

IMAGING 3.0 IN PRACTICE

March 2021 | Vol. 3 | No. 1



COMMUNITY OF CARE

Delivering Comprehensive Patient-Centered Care



Promote quality of care — participate in the ACR[®] CT Colonography Registry

Assess CT Colonography (CTC) performance data — by facility and physician — to drive your program's patient safety and quality improvement efforts.

Other benefits include:

Benchmark your performance for both process and outcome measures, including:

- Rate of adequacy of diagnostic and screening CTC examination.
- Rate of colonic perforation.
- True positive rate.

Contribute to the growing CTC data archive that can provide important insights for the CTC community and policymakers.

Join the registry at no additional cost if your facility participates in the Dose Index Registry or the General Radiology Improvement Database.

To learn more about the CTC Registry and how to participate, visit acr.org/CTC.



We have simplified the data submission process to make it easier to participate and have a new CTC Registry Start-Up Guide. By participating, we learn from each other and improve the care of our patients.”

— Courtney Moreno, MD, CTC Registry Committee Chair, and Associate Professor, department of radiology and imaging sciences, Emory University School of Medicine



IMAGING 3.0 IN PRACTICE

Community of Care Delivering Comprehensive Patient-Centered Care

The adage “we’re all in this together” implores all members of a community to assume responsibility for working toward a common cause. Everyone plays a role. The same can be applied to medicine when we consider patient care. All members of the healthcare team have a part in ensuring the highest level of care for the welfare of our patients.

As radiologists, we are integral members of the healthcare team, directing care in diagnostics and providing treatments in interventional radiology. But we don’t do this work alone. Our effectiveness – our patients’ health and wellbeing – relies on collaboration at every step with our colleagues both inside and outside of radiology and within our individual institutions and the larger house of medicine.

The most comprehensive, innovative, accessible care comes when we work closely with technologists, schedulers, referring providers, medical physicists, patient advocates, physician assistants, caregivers, patients, and other members of the care team. It comes when our professional organizations foster partnerships with other societies, as the ACR has done with groups that include the American Medical Association, the American Hospital Association, the Radiological Society of North America, and the American Association of Medical Physicists.

The articles in this issue detail some of the numerous collaborations that radiologists are leveraging to deliver quality care. And the Imaging 3.0 case study library is full of similar articles about our work across our radiology teams and throughout medicine. I hope you will take the time to explore these stories and to strengthen your partnerships at every opportunity. Together we can accomplish more than we can ever do alone.

Howard B. Fleishon, MD, MMM, FACR
Chair, ACR Board of Chancellors

Imaging 3.0 Advisers

Geraldine B. McGinty,
MD, MBA, FACR
Marc H. Willis, DO, MMM
Sabiha Raouf, MD, FACR

Imaging 3.0 Staff

G. Rebecca Haines *VP, ACR Press*
Jenny Jones *Publications Manager*
Chris Hobson *Sr. Communications Manager*
Linda Sowers *Consulting Editor*
Lynn Riley *Freelance Designer*

ACR Press Staff

Lyndsee Cordes *Director of Periodicals*
Lisa Pampillonia *Art Director*
Nicole Racadag *ACR Bulletin Managing Editor*
Chad Hudnall *ACR Bulletin Senior Writer*
Jessica Siswick *Digital Content Designer*
Cary Coryell *Publications Specialist*



All American College of Radiology Imaging 3.0 Case Studies are licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License. Based on works at acr.org/imaging3. Permissions beyond the scope of this license may be available at acr.org/Legal.

Case Studies

4 Collaborating Through Crisis

A strong partnership with referring physicians helps a New Orleans radiology department respond to one of the nation’s first COVID-19 hot zones.

8 Collaboration Takes Flight

Working side by side in the operating room, neuroradiologists and neurosurgeons in Wisconsin utilize imaging to map the best course of treatment.

11 Instant Results

With the help of technologists, radiologists in Colorado are taking a more active role in patient care through an immediate results delivery program.

14 Scanning Without Sedation

A pediatric radiology department in Boston created a program that has reduced the use of anesthesia in patients undergoing MRI by 73%.

18 A Critical Role: Including Patients in Care Decisions

A Q&A with a member of the ACR Patient- and Family-Centered Care Commission’s Education and Outreach Committees.

20 Failsafe

Radiologists develop a program that encourages emergency department patients to follow up on incidental findings.

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

Visit the full Imaging 3.0 library at acr.org/Case-Studies



Case Study Published September 2020

Collaborating Through Crisis

A strong partnership with referring physicians helps a New Orleans radiology department respond to one of the nation's first COVID-19 hot zones.

KEY TAKEAWAYS

- A radiology team at the center of an emerging public health crisis called on trusted relationships with clinical colleagues to guide them through the early stages of the pandemic.
- Thanks to the strong relationship between radiology and primary care leaders, the team avoided using chest CT imaging inappropriately as a COVID-19 testing tool.
- The radiologists leveraged secure chat tools already in the electronic health record to better communicate with colleagues and provide more responsive, collaborative consultations with providers.

In early 2020, Pedro Cazabon, MD, primary care service line leader at Ochsner Health System, intently watched news that was coming out of Asia related to the emerging COVID-19 pandemic. Little did he know that his community in New Orleans was facing an approaching storm, one that would put him and his primary care colleagues on the front lines of fighting a public health crisis in one of the early hot spots in the U.S.

"As with everybody around the world, we were watching a crisis unfold in Asia, which seemed so far removed from us here in the U.S. at the time," says Cazabon. "Then all of a sudden, it flared in Washington and then New Orleans and all of the initial hot spots — and a frenzy started to happen because COVID-19 is a new disease on the planet. It doesn't behave like other viruses in its class. Some people were saying it will be nothing; it's a cold or the flu. But then patients started showing up in our emergency room and the intensive care unit (ICU) — many with terrible outcomes. And we knew it was dire."

He continues, "Our doctors were scared. Our staff was scared. We had personal protective equipment (PPE) shortages. We had no testing in place at that time. We really didn't know what this novel disease was. Almost every doctor, one by one, encountered some variant that made us realize we had lost our so-called eyeball test — the ability to use our training and experience to arrive at a reasonable diagnosis at a glance. It was strange to have a disease that shows up all of a sudden and you don't have your basic skillset to diagnose. So, we started scrambling for answers."

Luckily for Cazabon and his colleagues, Ochsner Medical Center has a remarkable radiology team — led by Dana H. Smetherman, MD, MPH, MBA, FACR — that had some of the answers and was ready to collaborate with care providers to guide them through the early stages of the pandemic and beyond. More importantly, the



Pedro Cazabon, MD, primary care service line leader at Ochsner Health System, counted on strong relationships with radiology to guide the pandemic response.

radiology team had already forged strong working partnerships with their clinical colleagues, so they were a go-to resource for knowledge in the midst of crisis.

Leveraging a collaborative approach to patient care and proven communications tools, Ochsner Medical Center, with radiology helping to lead the way, battled back against a flaring COVID-19 outbreak in New Orleans and positioned the health system to respond effectively to the evolving public health crisis.

Counting on Colleagues

As COVID-19 started to spread rapidly in the U.S. and virus testing lagged, many medical providers began to express an interest in using chest radiographs or CT exams to screen and diagnose patients with suspected or known COVID-19 infection. Cazabon and his primary care colleagues were among those wondering if radiology could help fill the knowledge gap.

"Without testing, we were grappling for answers," says Cazabon. "We had heard that

“It is a great example of a radiology leader working together with a primary care leader and steering away from suboptimal patient management.”

—Pedro Cazabon, MD

the chest imaging could tell the story; it might be a fast path to diagnosis. So, I immediately picked up the phone and called Dana Smetherman, who is chair of our radiology department and with whom I already had a strong clinical partnership, and asked, ‘Is this something we can do?’ She immediately said ‘no, no, no.’ In a 10-minute conversation, she explained why not and provided additional guidance to help us go forward with safe imaging practices. In primary care, that was our first COVID-19-related collaboration with radiology, and we’ve had many more since.”

Smetherman notes that ACR guidance on the issue was clear: CT should not be used to screen for or as a first-line test to diagnose COVID-19. To date, viral testing remains the only specific method of diagnosis. (Read the ACR Statement on Use of Computed Tomography (CT) and Radiography for Suspected COVID-19 Infection at [acr.org/recommendation-ct-covid19](https://www.acr.org/recommendation-ct-covid19).)

Safety of staff and patients was also top of mind for Smetherman. “Not only is CT an inappropriate way to test for COVID-19, but it also potentially exposes your team to the disease because chest scans can take a while, and patients have to inhale and exhale while the technologists are in close proximity,” says Smetherman. “We are doing everything possible to keep our teams safe, and that means extra focus on appropriate and necessary imaging.”

Looking back, Cazabon says that having a good working relationship between the leader of radiology and the leaders of the clinical teams saved a lot of wasted time and avoided unnecessary imaging studies. “Without that partnership, I might have quickly said, ‘If we can’t get testing, then everybody with symptoms gets a quick chest

CT as the clearance.’ We would have ordered thousands of chest CTs to manage in the short term — out of sheer desperation. But I trust Dana, and if she says no, then it’s no.”

He adds, “To me, it is a great example of a radiology leader working together with a primary care leader and steering away from suboptimal patient management. It drives home the point that you need good, strong working relationships established ahead of a crisis, so when you need to call on that expertise and knowledge, you already have that trust built in and you can quickly respond and do the right thing for your patients.”

Ramping Up Safe Imaging

After the conversation with Cazabon, Smetherman, who is also associate medical director of medical specialties at Ochsner, quickly realized that other care providers throughout the health system were likely raising the same questions. So, she collaborated with departmental leaders to get the word out to frontline care teams, like emergency and primary care, and emphasized that they should not use CT as a backdoor way to get a COVID-19 test. Smetherman and her colleagues also worked to establish a process to ensure safe imaging for patients who needed it.

“We agreed that we would separate patients with symptoms and those without symptoms into distinct imaging suites,” says Cazabon. “We decided we would set up one chest X-ray station for patients with a cough and other COVID-19 symptoms, and we ensured that staff took extra precautions. We designated another X-ray suite for patients with other imaging needs. So, we were able to get our X-rays done expeditiously and



As radiology chair, Dana H. Smetherman, MD, MPH, MBA, FACR, leveraged communication tools and a collaborative approach to patient care to battle an emerging public health crisis.

without exposing all of the people in the radiology suite to patients who we suspected had COVID-19.”

As part of the patient-handling process, Cazabon says they also created a program called Red Dot, modeled after an approach used during flu season in which anybody with cold and flu symptoms gets a colored dot on their chart. “With possible COVID-19 patients who we were sending for imaging or to the lab, we realized we needed to do a warm handoff to transfer care from one department to another,” he says. “That way providers are able to see the red dot in the chart and be aware it is a person of concern coming into the department. That handoff process became very important, especially during the times when we didn’t have enough masks and PPE for our staff and patients.” (To learn more about how Ochsner handled safe imaging in a pandemic hot zone, visit [acr.org/overcoming-adversity](https://www.acr.org/overcoming-adversity).)

Going Virtual

At the peak of the crisis in New Orleans, providers at Ochsner Medical Center also realized they had a critical tool at their disposal to help stop the spread of the virus: technology. The health system had been

talking about ramping up virtual visits and telehealth consults for several years, but the COVID-19 outbreak accelerated adoption almost overnight.

According to Cazabon, the primary care department remained open to patients who needed immediate care. “During the crisis, more than 80% of our visits went virtual,” he says. “We were able to stand up a virtual network in a week. In 2019, Ochsner only conducted about 2,500 virtual visits the entire year, and now we do almost that number every day. Using technology to connect with our patients and care for them in their homes — without exposing them or our team to potential infection — makes all the difference.”

Cazabon says that the medical community responds well to real-world challenges. “When faced with a true threat, we pull together quickly and get things going in no time. When something moves from the theoretical to the real, all of a sudden, we can mobilize the things we’ve been talking about or thinking about doing into action. The potential was always there to do virtual visits; it just wasn’t real enough. Now, everybody says, ‘I love these virtual visits; we should have been doing them for years.’ That’s one of the things we won’t give back after this

is over. It will be one of the good outcomes from this crisis.”

Leveraging Technology

As a radiologist who has been using technology for decades, Smetherman embraces the use of integrated tools to communicate with her colleagues. “It used to be radiologists were the only ones sitting in front of a workstation,” she says. “Now our referring providers are also using electronic health records (EHR) on a more regular basis. We’ve found it incredibly helpful to use the communication tools within the EHR because our clinical colleagues are also on it all of the time, which speeds our responsiveness. I used to have to call providers to collaborate. I’ve got tons of people’s cell phone numbers, and I know the backdoor numbers for a lot of the clinics. It’s been a pleasant surprise how quickly we can now respond when we use our own EHR. And, it’s a tool that has been sitting right here all this time.”

Cazabon agrees, “Whether a radiologist is at home or in the reading room, it all plays the same for us. Last week, I sent a patient with a twisted ankle over for an X-ray. Within 20 minutes, it was already read and the findings sent back to me before the patient even got back to our office. I have no idea where



Stephen I. Johnson, MD, ultrasound section head, says that remote workstations and secure chat capabilities enabled radiologists to be highly responsive to referrers.

the radiologist was, but we communicated about everything electronically. We also use secure chat in the EHR, which has been fabulous because you can send a message using an app on your phone and get an immediate response without needing to text someone’s personal phone or wait until they pick up a message.”

Stephen I. Johnson, MD, staff radiologist, section head of the ultrasound department at Ochsner, agrees that leveraging technology to open the lines of communication between radiology and ordering physicians has been one of the positive outcomes of the pandemic. “Before, I didn’t have the secure chat capability on my phone, so I would only see messages and queries from providers when I logged into my workstation, which was often hours after my colleagues needed help,” he says. “Now, I see it on my phone immediately, so it makes me more responsive.”

To drive home the point, Johnson offers a before-and-after scenario. “Let’s say I read a CT study ordered by our emergency department (ED); I’m happy with it and I sign off. Then the physician has a question, so he messages me. Prior to secure chat, I wouldn’t have seen the message until I signed back in the next morning. Now, I get notified on my phone and can quickly respond. That saves



Thanks to radiology’s guidance, care providers at Ochsner Medical Center avoided using chest CT imaging inappropriately as a means to test for COVID-19.

PHOTO COURTESY OF OCHSNER MEDICAL CENTER.



the ED doctor a whole lot of time and trouble because, otherwise, he would've had to get to another radiologist to look at an exam he or she hadn't read. With secure chat, we avoid that whole situation. It takes me a minute to answer the question when it would have taken that physician and the radiologist a half hour. That kind of seamless response speaks volumes about radiology's ability to be a key partner in patient care."

Forging Partnerships

Close cooperation among specialties is critical at all times to deliver the best patient care — but it is especially vital during times of a rapidly escalating public health crisis. That's when strong, collaborative partnerships like the ones forged at Ochsner really pay off.

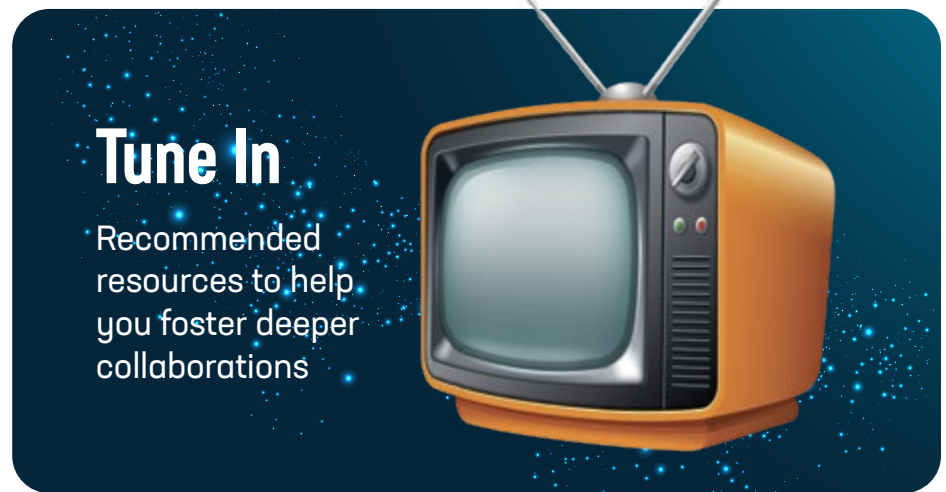
"This pandemic highlighted the importance of cooperation and mutual respect," says Cazabon. "Dana and I have collaborated on projects over the years, so we could count on that trusted relationship when we needed it most. If you don't have cooperation at the leadership level, then you won't have cooperation five steps down. You need to forge those partnerships between radiology and other clinical areas before you need them. That's what we've done here at Ochsner, and it helped us meet this crisis head on and deliver better care for our patients."

By Linda G. Sowers

Now It's Your Turn >>>

To lead your organization through a crisis, follow this advice and tell us about your successes and lessons learned at imaging3@acr.org or on Twitter using the hashtag #Imaging3:

- » Reach out to clinical leaders to collaborate on efforts to optimize patient care and demonstrate radiology's knowledge and value to the care team.
- » Establish strong working partnerships among departments before a crisis situation so that the lines of communication are already open when they are needed most.
- » Look at available communication and collaboration tools and encourage radiologists and referring providers to leverage them to enhance responsiveness and enable timely patient care.



Books



Team of Rivals: The Political Genius of Abraham Lincoln
by Doris Kearns Goodwin

The Wisdom of Teams: Creating the High-Performance Organization by Jon R. Katzenbach and Douglas K. Smith

The Idea Factory: Bell Labs and the Great Age of American Innovation by Jon Gertner

White Teeth by Zadie Smith

Articles



Harvard Business Review:

7 Strategies for Promoting Collaboration in Crisis

Cracking the Code of Sustained Collaboration

Give Your Remote Team Unstructured Time for Collaboration

Movies



Miracle

Based on the true story of the 1980 U.S. men's hockey team

Invictus

Dramatized biography of Nelson Mandela's enlistment of the rugby team to unite South Africa

Glory Road

Based on the true story of the first all-Black starting lineup in college basketball



Collaboration Takes Flight

Working side by side in the operating room, neuroradiologists and neurosurgeons in Wisconsin utilize imaging to map the best course of treatment.

KEY TAKEAWAYS

- A team of neuro-oncology specialists breaks down silos and provides patients with a multifaceted approach to neurological issues.
- Neuroradiologists join the clinical side of medicine by providing real-time image guidance within the operating room and playing a direct role with patients in the clinic setting.
- The neurosurgical oncology service has posted a 30–40% reduction in length of stay, mortality, and readmission rates, as well as a 10% reduction in cost per case.

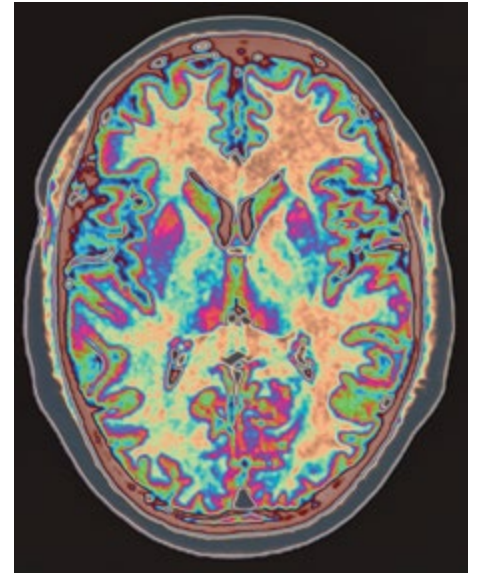
Not everyone would compare a successful multidisciplinary neurosciences center to the airline industry. However, not everyone is world-renowned neurosurgeon Amin Kassam, MD, who sees parallels between commercial flight and a healthcare model built on value through risk reduction rather than volume.

“I wanted to build a healthcare service line that mitigates risk, and the airline industry has done that well,” he says. “Flying is a safe event, when you look at the number of flights as opposed to the number of plane crashes. You can look at healthcare the same way.”

With that in mind, Kassam spearheaded the creation of the Aurora Neurosciences Innovation Institute (ANII), a multidisciplinary program of the Aurora Health Care Medical Group in Milwaukee, Wisconsin. The program’s goal is to create a collaborative environment where neurosurgeons pilot through brain surgery with navigation from neuroradiologists — all working side by side in the operating room (OR). Each team member provides support for the competency for which they are best suited.

Typically, imaging would be done in a separate location and provided to neurosurgeons in preparation for surgery. By combining efforts in one location, Kassam says patients benefit from more immediate care.

According to Jonathan E. Jennings, MD, section chief of neuroradiology for Aurora Health Care Medical Group and a neuro-radiologist with ANII, the overarching goal of the new program is improved outcomes, decreased patient morbidity, and reduced length of stay for patients. “In the two years since the program began, we’ve amassed a significant amount of data about the progress of this multidisciplinary approach,” he says. “Now we’re analyzing that information to help us drive better patient outcomes.”



The neuroradiologists support preoperative functional MRI (fMRI) brain mapping and diffusion tensor imaging, a form of trajectory planning that uses the diffusion of water molecules to generate contrast in MRI images.

Model Design

In 2014, Kassam was recruited by Aurora Health Care Medical Group to build its multidisciplinary neurosciences program. Kassam has had extensive experience over the past two decades in building service lines focused on multidisciplinary collaboration and proposed the concept of integrating neuroradiology as a clinical component of neurosciences. He designed the ORs and clinics to contain reading spaces for radiology. This meant actually seeing patients in the clinic, in the OR, and in postoperative acute and outpatient venues.

Radiologist Dale J. Lye, MD, who leads Aurora Imaging Services, was also forward thinking and supportive of establishing the ANII, not only because it provides a higher quality of patient care but because it is a natural progression in the evolution of how radiology will need to look in the future,

particularly as healthcare moves from volume to value. This open-minded thinking led to a natural collaboration that broke down silos and made implementing the concept much easier.

During the design process, the imaging team analyzed the clinicians' workflow to see where having a radiologist onsite could help improve efficiency. They realized neurosurgeons were spending time weeding through stacks of imaging reports in order to plan their next course of action. In response, they proposed that adding a neuroradiologist to the crew would provide the guidance necessary to complete a surgical flight plan.

"At ANII, neurosurgeons are pilots, radiologists are the navigators, and the OR is the cockpit," Jennings says.

Planning and Workflow

The cockpit of this multidisciplinary clinic space comprises a state-of-the-art, four-room operating theater, with a dedicated planning room embedded within the semi-restricted area adjacent to the OR. Neuroradiologists work together with their neurosurgery colleagues within that space.

The need for efficiency in radiology is maintained on the OR floor. At ANII, reading rooms are located within the OR suite and allow neuroradiologists to read non-surgical cases during downtime. In addition, a network of video communication creates connectivity between the OR, the planning room, clinical offices, and the main radiology reading room — essentially creating air traffic control.

With this model, no one service line "owns" the patient. "Just as a plane doesn't have just one pilot, a patient doesn't have just one surgeon taking care of him or her," Kassam says. "There are always two attending doctors with a patient, and we put the radiologist in the cockpit with us, reading images and providing our navigation in real time. In fact, the radiologist generates the flight plan before we even see the patient."

Neuroradiologists also play a direct role with patients within the clinic setting, joining oncologists in discussions with patients about the benefits and risks of surgery. For most complicated discussions, the neuroradiologist reviews the imaging

directly with the patient and the rest of the team. Patients have the opportunity to ask questions while all of the members of their treatment team are in one place. It's a unique role for radiologists, who historically don't have much patient contact.

Each member of the team brings a different strength to the case at hand, Kassam adds. "A surgeon can put information about a patient's case into the context of the disease, but a radiologist has the data and the ability to present the information at clinic in a way that the patient can understand," he explains.

"With this program, we break down the silos and form a collaborative unit," Jennings says. "As the silos break down between medical specialties, everyone comes up with good ideas. We are fortunate to have been welcomed as integral members of the neurosurgical care team."

The Patient Care Continuum

Melanie Brown Fukui, MD, a neuroradiologist at ANII, embraces the opportunity to work side by side with neurosurgeons. In



Nurse practitioner Kara Sapoznik (L) and Melanie Fukui, MD, a neuroradiologist at Aurora Neurosciences Innovation Institute, exemplify the collaborative efforts of the clinic as they review a patient's brain map in an area located within the surgical suite.



“Within this model, having a neuroradiologist immediately available at critical moments during anatomically complex procedures can decrease the potential for adverse outcomes.”

—Melanie Fukui, MD

addition to providing her imaging expertise in the OR, she is in a position to bridge patients' imaging needs from their clinic visit through preoperative planning and into the operative and postoperative phases of their treatment.

“This is a window into neuroscience here that I believe doesn't exist anywhere else,” she says. “We're a multidisciplinary unit in which radiology participates in planning and workflow. We are included in the overall work environment. Within this model, having a neuroradiologist immediately available at critical moments during anatomically complex procedures can decrease the potential for adverse outcomes.”

According to Fukui, radiologists are involved with the pre-surgical planning along with the surgeons. They also stay in the OR during “inflight cross checks” when

the surgeon is working in the brain, following the anatomy in imaging.

“We have come to speak a common language with our partnering neurosurgeons and advanced practice providers,” Jennings says. “We directly observe the manner in which imaging is used for operative guidance and have accordingly designed a set of pathology-specific MR protocols to fit the unique operative approaches and technologies our neurosurgeons use.”

(Learn how neuroradiologists have incorporated preoperative functional MRI brain mapping into the clinic at acr.org/fmri-adds-value.)

Collaborative Impact

Jennings, Fukui, and Kassam agree that the collaboration among members of the ANII team strengthens the clinical

environment and incrementally improves patient care.

In one instance, during surgery to remove a cluster of blood vessels from the brain of a 36-year-old man who suffered from seizures, imaging guidance in the OR suite provided Kassam with a map to the malformation. It also helped that the patient was kept awake during surgery in order to regulate the effects of the surgery on his functionality.

The culmination of this collaborative process has yielded significant results in a short period of time. The neurosurgical oncology service has posted a 30–40% reduction in length of stay, mortality, and readmission rates as compared to national risk-adjusted rates. This has also translated into a financial benefit, with a 10% reduction in cost per case, despite increasing the case complexity in comparison to the pre-ANII era.

The neuroradiologists also benefit from direct and immediate clinical-radiologic correlation, observing surgical procedures in real time and working in sync with surgeons and other members of the team. This enables imagers to see how their navigation helps the surgeon and where they can improve the process of providing the right map for surgeons to follow.

Jennings points out that participating physicians share information and learn from each other. “Now, the radiologist is involved at the point of care,” he says. “We interact with each other in a more natural way, with a more open flow of communication.”

By Kathy Knaub-Hardy

Now It's Your Turn >>>>

Follow these steps for cross-specialty partnerships to improve patient care, and tell us how you did at imaging3@acr.org or on Twitter using the hashtag #Imaging3:

- » Look for opportunities across the healthcare continuum in which the radiologist can come into more direct patient contact.
- » Seek out the clinicians in your practice or facility who use and value imaging the most, and work to form alliances between them and your radiologists.
- » Develop collaborative models that overcome silos in budgeting by valuing risk reduction for the patient rather than volume delivery by the provider.



PHOTO COURTESY OF AURORA NEUROSCIENCES INNOVATION INSTITUTE

Doctors in the operating room at Aurora St. Luke's Medical Center, of which the Aurora Neurosciences Innovation Institute is a part, rely on brain mapping images created by neuroradiologists who are part of the program.



Instant Results

With the help of technologists, radiologists in Colorado are taking a more active role in patient care through an immediate results delivery program.

KEY TAKEAWAYS

- Inspired by her husband's healthcare experience, radiologist Jennifer L. Kemp, MD, FACR, helped develop a consultation program in which the radiologists on her team deliver results to patients immediately after their imaging exams.
- Virtual consults give patients a better understanding of their diagnoses and how their bodies are responding to treatment while keeping their primary care physicians in the loop.
- Approximately 90% of patients who had virtual consults say the encounters significantly improved their healthcare experience.

When her husband was diagnosed with Stage 3 rectal cancer 13 years ago, diagnostic radiologist Jennifer L. Kemp, MD, FACR, got a firsthand glimpse into the anxiety that many patients experience after imaging exams. "I saw the absolute terror that my husband went through as he awaited the results of every CT scan," says Kemp, a body imaging subspecialist at Diversified Radiology of Colorado. "Before that, I didn't realize how many of my patients were going through the same thing."

In the past, Kemp's patients typically waited a week or more to receive their imaging results. With advances in technology, Kemp and her colleagues can now read studies within a couple of hours, but many patients still end up waiting days to receive the results from their physicians. "There's no reason patients should have to wait. They should have that peace of mind as soon as we have the findings," says Kemp, who is also the vice chair of radiology at Rose Medical Center.

Driven by her husband's experience, Kemp became more passionate about patient-centered care. She and her core team of body imagers at Diversified Radiology started dedicating time during their quarterly team meetings to discussing ways to become more patient centered. They began by adding their phone numbers to their radiology reports, which increased their accessibility to referring providers and patients. (Read more about this initiative at acr.org/direct-line-to-radiologists.)

From there, the team initiated several other patient-centered efforts. The most recent one — an immediate results delivery pilot program — began in December of 2017. Through this initiative, the radiologists discuss their findings with patients over the phone immediately after their imaging exams. While the radiologists don't yet offer this service to every patient, the group's technologists report that about 90% of patients who are extended the opportunity to consult with a radiologist take it.



Jennifer L. Kemp, MD, FACR, diagnostic radiologist and body imaging subspecialist at Diversified Radiology and vice chair of the department of radiology at Rose Medical Center, helped launch an immediate results delivery program to relieve patient anxiety.

"Patients want their results as soon as possible so that they don't have to suffer the anxiety that comes with waiting," Kemp says. "By reducing that waiting time, this service significantly improves the patient experience."

Developing a Plan

When Kemp and her body imaging team, which is based at Rose Medical Center, began the immediate results delivery program, they wanted to keep it manageable. To that end, they limited the program to patients who underwent CT and ultrasound exams at the hospital's outpatient imaging center. They focused on outpatients specifically because the hospitalists usually deliver imaging results to inpatients rather quickly.

Kemp and her team are the only subspecialty-trained radiologists who read CT and ultrasound images onsite at the hospital, which is located next to the imaging center. Instead of trying to coordinate face-to-face meetings across locations, the team

determined that phone calls would be the easiest way to connect with these patients.

Still, some team members worried about the amount of time these conversations would require. To address these concerns, the radiologists agreed to conduct consultations between 8 and 10 a.m. on Mondays, Tuesdays, Wednesdays, and Fridays — when their workloads are relatively light. They also committed to working with the technologists to adjust this window, as necessary, to include more patients. “We wanted to make ourselves as available as possible for patients,” Kemp says.

Once the method was established, the team developed a framework for the consultations: The technologist asks the patient whether he or she is interested in discussing the results with the body imaging radiologist on duty. If the patient accepts, the technologist asks the patient to wait in the waiting room and calls the radiologist — either by phone or by sending an instant message through their picture archiving and communications system (PACS). The radiologist then reviews the patient’s images before calling the technologist back — typically five to 10 minutes later. At that point, the technologist puts the patient on the phone to discuss the results directly with the radiologist.



Krista Miller, MHA, ARRT (CT)(NM), assistant director of radiology at Rose Medical Center, and other technologists play a key role in coordinating immediate results consultations between patients and radiologists.

Coordinating a Consultation

Before they could initiate the pilot program, the radiologists needed buy-in from patient-facing CT and ultrasound technologists, who play a key role in coordinating the service. When Kemp first approached the lead technologists individually to ask whether they’d be comfortable offering this service to patients, their response was overwhelmingly positive, and they agreed to help develop a plan for coordinating the new service.

“I’m honored and excited to be part of this program,” says Krista Miller, MHA, ARRT (CT) (NM), assistant director of radiology at Rose. “The technologists already had a collaborative relationship with the radiologists at this facility, so the buy-in was quick.”

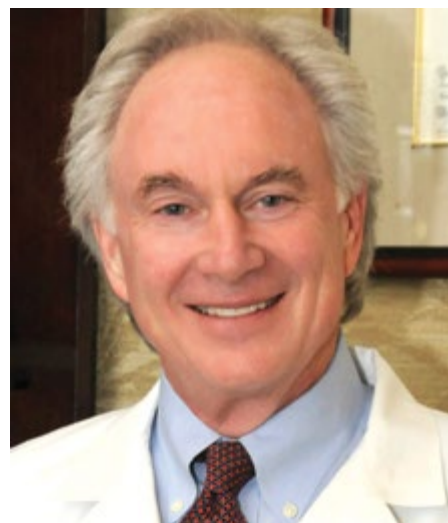
While the lead technologists were on board with the program from the start, some other techs worried that it might add another step to their workflow, negatively impacting their schedules. To minimize telephone disruptions, some technologists leverage their PACS’s instant messaging system to notify the radiologists whenever a patient opts for immediate results delivery.

The techs also have the authority to decide when to offer the service based on patient need — making it easier to adopt. “If we told the techs, ‘You have to offer this to every single patient,’ that could be a real workflow issue, especially if they’re swamped with add-on patients,” Kemp says. “Giving them the leeway to decide which patients would benefit from it builds more buy-in.”

Most of the department’s 10 CT and ultrasound technologists are participating in the program, and Kemp expects that eventually they will all consistently offer the service to patients. “As the technologists see the positive impact they can have with this program, they recognize that it’s the right thing to do,” she says.

Improving the Patient Experience

While the technologists do consider their workloads and the radiologists’ availability to an extent, they don’t hesitate to offer consultations whenever patients seem particularly worried. “A patient might reveal stress or anxiety about the results during an exam, so you have to be empathetic to those signals,” Miller says.



Richard S. Abrams, MD, internal medicine specialist and founder of Colorado Preventive Medicine, says collaboration between radiologists and referring physicians is critical to the program’s success.

For example, if a patient expresses concern about having to wait to receive the results from the referring physician, then the technologist will often extend the offer to speak with a radiologist. “We say, ‘Our radiologists are happy to review the results with you today, if you’re willing to wait a few minutes,’” Miller says. “Most patients are willing to wait; you just have to give them realistic expectations about how long it will be.”

In patient Dave Neslin’s case, opting to speak with the radiologist turned out to be one of the best decisions he could make. Last March, Neslin visited his primary care office for enlarged lymph nodes in his neck — a possible progression of his chronic lymphocytic leukemia. His provider ordered an ultrasound, and immediately after the exam, Neslin spoke with the radiologist. “The sooner I knew how serious it was, the better,” says Neslin, an attorney in Denver who was diagnosed with the disease two and half years ago.

Neslin spoke with Kemp, who informed him that all of the lymph nodes in his neck were swollen and urged him to go see his oncologist right away. She even contacted his oncologist directly to share the findings and help facilitate a timely appointment. After a confirmatory biopsy, Neslin began



“The only way this works is if there’s real trust between the patient, the physician, and the radiologist. Collaboration is absolutely critical.”

—Richard S. Abrams, MD

targeted drug therapy within two weeks of his ultrasound.

“If I hadn’t gotten the ultrasound results immediately, that prognosis alone could have taken several weeks,” Neslin says. “This allowed me to begin treatment sooner and helped me manage my disease while reducing my anxiety about my future.”

Collaborating with Physicians

The radiologists talk to an average of two patients a day. While some cases are serious, most of the consultations focus on routine findings and last fewer than 10 minutes. “The majority of results are normal, so the conversations are simple,” Kemp says. “If we have a more difficult conversation ahead of us — a suspected cancer diagnosis or other results that may be sensitive, scary, or confusing — it’s customary to contact the referring physician before speaking with the patient.”

If the scans reveal an emergency finding, such as appendicitis, the radiologists instantly notify the referring provider and then help coordinate the patient’s transfer to the emergency room (ER). For example, one patient was experiencing severe headaches, and his outpatient scan revealed acute bleeding in his brain. In a customary workflow, the patient would have left the radiology department before a radiologist had a chance to review the images — but because he waited for his results, the radiologists were able to send him directly to the ER.

In other cases, the radiologists might not know a patient’s next steps for treatment. These instances give the radiologists an opportunity to explain their role to patients, Kemp says. “Radiologists worry that patients will ask questions that they can’t answer,” she says. “We don’t have all the answers, and I

often say that to patients: ‘I don’t know, but I’m going to talk to your physician and put this puzzle together, and then your doctor will contact you about the next steps.’”

The radiologists have many referring providers’ cell phone numbers and often discuss patient cases with them. This communication has been a key to the project’s success. “I’m not going to be blindsided with a call from a patient saying, ‘The radiologist told me I have cancer,’ because the radiologists keep me in the loop,” explains Richard S. Abrams, MD, founder of Colorado Preventive Medicine who, as an internist, refers patients to Diversified Radiology. “The only way this works is if there’s real trust between the patient, the physician, and the radiologist. Collaboration is absolutely critical to ensure that none of us is overstepping our skills and bounds.”

Expanding the Effort

Based on patients’ positive responses to the ongoing pilot project, Kemp and her team want to eventually expand the immediate results delivery program throughout the rest of Diversified Radiology’s 60-member practice. From there, they hope to leverage technology that will allow the radiologists to also show patients their images, taking the encounters from just phone calls to truly virtual consultations.

Diversified Radiology already has a program in place in which the radiologists use remote access software to show lung cancer screening patients their images on a PACS station in the outpatient center. Kemp envisions using this software for the virtual consults, allowing the radiologists to highlight findings on scans without leaving the reading room.

While broadening the initiative will take time, Kemp says it’s an important step toward more patient-centered care. “My vision is to gradually alter our radiologists’ workflow to make direct patient consultation the norm, rather than something special that we offer only during certain hours of the day,” Kemp says. “All patients deserve the right to know their results as soon as possible.”

By Brooke Bilyj

Now It’s Your Turn >>>>

Follow these steps to launch your own immediate results delivery program and tell us how you did at imaging3@acr.org or on Twitter with the hashtag [#Imaging3](https://twitter.com/Imaging3):

- » Start small, perhaps with one subspecialty core of imagers, to develop a process for interacting with patients before scaling this program across your entire practice.
- » Build buy-in with technologists by giving them the authority to determine which patients might benefit most from immediate results delivery.
- » Constantly collaborate with referring physicians to keep them in the loop about findings you’ve discussed with patients.

Explore the Library

Radiologists nationwide are collaborating with other members of the care team to deliver optimal patient care.

For example, “Visual Learning” describes how radiation oncologists are partnering with neuroradiologists to create personalized videos that help cancer patients understand their specific symptoms and treatment plans.

To read this and more stories about how radiologists are coordinating care, visit the Imaging 3.0 case study library at acr.org/Case-Studies.





Case Study Published July 2020

Scanning Without Sedation

A pediatric radiology department in Boston created a program that has reduced the use of anesthesia in patients undergoing MRI by 73%.

KEY TAKEAWAYS

- To reduce the number of children who are sedated for imaging exams, radiologists at Boston Children's Hospital began exploring alternatives to anesthesia.
- The team implemented several techniques to help patients get through their exams without anesthesia, including shortening image acquisition sequences, scheduling appointments to coincide with nap and bedtimes, recreating children's bedtime routines in the hospital, and helping families practice for exams.
- Through these efforts, the radiology team successfully reduced sedation rates from 55% to 15% for MRI procedures.

When doctors scheduled a brain MRI for Angela Polizzotti's 10-month-old son, she was understandably concerned about the procedure. She couldn't imagine a baby like Blake lying still through the exam, which could take up to an hour. But she didn't like the idea of anesthetizing her child to keep him motionless. "He was so little, and he'd never had anesthesia before," Polizzotti says. "I was nervous about sedating him."

Luckily, Boston Children's Hospital's radiology department had been developing a program called Try Without Anesthesia to reduce the number of children who are sedated for their imaging exams. The team knew that limiting the use of anesthesia would have a twofold benefit: Patients could get their imaging sooner and avoid the potential risks associated with anesthesia.¹ When the Polizzotti family found out about the program, they decided to try the exam without sedating Blake.

"Obviously, MRI scans are not painful procedures. The only reason children need sedation is because they struggle to remain motionless long enough to capture clear images," says Richard L. Robertson, MD, radiologist-in-chief and chair of the department of radiology at Boston Children's Hospital. "By avoiding sedation, you reduce the overall risk, time, and cost of doing a diagnostic study."

Since radiologists at Boston Children's Hospital began exploring alternatives to anesthesia around 2007, they have formalized the Try Without Anesthesia program to get children through imaging exams without sedation. By helping children like Blake lie still during MRI procedures, the program has reduced sedation rates from 55% to 15% for these procedures. "This program provides a valuable service for patients and their families while also making our radiology practice safer and more efficient," says Robertson, who is also the John A. Kirkpatrick associate professor of radiology at Harvard Medical School.



PHOTO COURTESY OF ANGELA POLIZZOTTI.

When doctors at Boston Children's Hospital scheduled a brain MRI for 10-month-old Blake Polizzotti, his mother was nervous about sedating him. She agreed to Try Without Anesthesia to explore options outside of sedation.

Getting Started

Prior to 2007, radiologists at Boston Children's Hospital generally assumed that most children younger than 7 required sedation to remain still during MRI procedures. But as the hospital's appointment volume increased and the wait times for sedation swelled beyond 60 days, that assumption left many patients and their families waiting months for answers. To get children through imaging faster, the radiology team began exploring ways to reduce the need for sedation for imaging.

Around that time, Robertson learned about MRI-compatible video goggles

“For this initiative to work, we needed to look at all of the factors around imaging.”

—Richard L. Robertson, MD

that allowed children to watch movies during scans — a distraction that reduced the need for sedation by nearly 20% in early studies.² Impressed with the results, Robertson asked hospital administrators to invest in the goggles, and they quickly agreed. “The administration understood the importance of reducing the use of anesthesia,” Robertson says. “They recognized that when you avoid sedation, you decrease the risk of the exam for the patient. It’s also significantly less expensive.”

According to a study published in *Radiology*, the average cost of an outpatient MRI in 2011 was \$665 without anesthesia and \$902 with anesthesia.³ Other research suggests that pediatric MRI costs for sedated and anesthetized patients are, respectively, 3.24 and 9.56 times higher than MRI costs for patients who stay awake.⁴

By monitoring the exams from the reading room through the picture archiving and communication system (PACS), Robertson and his fellow radiologists could instantly determine whether the goggles and other techniques were working for each child. “Our radiologists actively supervise MRI cases as they’re being performed,” Robertson says. “We set up our PACS with the ability to send images at the end of each series acquisition, so we can watch the study in action and instantly decide, ‘We’ve captured the information we need; we can stop the exam now,’ or, ‘This child’s moving; we need to repeat that scan to get a clear picture.’”

Scanning Faster

After seeing early success with 5- to 7-year-old children, who seemed most engrossed in the movies, the radiology department began expanding the department’s efforts to reduce MRI anesthesia in other age groups. “We decided that the children who

are particularly vulnerable due to their small size and for whom we wanted to minimize sedation the most were babies up to age 1,” Robertson says. “So, in 2010, we started focusing on reducing sedation in that population.”

As part of this work, the radiology department adjusted the imaging protocols for faster acquisitions so that babies would be in the scanner for less time. “Shortening the image acquisition times is the single most important thing that we can do as radiologists to reduce the need for anesthesia,” Robertson says. “We found that many children can stay still for one minute but not for four minutes during a standard acquisition.”

To convince radiologists that faster protocols were diagnostically equivalent to standard acquisitions, Robertson and his colleagues conducted a blind review of brain MR imaging comparing fast scans to standard scans. After collecting images from 60 cases and redacting the image acquisition details, Robertson asked radiologists in his department to compare each image set. “Half of the time, they said the conventional acquisition was better, and the other half of the time, they said the faster acquisition was better,” says Robertson, who outlined his findings in a study that was published last year.⁵ “Through the blind review, the radiologists saw that faster acquisitions were diagnostically equivalent, which secured their buy-in.”

Although it wasn’t a formal program yet, more nurses, technologists, and radiologists were convinced of the idea of trying exams without sedation. They allowed extra time for parents to swaddle and calm their babies before their exams and utilized faster acquisition times to shorten the length of each scan. Through these informal efforts, the radiology department reduced the sedation



Richard L. Robertson, MD, radiologist-in-chief and chair of the department of radiology at Boston Children's Hospital and John A. Kirkpatrick associate professor of radiology at Harvard Medical School, spearheaded the Try Without Anesthesia program to reduce the radiology department's reliance on anesthesia for imaging procedures.

rate for babies under age 1 by more than half — cutting the use of anesthesia from about 55% to 20% in that population within a couple of years.

Formalizing the Program

With positive results from their early efforts, the radiology department began to formalize and expand the Try Without Anesthesia program. In 2015, Robertson convened a group of schedulers, technologists, radiologists, nurses, MRI physicists, image analysts, and faculty members from radiology’s research center to develop the program logistics. He also engaged the hospital’s information strategy department and external MRI vendor to establish the program’s technology workflow for faster imaging protocols and streamlined appointment-setting prompts.

“For this initiative to work, we needed to look at all of the factors around imaging,” Robertson says. “The schedulers had to be able to identify candidates upfront. The radiologists needed to know what imaging protocols to use to minimize exam durations, and the techs and nurses had to be

patient in working with the children. The physicists and image analysts also had a significant role in redesigning the imaging protocols, and the informatics team helped support the workflow.”

Through monthly meetings, the committee developed the workflow for the Try Without Anesthesia program — starting with a digital dashboard that was developed in-house to aggregate information from the electronic medical record, scheduling system, PACS, and protocoling applications to help identify candidates for the program. Schedulers are prompted to share the benefits of the program whenever families call to schedule anesthesia appointments, and the radiologists and technologists can also flag patients who seem like good candidates for the program based on certain indications or conditions.

The committee officially launched the Try Without Anesthesia program in January of 2016. The team initially limited the sedation-free appointments to four 105-minute slots every Sunday afternoon, when the hospital’s slower schedule permitted 30 minutes of one-on-one prep time with a child life specialist and 75 minutes of scanning time. These appointments initially focused on patients between 4 and 7, since patients in that age group had success



As the Try Without Anesthesia program coordinator, Kellyn Mahan helps families prepare for pediatric imaging by exploring alternatives to sedation.

“Through the Try Without Anesthesia program, families become more involved in the MRI scan.”

—Kellyn Mahan

using the video goggles to avoid sedation in prior years.

As more families learned about the anesthesia-free option, however, the program quickly expanded. By the time the Sunday-focused program concluded in July of 2019, 320 patients between the ages of 1 and 16 had participated in the Sunday Try Without Anesthesia appointments alone, with 91% of patients successfully completing the exams without anesthesia.

Recruiting Patients

The program received an additional incentive in December of 2016, when the Food and Drug Administration (FDA) issued an advisory about the potential neurocognitive effects of prolonged anesthesia exposure in young children. The warning urged pediatric healthcare professionals to balance the risks and benefits of sedation. “The FDA advisory strengthened our resolve to advance the program,” Robertson says. “But we needed a more structured approach if we were going to expand it further.”

To that end, Robertson hired Kellyn Mahan, who worked as a scheduling coordinator in the radiology department for several years and who had recently finished training to become a child life specialist, to take ownership of Try Without Anesthesia as the program coordinator in January of 2017.

Mahan’s main responsibility was to recruit patients for the program by calling families to discuss their options without sedation and informing families about the program when they called to schedule anesthesia appointments. Nurses and technologists also recommended the program when children seemed calm, unfazed, or even eager to

interact with them in the prep room before an anesthesia appointment.

To reach more patients, Mahan created brochures to distribute throughout the radiology waiting rooms and local clinics and collaborated with the marketing department to develop materials to educate referring providers about the program. “We want to reach as many patients as possible,” Mahan says, “so anything we can do to spread the word about these appointments is beneficial.”

Additionally, to keep the program top-of-mind among referring providers, Robertson and other departmental leaders talked about the importance of reducing anesthesia rates in weekly operations meetings, multidisciplinary conferences, and the radiology group’s annual quality management plan. “We constantly bring up the Try Without Anesthesia option,” he says. “Now, a lot of referring clinicians specifically request this approach for their patients, which has been really nice to see.”

Imaging at Bedtime

As the program grew in popularity, Mahan worked with the committee to explore other alternatives to anesthesia. Recognizing that children were likely to remain still for an MRI if they were asleep, the committee decided to try later appointment times to coincide with patients’ bedtimes. In October of 2017, the Try Without Anesthesia program began offering 9 p.m. appointments one day per week. These appointments allow families to schedule exams when the hospital is quiet and their children are sleepy. Since the hospital already had MRI technologists and radiologists working overnight shifts, staffing wasn’t a big issue.

“Our intention was to bring in children when they’re as tired as possible,” says Mahan, who initially advised patients’ families to keep children from napping on the day of the scan — but that approach just made kids cranky, not sleepy. “We realized that our success depended not just on how tired the kids were but on how well we helped families prepare for these appointments.”

Now, as soon as a family schedules a Try Without Anesthesia appointment, Mahan



PHOTO COURTESY OF BOSTON CHILDREN'S HOSPITAL

By offering late-night appointment times, MRI-compatible video goggles, child-friendly exam room décor, and plenty of patience, technologists and radiologists at Boston Children's Hospital help young patients get through imaging exams without anesthesia.

sends them a detailed email that explains the imaging process and encourages families to help children practice for their exam. The email includes a link to a YouTube video (bit.ly/MRISounds) that plays the sounds of an MRI machine, and Mahan sends the earmuffs and noise-reducing ear putty that children can wear during their scan. "We suggest that they play the sounds as much as possible during the child's bedtime so that the child gets used to hearing the noises," Mahan explains. "We also ask them to use the ear protection leading up to the appointment because it's often a new sensation for the children."

Polizzotti played the MRI sounds for her son Blake during naps and bedtimes leading up to his appointment. "It definitely helped," she says. "By the time he went in for his exam, the noise didn't startle him at all."

Replicating Routines

For additional support, Mahan asks a lot of questions about each child's bedtime routine so that she can recreate that environment when families arrive for their nighttime appointments. She encourages families to bring their children's blankets or stuffed animals to help them relax and asks families to arrive for their nighttime appointments around 7:15 p.m., giving the children plenty of time to get comfortable and fall asleep before their 9 p.m. exams, which the department now offers two days a week and hopes to eventually offer five days a week.

"They gave Blake a stuffed animal and provided a rocking chair for me to rock him to sleep and even allowed his favorite blanket to go in with him," Polizzotti says.

"My son is obsessed with Michael Bublé, so they actually played Michael Bublé music in the background, which really helped soothe him. They gave him little headphones, and he slept through the whole thing."

Over time, the hospital added more MRI-compatible tools to keep kids comfortable inside the scanner, including a crib made of PVC pipes. They also began offering custom DockATots, oval-shaped pillows that cradle babies and prevent them from rolling around. "The DockATot company donated products to us," Mahan says. "They even changed the metal zipper to a plastic zipper so that we can use them to transfer sleeping children onto the MRI bed."

If all else fails, radiologists allow parents to join their children on the MRI bed during a scan. "Although it's not optimal, it can be

one of our last resorts to keep a child still," Robertson says.

When Blake Polizzotti returned for a spinal MRI about six months after his first exam, he tossed and turned until his mother joined him on the bed. "I had to do a half-plank over his legs for the duration of the 30-minute exam, but he fell asleep as soon as I got on the bed," Polizzotti says. "Because the team was so patient and willing to try anything, my son made it through both MRIs without sedation."

Reporting Results

Blake is just one of many sedation-free success stories at Boston Children's Hospital. Robertson estimates that prior to 2007,

about 55% of the hospital's patients were sedated for MRI exams, but now thanks to the Try Without Anesthesia program, only about 15% of children require sedation for these studies.⁶ For certain cases — like a high-resolution study for a pre-operation epilepsy evaluation, for example — sedation may still be the best option, but many children just need a little patience and preparation to get through an exam without anesthesia.

By working together with families to help children through imaging procedures without sedation, the radiology department is creating a more collaborative approach to care. "Through the Try Without Anesthesia program, families become more involved in

the MRI scan," Mahan says. "Even if patients must ultimately be sedated, families appreciate having the opportunity to at least try it first without anesthesia."

For the Polizzotti family, the program positively impacted their overall health-care experience. "It gave us a lot of peace of mind and relief," Polizzotti says. "My husband and I were thrilled that Blake didn't have to go through the sedation process. We're so thankful to the amazing team that runs this awesome program. You can tell that they want your baby to get through this as much as you do."

As the program moves forward, the team continues to explore new tools and creative techniques to prepare children



A Critical Role: Including Patients in Care Decisions



When most people think about the care team, they immediately think about radiologists, technologists, referring physicians, and nurses. But one of the most important members of the team is the patient.

In this Q&A, David Andrews, member of the ACR Patient- and Family-Centered Care Commission's Education and Outreach Committees, discusses how involving patients directly in their care can benefit both radiologists and patients, leading to improved outcomes.

Q. From a patient's perspective, why is it important for radiologists to work closely with other members of the radiology and care teams?

A. Radiology has made remarkable progress in recent years, but as with all medicine, it remains an imperfect science. Whenever human judgement is involved, it's always helpful to have additional opinions and insights as confirmation. This will be especially true as artificial intelligence (AI) becomes a more standard part of much radiological evaluation. Patients want accurate information.

Radiological evaluations are in pursuit of information that might warrant additional care. The more direct communication among the members of the care team, the more likely it is that accurate information continues throughout treatment and the care is timely and successful.

Q. Why should radiologists consider patients part of the care team?

A. Patients are not passive objects. We are often the critical ingredients in care transitions — from radiology to subsequent care. The more patients understand their conditions and possible consequences, the better they can coordinate that information with not only immediate care but also their future care.

From decisions about whether to seek care (including follow-up) to self-management of their health, patients are critical agents. The more engaged we are with our medical professionals, including radiologists, the more likely we are to actively work with medical professionals to regain or maintain our health.





for imaging. They're currently looking into augmented reality and even a therapy dog to keep kids at ease. It's all part of the group's ongoing commitment to minimize the use of anesthesia.

"As much as possible, we ought to avoid sedation of children for diagnostic imaging procedures," Robertson says, "but there's not one right way to go about this. It requires some experimentation and a real dedication to doing this because it's the right thing to do. You provide a valuable service to the patient, and in the end, it can actually be more efficient for your practice, as well."

By Brooke Bilyj

ENDNOTES

1. Xu HS, Cavaliere RM, Min RJ. Transforming the imaging experience while decreasing sedation rates. *J Am Coll Radiol.* 2020;17(1):46-52. doi.org/10.1016/j.jacr.2019.08.005.
2. Harned RK, Strain JD. MRI-compatible audio/visual system: impact on pediatric sedation. *Pediatr Radiol.* 2001;31(4):247-250. doi.org/10.1007/s002470100426.
3. Vanderby SA, Babyn PS, Carter MW, et al. Effect of anesthesia and sedation on pediatric MR imaging patient flow. *Radiology.* 2010;256(1):229-237. doi.org/10.1148/radiol.10091124.
4. Uffman JC, Tumin D, Raman V, et al. MRI utilization and the associated use of sedation and anesthesia in a pediatric ACO. *J Am Coll Radiol.* 2017;14(7):924-930. doi.org/10.1016/j.jacr.2017.01.025.
5. Jaimes C, Yang E, Connaughton P, et al. Diagnostic equivalency of fast T2 and FLAIR sequences for pediatric brain MRI: a pilot study. *Pediatr Radiol.* 2020;50(4):550-559. doi.org/10.1007/s00247-019-04584-1.
6. Robertson RL, Silk S, Ecklund K, et al. Imaging optimization in children. *J Am Coll Radiol.* 2018;15(3):440-443. doi.org/10.1016/j.jacr.2017.10.017.

Now It's Your Turn >>>

Follow these next steps to begin implementing a Try Without Anesthesia program in your practice, and tell us how you did at imaging3@acr.org or on Twitter with the hashtag #Imaging3:

- » Engage a committee to explore alternatives to anesthesia, evaluating tools and techniques to distract and relax young patients during imaging exams.
- » Adjust appointment times, imaging sequence protocols, and even the atmosphere of the prep room to make imaging exams more comfortable for young patients.
- » Develop instructions to help families practice at home before an imaging appointment to prepare children for the sounds and other sensory experiences of an MRI exam.

Q. What does it mean for patients to be part of the care team? What does that experience look like from a patient's perspective?

A. Patients know about themselves, their history, values, and goals in ways that no medical record can fully or accurately articulate. This information can be critical to successful radiological evaluation. When patients and radiologists communicate directly, patients can share this information with radiologists, helping in diagnosis.

Direct communication between radiologists and patients can also help ensure that patients and caregivers understand their diagnoses. Care transitions are the responsibility of patients or caregivers. The more the patient knows about the radiologist's findings, the more likely subsequent evaluations and treatments will occur and be successful.

Q. What can radiologists do to ensure patients are part of the decision-making process?

A. To meaningfully participate in decisions about their care, patients need information. If the patient is an object being evaluated and all the information is just shared among the medical professionals, their option will mostly be to accede to the suggestions of the medical professionals or decline. It will be only well-informed and assertive patients who will receive the options that they can effectively exercise.

At a minimum, radiology reports should be shared with patients — preferably in a form understandable to non-medical people. If not already, there should be AI applications that can accurately translate a radiological report into something that patients can understand and act upon. Patients have a critical role in all follow-up to radiological evaluation. Their possession of accurate and intelligible information about imaging can make them better members of the care team and promote meaningful connections that will improve all future medical engagement.

Q. Have you personally experienced an instance when a radiologist has made you feel like you were part of the care team? If so, can you explain?

A. As a patient, I have never had a direct interaction with a radiologist about my care — technologists, yes, radiologists, no. In a recent medical adventure, I had some incidental findings, which were initially identified via CT and later confirmed with ultrasound. It was recommended that one of those be followed up with a biopsy. The arrangements for follow-up were left to me.

The radiologist's report was provided to me to allow for more accurate communication with those who would arrange and perform the biopsy. I appreciated the ability to see the radiologist's report and was entrusted as an active agent in subsequent evaluation and treatment (if necessary). This isn't really the ideal "part of the care team" but as close as I've gotten. I've had lots of interactions with radiologists and discussions about patients being part of the care team in my work with ACR, but not in my personal healthcare.



Failsafe

Radiologists develop a program that encourages emergency department patients to follow up on incidental findings.

KEY TAKEAWAYS

- Radiologists at Penn State Milton S. Hershey Medical Center led a team in the development of a program that closes the gaps in follow-up of incidental findings for emergency department patients.
- Participants in the program receive a letter and phone call about their incidental findings and are encouraged to follow up with a primary care provider.
- Patients have been receptive to the program, responding particularly well to the follow-up phone call.

A patient visited the emergency department (ED) for a rib injury. A CT scan showed no broken bones, but the radiologist noted a pulmonary nodule in the patient's left lung and recommended follow-up imaging. At discharge, the emergency physician suggested that the patient follow up on the nodule with his primary care physician (PCP) — but that didn't happen.

Now, a year later, the patient is having another CT, and this time the radiologist suspects and a biopsy confirms the presence of lung cancer. The patient finally begins treatment, but the chances of a positive outcome have significantly diminished.

Scenarios like this one occur every day in hospitals nationwide.¹ At Penn State Milton S. Hershey Medical Center, radiologists have taken the lead to address the issue with Failsafe, a program that uses letters and phone calls to inform patients about incidental findings discovered in the ED and encourages them to follow up with their PCPs. And it's having a positive impact.

In the past six months alone, 70% of the patients that the Failsafe team has spoken with indicated that they didn't know about their incidental findings and follow-up recommendations until they received either the letter or the phone call. "The program goes beyond the standard of care to ensure patients can address incidental findings in a timely manner," says Michael A. Bruno, MD, FACR, professor of radiology and medicine and vice chair for quality and safety at Hershey Medical Center.

Uncovering the Cause

Bruno and his team developed Failsafe after they learned about ED patients at Hershey who didn't receive the recommended follow-up care for their incidental findings and, as above, presented later with advanced cancers. They found three gaps in the communication process for handling incidental findings in the ED: 1)



Michael A. Bruno, MD, FACR, professor of radiology and medicine and vice chair for quality and safety at Hershey Medical Center, led the creation of Failsafe.

the preliminary radiology report sometimes excluded incidental findings, which were later added at the stage of the final report but might not have been noticed by the emergency physician, 2) some ED patients didn't have a regular PCP, and if they did, the PCP generally was never alerted to the incidental findings and was often completely unaware of the patient's ED visit, and 3) the emergency physician occasionally failed to communicate the findings to the patient and/or PCP.

"As a result of these communication gaps, the majority of ED patients with incidental findings that required follow-up and their PCPs were never told about the findings," Bruno says.

Even when patients were informed of their incidental findings in the ED and told to follow-up with their PCPs, most didn't do it. "Patients have the sort of mistaken impression that when they go to the ED, they've been thoroughly evaluated by a doctor, so

they generally don't visit their primary care physician right after an emergency room visit," Bruno explains. "Patients don't realize that emergency physicians provide only acute management assessment and treatment of presenting conditions. And despite being instructed to do so, patients don't always understand the need to follow up with their primary care physicians."

Developing a Solution

To close these gaps, Bruno and his team initially thought about sending their reports to ED patients' PCPs. But most of the patients that the radiologists talked to couldn't provide their PCP's name, because they either couldn't remember it or they didn't have a family physician.

So instead, Bruno and his team opted to communicate their findings directly to patients. "We would use the patient to carry our message to their PCP, who could then discuss our findings and recommendations with the patient," Bruno explains. "Our thinking was that patients have the most amount invested in the information, so they would be the most likely to convey the message and help us communicate better with the clinicians we serve."

With Failsafe, the radiologists send patients letters informing them that they have incidental findings that require follow up with their PCPs. To protect patient privacy, the letters exclude specific findings or follow-up recommendations.

"The letters have minimal customization," says Bruno, whose signature appears on each one. "We have one for adults and another for children, both available in English or Spanish, but other than that, all of the letters are the same." Eventually, though, the team discovered that the letters alone were not enough.

Getting Team Input

After developing the Failsafe model, Bruno called several emergency physicians, PCPs, and other stakeholders to pitch the program. William M. Bird, DO, vice chair for clinical care in Hershey's Department of Family and Community Medicine, says he was relieved to learn about the program. "Most primary

care docs are concerned about a small irregularity getting overlooked and then having it come back to hurt the patient months or years later, when it could have been addressed earlier," Bird says. "We agreed with the radiologists that this was an important quality issue."

Glenn K. Geeting, MD, medical director for hospital quality and vice chair for quality in emergency medicine, also saw the program's benefits. "As emergency physicians, sometimes we receive the final radiology report after the patient leaves the ED, and we aren't sure what to do with the incidental findings," Geeting says. "The findings may not be significant enough to call the patient back, but at the same time, we worry they could be a potential risk to the patient down the line. This program solves that issue and gives us peace of mind."

With stakeholder support, Bruno and his team assembled a workgroup that included emergency physicians and PCPs, an attorney from the hospital's legal team, the chief quality and chief medical officers, and both the ED and radiology department chairs. The group hashed out the program's details, such as how to handle patients who didn't have a PCP.

"We agreed to take all of those patients as new patients," Bird explains. "The letter provides a number that patients without a PCP can call, and we make it a priority to address their findings as soon as possible."

Gauging the Impact

When Failsafe launched in 2012, Bruno sent a memo (see the memo at [acr.org/failsafe-memo](https://www.acr.org/failsafe-memo)) to care providers to ensure everyone knew about the program. The radiology department's administrative team then began sending the letters to patients without any additional follow-up. But Bruno knew he needed to actually speak with the patients to gauge the program's impact.

After the team had sent 100 letters, Bruno called about a dozen patients to hear their thoughts on the letter. "Some of the patients said the letter upset them a little, but mostly they were happy to get the information," Bruno says. "Of the patients I talked with, eight had already arranged their follow-up appointments, one said he wasn't going to follow up, and another said



[Date]

Dear [Patient name, e.g., "Mr. Smith"],

I am writing to you today because you recently had an imaging study in the Dept. of Radiology here at Penn State Hershey Medical Center (PSHMC) as part of your visit to our Emergency Department. Your study was interpreted by a PSHMC radiology doctor, who felt there were findings that may require follow up.

The PSHMC radiologist who reviewed your study does not know the details of your health history, and therefore can only give general recommendations; it is up to your primary care doctor to customize those recommendations and make a follow-up plan that is right for you. Therefore, we are writing to ask you to please contact your primary doctor directly and inform them that they need to evaluate the findings related to your recent radiology test for follow-up.

If your primary care doctor is here at PSHMC, he or she can obtain the full Radiology report and decide what, if any, follow-up is right for you. If your doctor is not affiliated with PSHMC, you can obtain a copy of our report yourself by contacting our Health Information Services Department, at 717-531-8055. If you plan to make an appointment with your doctor to discuss the findings of the radiology study, you should request a copy of the report at least seven (7) days prior to your appointment, so that you will be sure to have it with you when you see your doctor.

If you do not have a primary care physician at this time, you may obtain a referral to a provider from our Department of Family and Community Medicine by calling the PSHMC Care Line at 717-531-6955 or if you are outside of our local calling area, you can use our toll-free Care Line number, which is 1-800-243-1455. The Care Line is available 24 hours a day, seven days a week.

Thank you for allowing us to participate in your care.

Sincerely,

[Committee Member], M.D.

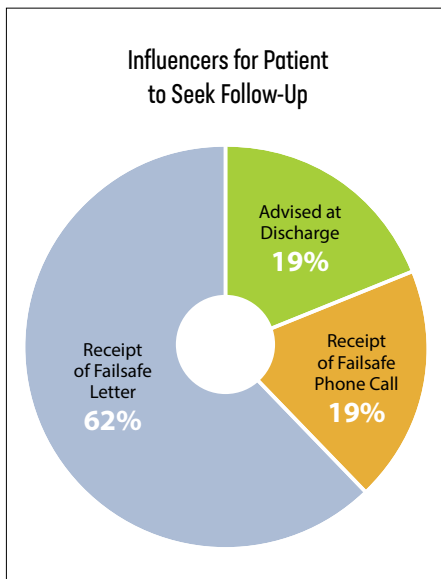
[Academic title]

Department of Radiology, Hershey Medical Center

A sample of the letter that patients receive through the Failsafe program.

she wasn't going to follow up, but since I called, she would."

From those initial calls, Bruno felt good about the program's impact. But after the team sent 500 letters, Bruno called another sampling of about 24 patients, and the response wasn't as positive. Most of the patients didn't bother returning Bruno's phone calls, and a majority of the patients he spoke with said they weren't concerned



Preliminary data shows that patients are more likely to follow up on incidental findings discovered in the emergency department with Failsafe.

about the letter. “Some said that they didn’t read the letter because they assumed it was about their bill, or they thought they already knew what it was about and just threw it away,” Bruno recalls. “Others said they didn’t think they needed to follow up.”

Expanding the Program

Realizing the program had an engagement problem, Bruno began advocating to hire a nurse to not only send the letters but also call the patients to ensure they received the letters and encourage them to schedule their follow-up appointments. Convincing hospital administrators to hire a nurse to manage the program wasn’t easy, but Bruno made the case with help from the chief medical and chief quality officers.

Specifically, the trio argued that if the program prevented just one lawsuit, it could potentially save the hospital millions of dollars. They also argued that revenue from the follow-up appointments performed at Hershey could offset the program’s cost, and that the nurse could also perform quality analysis. “These three arguments helped sway the more cost-conscious administrators, and so the hospital administration

ultimately decided to cover the nurse’s salary,” Bruno says.

Nicole Seger, MSN, RN, CPN, patient safety analyst, joined the team and began managing Failsafe in the first quarter of 2016. Around the same time, Bruno sent out another memo via the medical staff office to remind everyone in the Hershey care community about the program.

“It’s important that when you implement a program like this, your whole system knows about it because patients are going to ask questions and schedule appointments, and everybody needs to know what they’re referring to and what’s happening,” Seger says.

Informing ED Patients

In addition to hiring Seger, Bruno and his team worked with an IT expert to automate the Failsafe process and provide tracking capabilities. Now, when an ED patient has a non-critical incidental finding that requires follow-up, the reading radiologist enters the case into a program embedded within the department’s PACS, which puts the case on a list for an oversight committee member to review each week.

Once the committee member approves the cases, Seger enters them into a tracking system that automatically pulls the patients’ contact information and generates a letter for each case. Seger mails the letters and creates a flag in the system that reminds her to call the patients in 10 days to confirm that they have received the letters.

During the calls, Seger also collects and documents other information, like what the patients thought of the letter and whether they have scheduled their follow-up appointments. “Most of the patients I’ve called have been glad to receive the letter and have indicated that they intended to follow up with a PCP,” Seger says. “They also say the phone call, me reaching out to them directly, increased their motivation to follow up.”

Planning the Next Phase

In the past six months, Seger has sent 106 letters to ED patients with incidental findings

and reached 48 of them by phone. Of the patients she’s spoken with, 21% said that they planned to follow up with their PCPs.

“With this preliminary data, we’re already learning a lot about patient engagement and how to reach patients more effectively,” says Bruno, adding that the program will also help radiologists and other providers better understand the long-term impact of incidental findings follow-up.

While the team is just beginning to collect data about the program’s results, the anecdotes from patients and support from emergency physicians and PCPs has convinced Bruno to expand the program again in 2018. This time he’ll take it beyond the ED to include all of Hershey’s radiology patients.

“We knew the ED would provide a solid proof of concept to start, but we have other patients who have incidental findings that aren’t followed up as reliably as we would like,” Bruno says. “We think we could do more good if we included all imaging patients to ensure they have the information they need to follow up with their PCPs about our evidence-based recommendations. By doing so, we could save even more patients from enduring the potential harms associated with delayed care.”

ENDNOTE

1. Blagev DP, Lloyd JF, Conner K, et. al. Follow-up of incidental pulmonary nodules and the radiology report. *J Am Coll Radiol* 2014;11:378-383. Available at bit.ly/IncidentalFollowUp.

By Jenny Jones

Now It's Your Turn >>>>

Follow these steps to begin developing your own program for incidental findings follow-up and tell us how you did at imaging3@acr.org or on Twitter with the hashtag #Imaging3:

- » Identify the gaps in incidental findings follow-up at your institution.
- » Develop a program to close the gaps that includes sending letters and making phone calls to patients.
- » Bring stakeholders together to solicit their input and ensure everyone is on board with the program.



Finance and
billing staff



Physician assistants

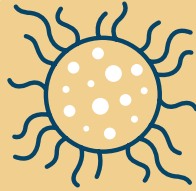


Medical physicists

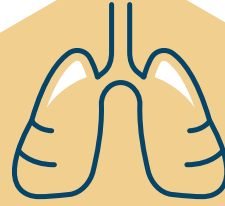
Hive Mind

Coordination among all members of the care team, including patients and families, is essential to increasing positive outcomes.

For more insights into how radiologists are collaborating across the enterprise, see the special section of the November 2020 ACR Bulletin at acr.org/bulletin-november-2020.



Oncologists



Pulmonologists



Referring clinicians



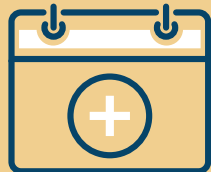
Patients



Emergency medicine



Patient advocates



Schedulers



Nurse navigators



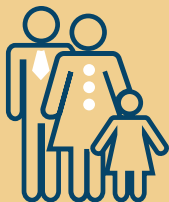
Tumor board



Technologists



Smoking cessation



Family members



Frontline staff



Information
technology



And many more
partners

Leadership Is for Everyone



In times of uncertainty, strong leaders are more important than ever before. To survive and thrive, every radiologist needs to fill gaps in non-interpretive skills. That's where the Radiology Leadership Institute® (RLI) comes in.

Built by radiologists for radiologists, the RLI teaches you the essential leadership and business skills you need to be a change agent in your organization.

Online Courses & Podcasts



Maximize Your Influence & Impact
Power Hour Webinar Series
RLI Taking the Lead Podcast

Live Events & Networking



RLI Leadership Summit
ACR-RBMA Practice Leaders Forum

For Residents & Fellows



RLI Resident Milestones
Kickstart Your Career
Leadership Essentials

With programming for radiologists who are leading change at all levels, the RLI can help you advance your career and master the challenges ahead.

Be a Leader

