. However, Smetherman says, "As a leader, your physical presence in a scary situation like this is absolutely critical. It would be difficult to lead something like this remotely. Your team has to know that you're there for them; you're alongside them. You can't use your residents and techs as human shields. You have to show that the safety of your people and patients is your first priority."

Morale Boost

Despite all of the safety protocols in place, Smetherman recognizes the staggering psychological effects of the pandemic on her team. "We've never had to face this kind of epic threat," she emphasizes. "There's a high rate of death, it's contagious, and also our knowledge is constantly evolving. We are accustomed to having rigorous scientific data, and the uncertainty of this situation is troubling. When I was rounding in the early days of this, I found people in tears in the reading rooms."

Having overcome disasters like Hurricane Katrina in the past, Ochsner has a robust stress and psychological assistance program in place for employees. It includes quiet spaces, an employee hotline, and a social worker or psychologist on every rounding team. Smetherman has encouraged radiology team members to take full advantage of these resources. "Everybody's doing the best they can right now. We have to be kind to each other and realize that we're going to be stressed out and things are not going to be perfect. But we're all in this together."

Smetherman says that recognizing success and practicing gratitude helps keep morale high. "In our meetings, we not only talk about the number of patients who have died or who are on ventilators, but we talk about the number of patients who have been discharged," she says. "We celebrate patients coming off of the ventilators and the decreased need for ventilators as we manage more patients with non-rebreather masks."

While celebrating wins is important, Smetherman also says that it's critical to remain humble, especially in a situation like the current pandemic, where so much is unknown. "I've had to acknowledge that my decisions are a best guess," she says. "I didn't have months to come up with a fabulous strategy and implementation plan. I've had to let my team know over and over again that I'm not going to be perfect, and I'm going to make mistakes. In a crisis, people at least appreciate that you're able to show your own clay feet. Everybody looks to you as the leader, and if you are uncertain or stressed, it trickles down. We have to stay positive if we're going to win this thing."

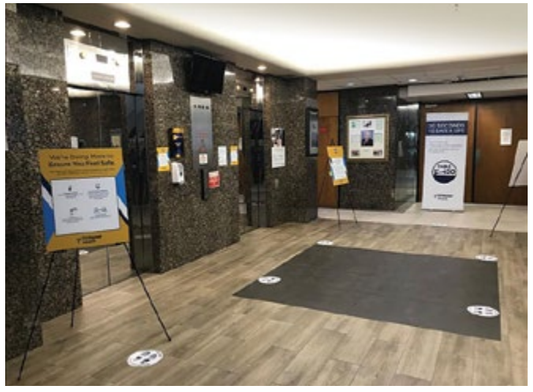


PHOTO COURTESY OF OCHSNER MEDICAL CENTER

Ochsner Medical Center took critical steps to ensure that patients who come in for care during the pandemic feel safe.

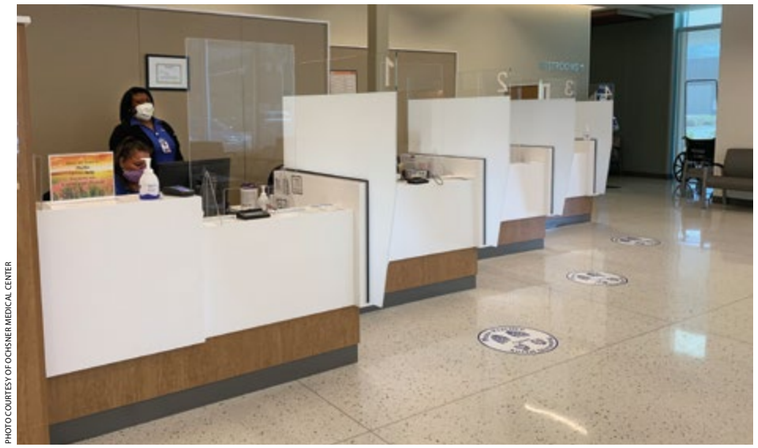


PHOTO COURTESY OF OCHSNER MEDICAL CENTER

Ochsner put markers on the floors for social distancing and installed Plexiglas at check-in desks.

Improvement Opportunity

After COVID-19 cases started decreasing in New Orleans, the radiology team turned its focus to restarting imaging services and making sure patients feel well cared for and safe. They put markers on the floors for social distancing and installed Plexiglas at check-in desks. At all of their sites, patients are greeted with consistent, Ochsner-branded stations for temperature and symptom checks. Masks are mandatory.

During the time when outpatient volumes were lower, Smetherman and her team worked to rapidly pilot a new workflow for outpatient imaging centers. They asked themselves questions like: How do we handle things like patients drinking contrast fluid? How much time will it take us to clean the units in between patients?

"We are trying to refrain from having patients in our waiting rooms," Smetherman explains. "We ask patients to check in remotely and wait in their cars until they get a text message. Then a technologist meets them in the lobby for a temperature and wellness check and brings them straight back for their imaging; they change in the room and then go straight out after their exam is done. We have Ochsner-branded signs across our enterprise to let patients know the imaging exam area has been cleaned. We have whiteboards outside of the door that tell us the dwell time in the room, so we don't bring the next patient back until we know it's safe."

> "It's not about taking old processes and trying to make them work. We must jump right into figuring out how to optimize the new."
>
> –Dana H. Smetherman, MD, MPH, MBA, FACR

Smetherman also notes that the pandemic has ushered in some welcomed advances. Her motto: "Never waste a good crisis." This emergency has fast-tracked some initiatives, like telehealth and video visits, that the group had been eager to implement. And the radiology department continues to roll out home workstations in a phased approach. "We're increasing the number of people who can work remotely because we don't know what's going to happen in the future," Smetherman says. "Physicians are a tough group; they want to be there for their patients. This will be an important tool to help us communicate with referring providers and serve our patients going forward."

Forward Momentum

It has been said that, "The secret of change is to focus all of your energy, not on fighting the old, but on building the new." Smetherman echoes that sentiment when asked about transitioning to the next phase of the pandemic and developing strategies to deliver imaging services going forward.

"The way to succeed is not to try to rebuild the past," she says. "Change is hard, but we must build for a new future. It's not about taking old processes and trying to make them work. We must jump right into figuring out how to optimize the new. Challenges will undoubtedly arise, as will the need to adopt different leadership strategies. Nonetheless, I am optimistic that the lessons learned and knowledge gained in this first skirmish of our battle with COVID-19 will serve us well as our specialty and community navigate the uncharted waters ahead."

By Linda G. Sowers

Now It's Your Turn ››››

Follow Smetherman's guidance to lead your organization through crises, and tell us about your successes and lessons learned on Twitter with the hashtag #Imaging3 or at imaging3@acr.org. Here are her words of advice:

- Communicate a clear vision for moving forward. "In our case, our vision is to embrace the new right now. It's going to be hard; it's going to be rocky; there are things that won't work perfectly. But we're going to link arms and figure it out together."
- Prioritize the safety of colleagues, employees, and patients. "We have to jump in, act quickly, and make everybody feel safe. We can't have people feel like we are not as safe as the grocery store."
- Get comfortable with rapid change. "As physicians, as scientists, as radiologists, we're used to having robust data on which to act. That's not the case here. The disease is changing in ways we can't anticipate. There are lots of unknowns. We have to get comfortable with rapid process improvement and failing fast. If it's not working, we just have to move to something else."

Case Study Published May 2020

Crisis Management

As the COVID-19 pandemic wears on, private-practice radiology leaders take action to ensure quality patient care – and the long-term viability of their businesses.

KEY TAKEAWAYS

- Private practices across the nation are planning ahead for a steady rebound to optimal patient volumes by the end of the summer.
- While the first wave of COVID-19 infections persists, practice leaders are volunteering for pay cuts, deferring bonuses, and shifting vacation time to protect staff financially.
- To bridge challenging financial gaps, independent practices may wish to explore applying for a Small Business Administration loan.

During the early days of the COVID-19 pandemic, healthcare systems worldwide were inundated with sick patients. As infections mounted into the spring, the medical community was forced to divert resources. Combined with an environment in which unemployment rose to levels not seen since the Great Depression and many found themselves without insurance coverage, specialties like radiology saw a drastic reduction in patient volumes. For radiology, this meant a precipitous drop in non-urgent imaging and image-guided procedures, which make up a significant portion of overall patient volume and revenue.

Although some intrepid radiologists entered the front lines of the COVID-19 wards (see the "Answering the Call" Imaging 3.0 case study at acr.org/Answering-the-Call), seeking to lend their expertise where they could, most imaging professionals had to decrease their involvement in patient care. For private-practice radiologists in particular, this resulted in rescheduling many imaging exams, indefinitely postponing others, and planning ahead to keep their businesses afloat through an uncertain time.

Samir B. Patel, MD, FACR, value management program founder and executive board member at Radiology, Inc., in Mishawaka, Indiana, notes that his group has successfully navigated past challenges through resilience and strong leadership.

Delaying Care

"Our independent, private practice has been in existence since 1904," states Samir B. Patel, MD, FACR, diagnostic radiologist, value management program founder, and executive board member at Radiology, Inc., a private radiology practice in Mishawaka, Indiana. "The practice has endured the flu pandemic of 1918, the Great Depression, multiple recessions, a spinal fungal meningitis epidemic in 2012, and two world wars. Prior challenges were successfully navigated through resilience and strong leadership, which we are confident will lead us past this pandemic."

It's this kind of determination that has led Patel, who is also a board member of Beacon Health System, the region's largest healthcare entity composed of seven hospitals, and his colleagues at Radiology, Inc., to work around the clock managing this crisis, from both a patient care and a financial standpoint. In addition to Beacon Health System, the practice provides professional services for three hospitals from two other health systems as well as a multispecialty independent clinic — each of which has different policies in terms of exam rescheduling and patient management.

"Overall, our imaging volume is down about 45%," Patel explained at the time. "We have not rescheduled screening exams, electing instead to suspend them indefinitely. This is because it is difficult to predict if volume levels will remain normal because of multiple variables. Other exams will be rescheduled in accordance with individual sites' global response plans, which include imaging and non-imaging procedures." Beyond this, Patel notes, radiologists are reviewing previously scheduled outpatient imaging exams to determine their urgency. If delaying an exam would negatively impact a patient, typically determined after direct communication with the ordering provider, the procedure would be performed as scheduled.

> "The more that radiology practices can assure patients of their return to a safe environment, the better."
>
> –Robert S. Pyatt. Jr., MD, FACR

When it comes to rescheduling exams, many practices across the country aimed to ramp up appointments once newly diagnosed COVID-19 cases began to decline. Robert S. Pyatt Jr., MD, FACR, past chair of Chambersburg Imaging Associates, an 11-person group in south-central Pennsylvania, and chair of the radiology department at WellSpan-Summit Hospitals, anticipated a return to normalcy in the early summer. "In our county, COVID-19 cases are increasing to some degree," noted Pyatt, who is also chair of the ACR's Commission on General, Small, Emergency, and/or Rural Practice. "But we are hoping the statewide stay-at-home orders will be lifted by early June."

Although the majority of Chambersburg Imaging Associates' routine procedures have been rescheduled, Pyatt anticipates that some rescheduled patients may be reluctant to return until they feel that the crisis is truly over, which may push back their appointments even further. Because of this reality, Pyatt sees his group's approach as a phased-in return to normalcy. "It will take a majority of patients some time to feel that it is safe enough to return," notes Pyatt. "The more that radiology practices can assure patients of their return to a safe environment, the better."

Daniel Ortiz, MD, musculoskeletal and general radiologist at Summit Radiology Services, P.C., a 25-person independent practice in northern Georgia, echoes the merits of this phased-in approach to patient scheduling. "Temporary care delay is completely appropriate and necessary," states Ortiz, who is immediate past chair of the ACR's Resident and Fellow Section. "But eventually, we will have to adapt to an intermediate phase, with protections in place that ensure patients can get their routine care." Ortiz noted that summer would make for a good target to be operating at, or close to, optimum patient volume.

Adjusting Finances

Care delays not only have ripple effects for a patient's long-term health but also for the ongoing viability of practices of all sorts, particularly private practices. To contend with monetary shortfalls, groups across the nation have adopted a broad array of approaches, from instituting hiring freezes and salary cuts to, in some cases, furloughs and layoffs.

For Pyatt's group, which sees itself as an extended family and maintains a culture of inclusiveness, laying off employees hasn't been an option. "We have looked to decrease multiple expenses," notes Pyatt. "These include outside moonlighter radiologists on weekends and teleradiology expenses. We have also eliminated bonuses and dividends from joint ventures, along with reducing or eliminating partner paychecks in exchange for funding their pensions."

To smooth out any bumps in the road ahead, the practice leaders at Summit Radiology Services have started at the top when it comes to making sacrifices. "My practice's partners chose to defer their bonuses and take a base salary cut to preserve the salaries of associates and employees," explains Ortiz. "This stands in stark contrast to some of my friends in other groups who have experienced up to an 85% salary cut. Given the low volumes and need for fewer radiologists at this time, the partners are being given extra time off since they took the financial impact."

As for part-time staff, Pyatt is looking to keep them in-house as well. "We plan to use our part-time radiologists two weeks per month in May and June, and hopefully more in July," he says. "It would be difficult for them to find new jobs right now given the circumstances, and since we value them as key members of our team, we can provide some income each month."

Robert S. Pyatt Jr., MD, FACR, chair of the radiology department at Wellspan-Summit Hospitals in Chambersburg, Pennsylvania, predicts that some rescheduled patients may be reluctant to return until they feel that the crisis is truly over.

Pyatt thinks that although it will take at least a few months for patient volumes to return to form, once the first wave of the COVID-19 pandemic abates, it will have to be all hands on deck. "Our radiologists and staff members are being advised to plan on working longer hours on weekdays and more weekend hours once patients begin returning. With that, there is concern for increased burnout, as less vacation time will likely be allowed during the ramp up." (Consult ACR's Radiology Well-Being Program at acr.org/Well-Being for tips on how avoiding burnout.)

Anticipating Volumes

While some groups are anticipating that patient volumes will rise steadily to meet past levels, others suspect that patients may be slow to return to imaging for a number of reasons, including a loss of health insurance due to unemployment or out of a fear of contracting the illness until a vaccine is approved. If patient volume doesn't rebound

> "Our current plan anticipates a return to near-average volumes by balancing the factors driving down volumes."
>
> –Daniel Ortiz, MD

over the next 12 months or more, says Patel, "our practice leaders, with input from all of our team members, would discuss how to right-size the organization."

Ortiz believes that, although patient volumes might not rise precipitously in June, radiology will remain in a strong position coming out of this first wave of the epidemic. "Our current plan anticipates a return to near-average volumes by balancing the factors driving down volumes, such as a loss of insurance coverage and attendant economic concerns, and those driving them up, such as a backlog of canceled routine cases."

Like Ortiz, Pyatt is optimistic about his group's ability to endure the next year or more. "Safety-wise, seven of our 11 radiologists have workstations at home, so that will prepare us for the next wave of infection. Our part-time radiologists are flexible with their work hours, and our partners will take significant pay cuts to weather the low points that might happen in the late fall or winter."

Daniel Ortiz, MD, musculoskeletal and general radiologist at Summit Radiology Services, P.C., in northern Georgia and immediate past chair of the ACR's Resident and Fellow Section, is optimistic about his group's ability to endure.

Bridging the Gap

Beyond internal bookkeeping and reading scans from home, applying for available loans can mean the difference between private practices remaining open and having to close shop. ACR has posted information on its website about how to apply for a Small Business Administration (SBA) loan to bridge challenging financial gaps. As the ACR website states, the Coronavirus Aid, Relief, and Economic Security Act, or CARES Act, revised eligibility criteria, allowable uses, and other considerations to make SBA's programs more inclusive, expansive, and useful.

Tim Gutsie, practice manager at Chambersburg Imaging Associates, believes it is worthwhile to explore the details of financial rescue packages. "We applied for and anticipate receiving our SBA loan shortly," Gutsie says. "At that point, we will be able to pay our part-time radiologists for the next eight weeks."

And more help could be on the way if radiologists are allowed to begin billing for evaluation and management services, as ACR has been advocating. In a letter to the Centers for Medicare & Medicaid Services, William T. Thorwarth Jr., MD, FACR, ACR chief executive officer, requested that radiologists be granted more authority as "treating physicians." If approved, such a move could put radiologists on equal footing with primary care physicians and other specialists, thereby allowing them to take on a larger role in patient care.

As Patel sees it, the approach could improve the standing of radiologists, making them even more crucial members of coordinated care teams. "Allowing radiologists to successfully bill for evaluation and management services, along with ordering exams in the outpatient setting through direct patient consultation, would enhance our visibility, increase our accessibility, and decrease the burden on primary care providers," Patel says. Pyatt agrees: "The more that interested radiologists can help fill gaps as treating physicians, the more it could help our specialty in many ways, including some potential degree of financial benefit."

Looking Ahead

Whether or not radiology's responsibilities expand during this pandemic, ensuring that patients are at the forefront of all decisions and cultivating a strong, empathetic work culture are both of supreme importance. "It's imperative to maintain a longer horizon view that we'll get through this together," suggests Pyatt. "Communicate often and work as a team. Every time I talk with staff, I ask how they are doing. I know every one of my staff and want them to know that I care about their safety and their important work for our patients, as well as for their families' safety at home. If you communicate well," Pyatt concludes, "the group will be happier overall, and that will translate to quality patient care and future success for the group."

By Chris Hobson

Now It's Your Turn »»»

Follow these next steps on the path to business viability during a crisis and tell us how you're doing on Twitter with the hashtag #Imaging3 or email us at imaging3@acr.org:

- If you are a practice leader, consider protecting your full-time staff financially by deferring bonuses or exchanging a reduction in pay for perks, such as extended vacation time or pension funding opportunities.
- Work closely with your practice's business manager to apply for and secure financial relief, such as from an SBA loan.
- Prepare staff for intermittent periods of working extended hours both during the week and on weekends once patient volumes resume, making sure to explore strategies for mitigating physician and staff burnout.

Case Study Published February 2018

Harvey's Heroes

Dedicated Texas radiologists spend days and nights delivering patient care during Hurricane Harvey.

KEY TAKEAWAYS

- Radiologists at Baylor College of Medicine and residents at Ben Taub Hospital remained on the job for over 60 straight hours during Hurricane Harvey to ensure patients received quality care.
- While facing flooding and food shortages, the team was forced to relocate radiology equipment during the storm.
- To facilitate communication and physician relief during a disaster, radiologists recommend developing contingency and emergency plans in advance.

Hurricane Harvey swept toward Houston in the summer of 2017 as a Category 4, the first storm of that magnitude to hit coastal Texas since 1961. As Harvey closed in, local radiologists readied for their shifts — uncertain of what the storm might bring.

On the night of Aug. 25, assistant professors of radiology Ann Marie Marciel, MD, PhD, and Sangeetha Kumar, MD, arrived at Baylor College of Medicine, where they regularly read images and support five local hospitals. One of these hospitals is the adjacent Ben Taub Hospital, where residents Varshana Gurusamy, MD, and Joshua Carlton, DO, also prepared for the storm.

Over the next few days, the team worked together to read images and work with other departments to overcome unforeseen challenges, ensuring that patients were cared for throughout the storm. Their efforts not only made radiology more visible but also helped patient care continue steadily during a time when it was gravely needed in Houston.

"While no one wants to endure a disaster like Harvey, the radiologists turned it into a positive opportunity for our specialty and for other fields to remember that we are part of a team treating patients," Marciel says.

Ann Marie Marciel, MD, PhD, assistant professor of radiology at Baylor College of Medicine, and her colleagues read images and supported local hospitals for 60 hours during Hurricane Harvey.

Storm Preparedness

A doctoral candidate at Baylor when Tropical Storm Allison flooded the campus in 2001, Marciel knew that Harvey might force her to stay an extended period of time at the hospital. To prepare, Marciel packed food and clothing for four days. Kumar, Gurusamy, and Carlton all took similar actions before heading to work.

Intent on getting there, Gurusamy arrived at Ben Taub Hospital two hours early for her Friday night shift and recalls checking the weather whenever possible. "I remember going out at midnight on Saturday and watching the water creep toward the doors," she says. "Nearby picnic benches were completely submerged; we were really only accessible by boat. That's when it became clear that we were going to be stuck in the hospital at least overnight."

While it quickly became impossible to leave the hospital, local patients still managed to arrive. Gurusamy and Carlton took turns sleeping to provide uninterrupted care, and the two met daily with other physician leaders to strategize and share information about the storm, hospital, and patients.

"It was tiring and at times scary," Gurusamy says, "but I did not have a single negative interaction with anyone. I really wanted to become a doctor to help people, and this was a situation where I could see how much that help was needed."

Shane P. Jenks, MD, assistant professor of emergency medicine at Baylor and emergency medicine assistant program director at Ben Taub, managed the emergency department during the storm and was impressed with how quickly the radiologists read images under the circumstances. "With everything going on, I

didn't think a radiologist would be available in the middle of Saturday night, but I decided to look into it," Jenks says. "I ordered the MRI and received the results almost immediately."

Communication Plan

Meanwhile, across the street, Baylor College of Medicine stood like an island as the water rose around it. Concerned that the rising water and wind could cause a power outage, Marciel and Kumar worked with the information technology (IT) team, which includes both radiologists and IT specialists, to identify alternative ways to access images in the event of a power failure.

"We needed to be able to view the images from multiple sites, so we had to make sure we had a backup viewing system in place to access those images, even if different parts of the system went down," explains Marciel, who along with Kumar remained committed to supporting the residents and patients at Ben Taub and the other hospitals they serve.

While Baylor never completely lost power, other hospitals that it serves experienced electrical failures. "When one hospital lost the ability to receive reports and the phone lines were down, we used encrypted email messages to stay HIPPA-compliant," Marciel explains. "The technologists on the other end entered a username and password to view the email and attachment. They then printed the reports and hand-delivered them to the appropriate doctor, before scanning them into their PACS."

In addition to finding creative ways to communicate with their hospitals, the radiologists developed additional communication strategies that allowed other employees to provide assistance to the radiologists remotely.

"We identified key players among the medical directors and IT leaders, and the chair of radiology was instrumental in providing important updates," Marciel says. "We formed groups that disseminated information about which roads were clear so that relief teams knew when they would be able to travel, and three times a day, our chairman sent communications about what was going on at every site. Communication flowed organically thanks to everyone's willingness to respond throughout the disaster."

Flood Response

As Baylor's radiologists strove to maintain communication with other medical facilities and employees, Ben Taub Hospital's basement became waterlogged. "At around 2 a.m. on Sunday, we were told that a pipe had broken in the basement and that the basement was off limits," Carlton recalls. "The pharmacy and the kitchen are in the basement, so we no longer had access to the food services there."

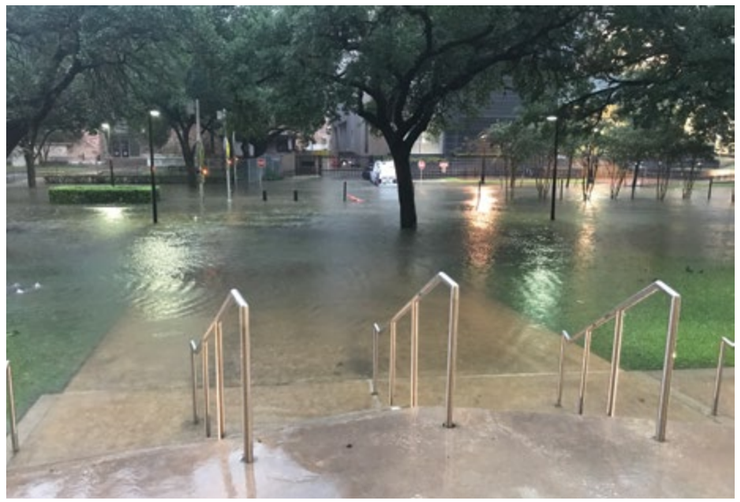
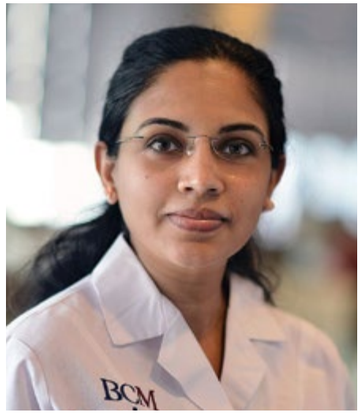


PHOTO COURTESY OF BAYLOR COLLEGE OF MEDICINE

As Hurricane Harvey moved through Houston and water levels rose, medical facilities were eventually rendered inaccessible.



Sangeetha Kumar, MD, assistant professor of radiology at Baylor College of Medicine, stayed in constant communication with the residents at Ben Taub Hospital throughout the storm.

The hospital began rationing food, giving patients priority. With their personal food supplies waning, many hospital employees resorted to eating non-perishable items like peanut butter, crackers, canned fruit, and canned juice. The flooding and food loss forced Ben Taub Hospital to stop taking new patients Sunday night, and talk of evacuating the facility began.

As the hospital struggled to recover from the flooding, personnel prioritized call rooms for those who needed showers, leaving residents searching for other places to sleep. "The first sleep shift I took was in a pediatric emergency exam room, but it was nearly impossible to sleep between tornado warnings and hospital noise," Gurusamy says. "I probably got between three and four hours of sleep the whole time I was at the hospital."

With rotating shifts, as one resident attempted to sleep, the other read images alone. "It was overwhelming," says Gurusamy, a second-year resident. "On top of complicated studies ordered by the medical intensive care unit, the emergency department ordered an emergent cord compression spinal MRI, a study I hadn't learned to read yet. The attendings at Baylor remained supportive, however. I called, and they walked me through everything I needed to do."

Reading Room Evacuation

Soon, Baylor faced its own challenges with flooding. Baylor had installed floodgates in the basement after Tropical Storm Allison, so the radiologists didn't anticipate flooding near their main reading room. But on Saturday, the wall near their workstations began leaking, and it became clear that they would need to evacuate the area.

The team found a room on the floor above with ports for three workstations. With the elevators out, they had to lug their equipment up the steps. As the radiologists shared workstations in their makeshift reading room, the technologists helped ensure that no exams were overlooked.

"It was challenging to share workstations because we had to log in and out each time we received a page, and we were sometimes paged at the same time. But we never lost connectivity," says Kumar, who applauded the hospital's maintenance crew for diligently mopping and pumping water out of the basement to save their primary reading room from total destruction.

Varshana Gurusamy, MD, a second-year resident, received constant support from the radiologists at Baylor College of Medicine as she encountered images she had not yet begun to read in her medical training.

Even as Marciel and Kumar evacuated their reading room, they never lost touch with the residents at Ben Taub. "The moment I saw the leak next to the reading room on Saturday night, I gave my mobile number to both of my residents," Kumar says. "In case I had to vacate the room, I wanted them to still have immediate access to me."

Gurusamy was particularly grateful for this. "Dr. Kumar and Dr. Marciel were always reachable. I don't know how or when they slept," she says. "I can't downplay how encouraging it was when we could reach them at any time, day or night."

Silver Lining

The residents were finally relieved from Ben Taub, and Kumar was able to leave Baylor on Monday, Aug. 28. Marciel headed home on Tuesday. All were exhausted but optimistic.

"You can't control what Mother Nature is going to do, but with everyone working together and stepping up to do their part, we made it through without compromising care," Gurusamy says. "It was truly amazing and positive to see people come together to help one another."

Carlton echoes this sentiment and says that the experience gave him a renewed appreciation for the medical team. "As a radiologist on a typical shift, people come with questions, and there's not much connection. But when you go through a crisis together and everyone is cooperative, considerate, and professional, you develop a sense that you are all on a team and can rely on each other," he says.

While Hurricane Harvey wreaked havoc on the Houston area, the radiologists learned a lot from the experience: most importantly that solid communication is essential for maintaining effective patient care during a disaster.

"Determine who will be your central communicator and how you will disseminate information before the situation gets bad," Marciel suggests. "Think outside the box, and try to have a good attitude. Tremendous attitudes and an overall willingness to communicate are what got us through the crisis."

In anticipation of the flooding, Joshua Carlton, DO, a third-year resident, packed extra food, personal clothing, and study material before arriving for his shift at Ben Taub Hospital.

The experience also gave the radiologists a renewed connection to their patients. "During a natural disaster, it becomes even more apparent that radiology is essential to diagnosis and treatment," Marciel says. "It helps you refocus and understand that patients and physicians are waiting for these reports, regardless of whether it is a normal day or if there is a hurricane."

By Chelsea Krieg

Now It's Your Turn ›››

Take these steps to begin creating an emergency response plan and tell us how you did on Twitter with the hashtag #Imaging3 or email us at imaging3@acr.org:

- Organize an emergency contact communication team. Decide who will disseminate information during a disaster, identify roles, and collect multiple forms of contact information to use in case the first is inaccessible or unavailable.
- Work to make remote access available for all practicing radiologists in case entering and leaving medical or research facilities becomes impossible.
- Coordinate with referring providers and other medical staff to determine the needs of each department and discuss how working collaboratively might benefit the emergency response.

Case Study Published July 2020

Safely Reopening

A New York radiology department collaborates across a large enterprise to safely resume elective and non-urgent imaging following the initial COVID-19 surge.

KEY TAKEAWAYS

- Radiologists at NYU Langone Health began preparing to reopen the imaging department for non-urgent and elective exams shortly after the first COVID-19 surge began in March of 2020.
- The department, which includes 223 radiologists and 1,200 staff members who work across 56 sites, used a collaborative approach to reimagine its operations in the post-surge era.
- The team adopted new waiting room procedures, accelerated imaging protocols, and implemented work-from-home efforts for social distancing. It expects to maintain several aspects of the new workflow long after the pandemic.

In March of 2020, NYU Langone Health, like hospitals nationwide, became overwhelmed with COVID-19 patients, forcing it to concentrate its resources on caring for patients with the disease. As part of the response, the hospital's radiology department followed national guidelines to postpone non-urgent and elective imaging exams. But even as radiology's patient volume plummeted more than 60%, the imaging team began planning for the department's inevitable reopening — work that is paying off with a resurgence in volume and a more efficient workflow that is expected to endure long after the pandemic.

Just a week after New York's stay-at-home orders took effect in mid-March, Michael P. Recht, MD, Louis Marx professor and chair of NYU Langone's department of radiology, sent an email to his team of 223 radiologists and 1,200 staff members who work across 56 imaging sites. He explained that the department would eventually reopen but would need to significantly change its workflow for staff and patient safety in the post-surge era. "I wasn't sure patients would want to come back given the safety concerns," Recht says. "But both our faculty and staff were committed to reimagining the department's operating procedures, so we could safely reopen."

With his team on board with returning to work, Recht made it a priority to involve everyone — including radiologists, technologists, receptionists, schedulers, and IT experts — in the reopening efforts. "To be successful, you need to have everybody engaged, and you need to have the experts' opinions," Recht explains. "For instance, I've never been a scheduler, so we needed to hear from our schedulers about how we could alter our process to keep everyone safe. Radiology leadership wouldn't have gotten it right without including all of the members of our team."

Michael P. Recht, MD, Louis Marx professor and chair of NYU Langone's department of radiology, knew the department would need to significantly alter its workflow to keep patients and employees safe in the post-COVID-19 surge era.

Gathering Information

Recht appointed Gregory Chang, MD, MBA, professor at NYU Grossman School of Medicine and associate chair of outpatient imaging and strategy at NYU Langone; Ankur Doshi, MD, associate clinical director of radiology informatics at NYU Langone; and Hersh Chandarana, MD, associate chair of clinical and translational research, to lead the planning efforts. These efforts involved collaborating with team members across locations on everything from reconfiguring waiting room procedures to developing more efficient imaging protocols.

To ensure everyone had a voice in the planning, 140 team members representing all areas of the department's operations were organized into nine committees. Some of the committees were modality specific while others focused on processes, including leveraging the patient portal for contactless patient scheduling, impacting all of NYU Langone's imaging sites. Each committee convened independently through virtual meeting technology to discuss things like extending appointment times to allow for disinfecting between patients and updating protocols for more efficient imaging.

> "We had team members from Long Island, Staten Island, Manhattan, Brooklyn, and our other affiliate locations working together to develop a uniform approach to reopening the radiology department."
>
> –Ankur Doshi, MD

Once a week, all of the committees gathered together virtually to share and adopt ideas. "Our team is spread out among different sites, and each site operates a little differently," Doshi notes. "We had team members from Long Island, Staten Island, Manhattan, Brooklyn, and our other affiliate locations working together to develop a uniform approach to reopening the radiology department."

Reducing Wait Times

Many of the changes that the team made were aimed at maintaining social distancing among patients and between patients and staff, particularly in the waiting rooms. To reduce the number of patients in the waiting rooms, the team worked with radiology's IT department to integrate a text messaging system into the electronic health record. Now, they ask patients to wait outside or in their cars and use text messaging to keep them informed. When the technologists are running behind, they use the system to send alerts to patients and ask them to wait until they receive another text message to enter the imaging center. They meet patients who are unable to receive text messages at the door with information about wait times.

"For the longest time, I've been trying to replicate what the airlines do to keep flyers updated about flight delays," Recht says. "It's so hard when a patient gets to the imaging center and they're told that we're running behind but they have no idea how long the wait will be. Keeping patients informed through text messaging is really valuable, and it's something that we're working to refine, so we can be as accurate as possible when we tell patients the expected wait times."

Another way the team has reduced the number of patients in the waiting rooms is by uploading patient intake forms onto the patient portal. When patients call to make appointments, the schedulers ask them to complete the forms in the portal prior to their appointments. If patients aren't already active in the portal, the schedulers follow a script that encourages patients to use the portal. Once patients agree to use the portal, the schedulers can easily send them a link and walk them through the process to activate the portal and complete the forms.

If patients decline to use the portal, the schedulers offer to email the forms and ask them to bring the completed documents to their appointments. "We encourage patients to do the paperwork electronically, so they don't have to spend time in the waiting room unnecessarily handling paper," Chang explains. "We want to decrease the amount of contact that patients have with each other and with our staff to make it as safe as possible."

Screening Patients

The team has also implemented pre-appointment patient screening as a safety precaution. When patients call to schedule their appointments, the schedulers ask them questions to rule out COVID-19. These questions include whether patients have tested positive for the virus and whether they are exhibiting any of the symptoms that the Centers for Disease Control and Prevention has outlined for the virus. When patients arrive for their appointments, designated screeners stationed at the door of each imaging center ask them these questions again and take their temperatures.

Ankur Doshi, MD, associate clinical director of radiology informatics at NYU Langone, co-led the department's COVID-19 reopening plans across multiple locations.

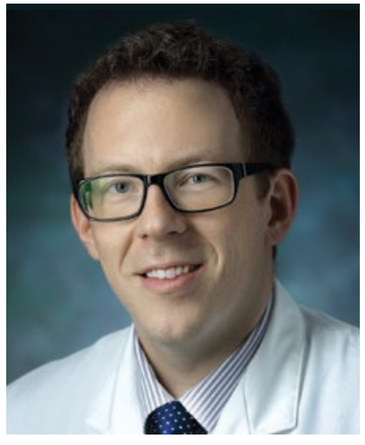
If a patient presents with two or more COVID-19 symptoms or if a patient indicates that they have tested positive for the virus, the imaging team takes them to a separate area within the imaging center for their exam. "We thought long and hard about whether we should be imaging COVID-positive patients," Recht says. "We decided that because our emergency rooms are overwhelmed, we had a responsibility to care for these patients. We have made sure our team has the necessary personal protective equipment to image these patients safely and appropriately in our outpatient centers."

Whether patients have COVID-19 or not, the radiology team knew it needed to be diligent about cleaning the exam rooms and imaging equipment to reduce the chances of spreading the virus. Through conversations that involved the technologists and other staff, the group decided to lengthen

exam times to allow for cleaning between appointments. "The teams worked together and came up with the length of time for each type of examination: We added 10 minutes to our MRs and diagnostic mammograms and five minutes to our CTs," Recht says. "Since reopening, we've continued to meet with our outpatient staff and have found that we've become so efficient that we don't need as much time as we thought for each exam. We've actually started cutting back the length of time designated for each exam."

Updating Protocols

While the team knew it needed to allow more time for cleaning, it also took measures to shorten some exams to reduce contact duration. Jan Fritz, MD, associate professor of radiology at NYU Grossman School of Medicine and chief of the division of musculoskeletal radiology at NYU Langone, worked with Timothy Shepherd, MD, PhD, assistant professor in the department of radiology at NYU Grossman School of Medicine, to co-lead a committee of advanced technologists that analyzed the protocols for the most common MRI exams, including musculoskeletal and neuro, and considered ways to reduce the image acquisition time without sacrificing image quality. "With COVID-19, we had a lot of idle scanners," Fritz explains. "We took advantage of the downtime to look at our protocols, and we devised strategies to reduce the image acquisition time using the latest acceleration techniques."



Jan Fritz, MD, associate professor of radiology at NYU Grossman School of Medicine and chief of the division of musculoskeletal radiology at NYU Langone, co-led a committee to analyze the protocols for the most-common MRI exams.

Fritz and his colleagues had been researching ways to accelerate acquisitions to improve tolerability for patients with painful conditions, reduce patient anxiety, increase accessibility, limit motion artifacts, and decrease the need for sedation and anesthesia even before the COVID-19 pandemic, but some of the department's radiologists were reluctant to adopt new protocols because they were used to doing things their way. The pandemic motivated the team to establish standard protocols across the enterprise, Recht says. "We had an inclusive process with a committee that included representatives from every campus and every subspecialty," Fritz explains. "We agreed on protocols for each body region, and then everybody worked through their local teams to get the protocols approved."

With the new protocols in place, the team has accelerated the image acquisition time between 25% and 75% across the board without reducing the number of sequences or compromising the image quality, Fritz says. "COVID-19 has been a sad situation, but it has been a good situation in that the radiologists were able to come together to agree on one set of protocols to use at each site," he says. "Now we know we are using standard protocols at each of our sites based on best practices, which we believe is a good thing for our patients. It ensures patients undergo the same high-quality MRI examination regardless of the site, standardizes the exam times to make scheduling easier, and helps the interpreting radiologists read the exams more efficiently because the protocols are all the same."

Working Remotely

While many of the measures the team has implemented focus on reducing interaction among patients and between patients and staff, it has also worked to limit the amount of interaction among employees. Recht says that technologists and other staff have separated their computers to ensure that they don't have to gather around the same desk. Sites have also designated team members who help keep staff from crowding together. "The architecture is different at each of our imaging centers, so we have really relied on our local teams to address social distancing at each of their sites," Recht says.

To further reduce interaction among employees, the team also instituted work-from-home opportunities for radiologists and other team members. Before the COVID-19 pandemic, the department had about 50 remote workstations among its 223 radiologists. But as soon as the pandemic emerged, Recht worked with the department's IT team to secure nearly 100 additional workstations so that most radiologists could work remotely. "Allowing people to work from home and have flexible work hours is something that is going to endure," Recht says. "We will still need to have a presence in our hospitals and our outpatient centers, so we can't have everyone working from home at the same time. But we can stagger schedules, and I think that's going to increase wellness and work-life balance for our faculty."

Like the radiologists, several of the department's billers, schedulers, and other staff members are also working remotely. "We're actually doing a study now to measure the productivity," Recht explains. "We anticipate that a number of those folks will also be working from home part time in the future. We want to give our staff the same flexibility that we give our faculty, and, in all honesty, it's going to benefit us financially because the amount of space and offices that we need will probably decrease, which will decrease our expenses in the future. It's a win for everybody."

Lasting Impact

NYU Langone's radiology department reopened five weeks after stay-at-home orders took effect in New York City, which was particularly hard hit by the initial COVID-19 surge. Since then, the department's CT exam volume has returned to 95% of normal. Although other exam volumes are climbing more slowly, overall outpatient exam volume has now rebounded to approximately 85% of pre-COVID-19 volumes.

> "It's a universal truth that it's important to engage everybody in the process. It allows team members to better understand and take ownership of outcomes."
>
> –Michael P. Recht, MD

To help address patient anxiety, the radiology team has added a special COVID-19 page on its website (visit bit.ly/LangoneCOVID) that outlines all of the safety precautions it is taking to protect patients and staff. It has also added safety information to the patient portal, and the schedulers share the information with patients when they call the office. "The schedulers have a one sentence script to help assure patients that we are taking precautions to keep them safe," Doshi says. "If patients have questions, the schedulers have information at hand to go into further detail."

While sharing COVID-19 information with patients won't be necessary once the nation gets past the pandemic, Recht anticipates that many of the changes the team has made will endure. Like remote working, he expects that the team will continue to leverage several innovations, chief among them the text messaging system to keep patients informed about wait times, the electronic process for submitting patient forms through the patient portal, and the accelerated protocols to ensure patients don't need to spend any more time in the department than necessary. Recht attributes the lasting impact of these changes to the team's collaborative approach to addressing the health crisis.

"When you take time to gather input and involve people from each level of the organization in a process like this, you get diverse perspectives and expert insights that lead to solutions that are really the best solutions for the team," he says. "While every practice might have a different way of approaching these situations based on their unique circumstances, I think it's a universal truth that it's important to engage everybody in the process. It allows team members to better understand and take ownership of the outcomes. Our team's response to the COVID-19 pandemic is proof of this concept, which we strive to instill in everything we do."

By Jenny Jones

Now It's Your Turn ››››

Follow these next steps to begin implementing this emergency response approach at your institution, and tell us how you did on Twitter with the hashtag #Imaging3 or email us at imaging3@acr.org:

- Recognize the need to address challenges early to allow as much time as possible to develop collaborative solutions.
- Reach out to team members from every level of the organization and involve them in the planning process.
- Look for ways to leverage technology to institute impactful and lasting change to your group's operations.

Four Key Steps for Leading in Crisis

1. Learn to manage yourself first and then focus on both the crisis as well as the bigger picture.
2. Crises are not merely obstacles; they can be great opportunities as well. Look for a winning play in the midst of the chaos.
3. Find ways to play offense even when you are beset with problems. Simply reacting to a crisis is a recipe for loss.
4. Crises are opportunities to examine yourself and your institution. Use them to make things better and be ready for the next challenge.

Source: Lexa FJ. Leading in a crisis, part 1: Succeeding in battle. *J Am Coll Radiol.* 2009. 6(7) 521–522. Available at bit.ly/Leading_Crisis. Accessed Sept. 25, 2020.

Case Study Published March 2020

Ready for Anything

A radiologist leads mass casualty preparedness planning at a military medical center in Tacoma, Washington.

KEY TAKEAWAYS

- Recognizing that all hospitals must be prepared for a mass casualty — and that radiology plays a critical role — a radiologist at Madigan Army Medical Center led efforts to improve the facility's response plan.
- The radiologist leveraged routine quality improvement efforts that focus on daily activities, such as communication and patient identification, to secure buy-in from radiology colleagues around mass casualty preparedness.
- The radiologist engaged emergency medicine and surgical partners in a cross-department mass casualty exercise, resulting in a robust emergency operations plan that integrates radiology to save as many lives as possible in disastrous events.

U.S. Army Col. Eric Roberge, MD, radiology consultant for Regional Health Command-Pacific and chief of the department of radiology at Madigan Army Medical Center in Tacoma, Washington, began focusing on mass casualty preparedness while serving as a flight surgeon in Korea in 2001 and then as chief of radiology at the 47th Combat Support Hospital in Anbar Province, Iraq, in 2009. When he returned stateside, Roberge no longer had to respond to combat casualties, but his interest in mass casualty preparedness didn't wane — in fact, it only deepened as he considered the myriad scenarios in which hospitals across the U.S. might have to respond to mass casualty events, such as natural disasters, transportation and industrial accidents, and terrorism.

Based on lessons learned in combat, Roberge often presented about mass casualty preparedness at professional conferences and frequently studied and talked with colleagues about radiology's role in responding to potential domestic mass casualty scenarios. But it was two mass shootings — one at a nightclub that left more than 100 dead and injured in Orlando, Florida, in 2016 and another at a concert that left more than 800 dead and injured in Las Vegas in 2017 — that moved Roberge to action.

"It was really after those two big, high-profile incidents that I stopped treating civilian mass casualty preparedness as an esoteric thought experiment and really started to put deliberate action toward developing my department's mass casualty plan," he says. It was an unusual step for a radiologist, many of whom are often left out of mass casualty planning despite radiology's great potential for improving triage during such events.

Since then, Roberge has become the radiology representative on the trauma committee at Madigan Army Medical Center, a network of healthcare facilities in Washington and California that serves active-duty military members, their families, and veterans. In this role, Roberge has led development of an interdepartmental mass casualty exercise among his hospital's radiology, emergency, and surgery departments and opened the lines of communication among the departments to develop a robust emergency operations plan that deliberately integrates radiology into the mass casualty response. "We've established ourselves as trusted experts who can be relied upon to contribute meaningful work as part of the hospital's disaster response," Roberge says. "It's clear now that we're a team of teams, not individual teams."

U.S. Army Col. Eric Roberge, MD, radiology consultant for Regional Health Command-Pacific and chief of the department of radiology at Madigan Army Medical Center, has ensured that radiology is included in the hospital's mass casualty response plans.

Recognizing a Need

To start, Roberge reviewed Madigan Army Medical Center's existing mass casualty preparedness plan, the radiology portion of which dated back to 2002. According to the document, radiology would cancel all of its routine scheduled cases during a mass casualty, and many of the radiology department's employees would go into the hospital's labor pool (which often handles moving patients and other ancillary tasks) to support operations in the emergency rooms (ERs) and operating rooms (ORs).

"The problem with radiology going into the labor pool is that radiology is often super busy during a mass casualty," Roberge says. "If it's a penetrating mechanism, like a mass shooting, radiology's role may be more limited, but if it's a bus crash or a train derailment and everybody has blunt force trauma, all of those people are going to need CT scans. Either way, radiologists are needed to assist with patient care during a mass casualty incident — not just as part of the labor pool."

As Roberge read the plan, it was clear that the radiology department hadn't been consulted about its role in mass casualties — something he has found is common at many hospitals. "I have traveled to hospitals around the country, not just military hospitals but civilian ones, and have found that it is a consistent, recurring theme where the radiology portion of the mass casualty plan is written by a non-radiologist," Roberge explains. "They all tend to say that radiology will supply people to the hospital's labor pool. But pulling radiology employees from their critical work demonstrates a lack of insight into the essential role that radiology plays during a mass casualty. If used correctly, radiology can help clinicians more accurately prioritize which patients they should see next and protect critical resources in the hospital, like operating rooms, for those who truly need them. This level of triage can ensure that as many lives as possible are saved."

Developing an effective mass casualty plan that includes radiology is imperative for all hospitals and health systems nationwide, Roberge says. "It's important to look at disaster and mass casualty planning not as preparing for something rare or unlikely," he says. "Disasters don't just happen in big cities or as part of military operations. There's a pediatric hospital in Alabama that received about 120 patients following a series of tornadoes. A hospital in Seattle received a busload of international students after a duck boat crash. Hospitals across the country respond to mass shootings almost every day of the week. There are vehicle pileups on icy roads in North Dakota, floods in Houston, and hurricanes and earthquakes in Puerto Rico. Fertilizer factories explode in Wyoming. The point is: This stuff happens everywhere — and it's our job as physicians to be prepared to respond when it does."

Engaging Care Partners

Recognizing deficiencies in Madigan's plan, Roberge began talking informally with clinicians in the hospital's emergency and surgical departments about radiology's role in mass casualty events. "I asked them what they needed from radiology during a mass casualty incident and provided various scenarios that could result in mass casualties in the Pacific Northwest," he says. "For instance, we are in an area known as the Cascadia Subduction Zone, which is a fault line that is overdue for a huge earthquake and tsunami. So I asked them, 'What would happen if we had an earthquake followed by a tsunami?'"

Roberge received various responses from emergency physicians and surgeons about how they viewed radiology's role in mass casualty events. For example, one surgeon who Roberge has worked with closely said that he saw radiology as a hurdle to avoid during mass casualties. "He said, 'I just need to get patients to the operating room really fast, and radiology just slows things down,'" Roberge recalls. "His big complaint was that in a mass casualty, patients are often bleeding to death, and the clock is ticking. He saw radiology as taking a long time, which in his calculus wasn't worth the investment."

The feedback challenged Roberge to think about how radiology could improve its response during mass casualty events and other care scenarios. "If I'm not giving the surgeons, one of my internal customers, what they need — rapid, accurate diagnoses — then I'm not doing a good job, and I'm actually becoming a bottleneck to patient flow," Roberge explains. "I knew I had to come up with ways to provide more efficient service for better triage accuracy." The conversations also allowed Roberge to demonstrate radiology's commitment to effective patient care. "If you're a good, active listener who asks thoughtful questions, people will come to trust your expertise and see that you have good intent," he says. "You can then build on that relationship to extend influence."

Most of the emergency physicians and surgeons with whom Roberge spoke were surprised, but not offended, to see a radiologist take the lead in mass casualty preparedness. "Leadership is leadership," says Lt. Col. Nathan K. Friedline, MD, deputy chief of Madigan's department of emergency medicine and assistant professor at the Uniformed Services University of the Health

When an Amtrak train derailed near Tacoma, Washington, in December of 2017, Madigan Army Medical Center received many of the more than 70 people who were injured in the crash.

PHOTO BY STEPHEN BRASHEAR/GETTY IMAGES

Sciences. "I was impressed that Dr. Roberge was stepping out of his normal role to collaborate across departments and improve our response to mass casualty events. These scenarios can be very daunting and scary, so practice and planning among teams beforehand is pivotal. I appreciate his interest in trying to achieve the best-case scenario."

Identifying Potential Weaknesses

After speaking with ordering providers, Roberge developed a process map to identify weaknesses in radiology's workflow, from receiving orders to conveying results to clinicians, during a mass casualty event and other emergency situations. For instance, the hospital planned to switch to electronic health record (EHR) downtime procedures in a mass casualty, meaning it would initially stop using the EHR, allowing response to take priority over documentation of care.

"The problem is that radiology doesn't run on paper; it runs on computer systems," Roberge explains. "Under the proposed workflow, you would have to hand-enter paper orders into the radiology information system (RIS), which is time consuming and adds to the concerns that ordering providers expressed about radiology delaying a mass casualty response. So we reflected on the need for radiology to use the EHR for imaging orders in the revised plan."

Roberge also considered lessons from actual mass casualty events throughout the country. One lesson came from a Boston hospital that received patients from the Boston Marathon bombing, a terrorist attack that killed three people and injured hundreds more in 2013. As is typical, he says, the hospital assigned trauma names to patients until they could identify everyone. Each name was about 30 characters long, but the RIS could display only the first 12-15 characters. "If the stem of every trauma name is identical, you can't differentiate among patients, which is what reportedly happened during the Boston Marathon bombing," Roberge says. "They ended up changing their trauma names as a result, and it was something I paid attention to here at Madigan, as we considered shortening our naming conventions."

In 2017, Roberge was able to further analyze Madigan's emergency operations plan when the hospital participated in a multistate Federal Emergency Management Association, or FEMA, exercise called Cascadia Rising. The scenario imagined a 10 magnitude earthquake along the Cascadia Subduction Zone, a 620-mile-long fault in Northern California, which triggered a tsunami and destroyed all of the area's highways and bridges. Roberge concentrated solely on radiology's response during the exercise, using a 200-pound dummy to determine the throughput rate of trauma patients on one CT scanner. The team found that its throughput rate was reasonable at three to four patients per hour.

Coordinating Care

A few months after Cascadia Rising, Roberge sent an email to about 30 of his colleagues and other care partners about conducting another mass casualty exercise at Madigan in which patients would be transported to different sections for care. "During Cascadia Rising, I was focused on my department, and the ER was focused on operations in the ER, and the OR was focused on operations in the OR," Roberge says. "I knew everybody was going to do well within their own teams, but the hospital is a team of teams. Patients are handed off as they move from one area of care to another. Transitions of care are where mistakes occur, and I thought it was important to simulate those and identify opportunities for improvement."

An actual test came just a few days later when Amtrak Train 501 derailed and careened off of a bridge in Tacoma, killing three people and injuring more than 70 others — many of whom were transported to Madigan for care. As patients from the train derailment arrived at the hospital, many of the issues that Roberge warned about came to fruition. "The ED was crowded with people trying to be helpful but who were unfamiliar with their roles in the emergency operations plan," he recalls. "As a result, we had communication issues and challenges identifying and tracking patients."

Once the emergency was over, Madigan reflected on lessons learned and compiled an after-action report to document what transpired during the event. Hospital leaders recognized that they needed to update their mass casualty plan. Using an iterative

Lt. Col. Nathan K. Friedline, MD, deputy chief of Madigan's department of emergency medicine and assistant professor at the Uniformed Services University of Health Sciences, was impressed to see a radiologist take the lead in mass casualty preparedness.

process — from reviewing lessons learned to revising and testing new workflows — they made critical changes and detailed each department's roles and responsibilities during such an event. For radiology, this involved refining patient naming conventions, honing its communication procedures, tweaking its preliminary reporting methods, and updating its CT protocols for use in mass casualties, says Roberge, who adds that radiology framed this work as a quality improvement project to ensure it was well-resourced and coordinated with the department's overarching policies and procedures.

With the changes in place, Roberge organized a team to develop a mass casualty exercise to test the revised plan across departments. The core group included two emergency operations center planners, an emergency physician, a trauma surgeon, and a family practice physician. "We also had a broad coalition of hospital staff, including logistics personnel, pastoral services, security services, and clinical services, and we coordinated with our joint partners in the Air Force, as well as state and local partners," Roberge says. "We expect a real-world response to a mass casualty to include multiple systems of care. As such, we need to be prepared to work seamlessly with our partners."

Testing the Plan

Over the next eight months, Roberge and the group developed an exercise called Mile Square, which imagined that a C-17 transport plane had crashed into a chapel filled with people on a weekend. "The exercise served as a measurement of progress and after-action review of the fixes that the hospital implemented following the train derailment of 2017," says David B. Misner, MD, EMS medical director at Joint Base Lewis-McChord and clinical staff attending in the department of emergency medicine at Madigan Army Medical Center, who was involved in planning the exercise. "It was rather unusual to see a radiologist involved, but it was refreshing to see the common goal setting and quantitative approach to a chaotic situation."

Madigan held the Mile Square exercise a year and a half after the Amtrak train derailment. During the exercise, individual departments — including radiology, emergency medicine, and surgery — got a chance to sharpen their internal operations. But more importantly, the departments tested patient transitions and interdepartmental communications, with radiology central to the response, says Maj. Tyler A. Dailey, MD, radiologist at Madigan. "During mass casualty events, radiology becomes a hub that many clinicians, particularly surgeons, rely on to quickly and accurately identify different injuries and triage patients," he says.

The exercise showed that many updates to the emergency operations plan improved the overall response. For instance, assigning a specific point of contact within radiology for patients who required immediate surgery ensured more timely care. The exercise also uncovered additional challenges that the team hadn't considered, including image transfer time for large data sets from the CT scanner to the picture archiving and communication system. When multiple scanners were simultaneously sending 6,000 to 9,000 images across the network, it took as long as 30 minutes for each transfer. This led the team to scrutinize its network performance and to consider using scaled-down "bare bones" protocols during mass casualties.

"Many of the things we worked on performed better than they had with the train derailment, though not all," Roberge says. "It's one of the reasons why planning and testing should be an iterative and thorough process."

Preparing to Respond

The Madigan team plans to continue holding similar mass casualty response exercises to ensure everyone remains prepared to respond to an event and to continue to refine its plan as needed. Roberge encourages other hospitals — and radiology departments in particular, given their central role in triaging patients and directing downstream care — to take the time to develop a comprehensive response plan and practice it regularly.

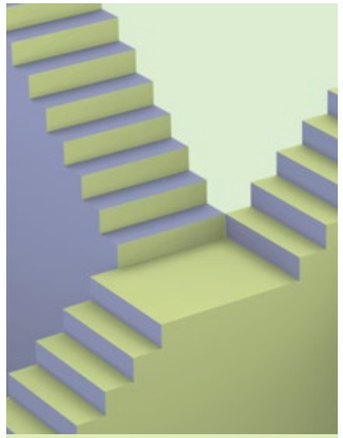
"Radiologists and other physicians must take a close look at their systems to consider how they will function during a mass casualty situation, both the operations within their own departments as well as interfaces with other departments, and how the system can break down," Roberge says. "It's something we should be doing every day in preparation for not only mass casualty events but also for efficient and effective daily care delivery — that's what performance improvement is all about."

By Jenny Jones

Now It's Your Turn ››››

Take these next steps to begin implementing a disaster preparedness plan and tell us how you did on Twitter with the hashtag #Imaging3 or email us at imaging3@acr.org:

- Read your hospital's emergency operations plan, know what is expected of radiology in the event of a mass casualty, and ensure that radiology's role is incorporated into the response.
- Gather input from care partners to understand their perception of radiology during a mass casualty and what they need from radiology in an emergency situation.
- Conduct regular training exercises to ensure everyone understands their roles in mass casualty response and to address challenges before they become bottlenecks in a real event. Ask the emergency department to include radiology in their next exercise by sending a few patients to the CT scanner. Scan a mannequin and use de-identified images from another trauma case to test your process.



John Kotter's 8-Step Change Model

1] Create Urgency
2] Form a Powerful Coalition
3] Create a Vision for Change
4] Communicate the Vision
5] Remove Obstacles
6] Create Short-Term Wins
7] Build on the Change
8] Anchor the Changes in Corporate Culture

Source: Kotter J. The 8-step process for leading change. Available at http://bit.ly/KottersSteps. Accessed Sept. 18, 2020.

CRISIS MANAGEMENT

The phases of disaster and how to prepare for the next one

Preparation

LONG-TERM PLANNING
- Disaster drills
- Training: e.g., Incident Command Center
- Contact information

IMMEDIATE PLANNING
- Communication: who, how, what, how often
- Defining expectations: where to report, what to do
- Defining roles

Disaster

- Infectious pandemic
- Natural disasters – hurricanes, floods, earthquakes
- Active shooter
- Terrorist attack
- Radiation disaster
- Chemical spill
- Power outage
- Cyber attack
- Transportation disaster – e.g., train, airplane

Mitigation

- Lessons learned
- Capacity building

Response

EMERGENCY/EVENT
- Might have had time to prepare
- Might not have had time to prepare
- How likely are evacuations to/from your location?

ONGOING
- How is it evolving?
- Not what expected
- Understanding duration

DEMANDS
- Hazard or disaster generated
- Response generated

Recovery/Restoration

TRANSITION TO BASELINE/NEW BASELINE
- Returning to work
- Re-opening/shifting clinical services
- Catching up on delayed care

LONG-TERM IMPACTS
- Community: re-entry, power outages
- Trauma
- Changes in clinical practice
- Economic

Source: James V. Rawson, MD, FACR. RLI Power Hour Webinar August 2020: Crisis Management. acr.org/RLI-Crisis-Management. Access Sept. 28, 2020.

Supporting Your Well-Being During the Pandemic

Self-care is critical, especially during these challenging times. Take the first step toward well-being with the **ACR® Radiology Well-Being Program**, which includes access to the following tools and resources:

- The Well-Being Index (WBI) survey tool to self-evaluate your level of well-being and access radiologist-specific resources on important well-being topics.
- Support guides designed to walk you through activities related to self-care, resilience and more.
- A well-being curriculum for residency program leaders designed to meet ACGME well-being requirements.
- Activities and articles to support well-being during the COVID-19 pandemic, including stories of ways fellow radiologists have found — or created — bright spots in the midst of upheaval.

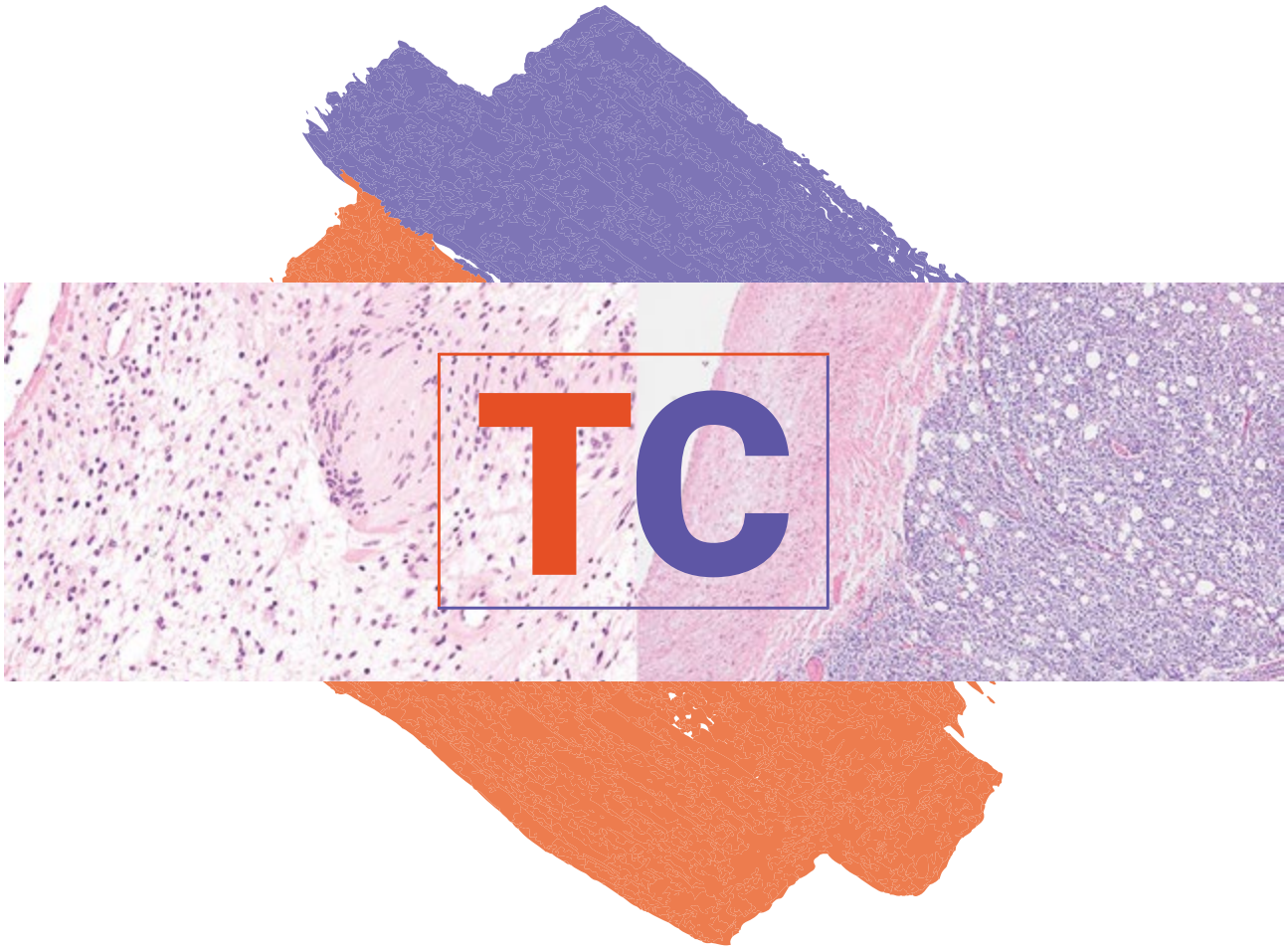
acr.org/WBI | 1·800·227·5463 |

Being Well Together

According to the 2019 Medscape Radiology Lifestyle Report, almost half of radiologists surveyed experienced burnout.

ACR® AMERICAN COLLEGE OF RADIOLOGY

11.20



ACR® AIRP® Rad-Path Thoracic and Cardiovascular Categorical Course

Join Us Virtually November 5–11, 2020

As a practicing radiologist, you may have limited access to the latest skills in radiologic-pathologic correlation. Update your rad-path skills with the Thoracic and Cardiovascular Categorical Course, designed to illustrate the basic concepts and rad-path correlation in chest imaging.

After completing this course, you will be better able to:

- Explain the importance of effective communication with pathologists in the diagnosis of lesions.
- Identify imaging characteristics of lesions involving the chest and cardiovascular system.
- Illustrate how the underlying pathology of the lesion contributes to its imaging characteristics.
- Describe those chest diseases in which radiologic imaging is key for accurate diagnosis.

Learn from top educators and hone your diagnostic skills!

AIRP® AMERICAN INSTITUTE FOR RADIOLOGIC PATHOLOGY

airp.org
1·800·373·2204

ACR® AMERICAN COLLEGE OF RADIOLOGY

Courses are provided by the American Institute for Radiologic Pathology™, an affiliate of the American College of Radiology®.