

Case Study: Partners in Quality

With R-SCAN, radiologists and ED physicians achieve a 45 percent improvement in appropriate CT ordering for PE.

By Kerri Reeves

Key Takeaways:

- Radiologists and ED physicians in suburban Philadelphia collaborate on an R-SCAN™ project to reduce low-value CT imaging for pulmonary embolism.
- Reminding referring physicians about the ACR Appropriateness Criteria® for PE diagnoses with CT improves appropriate imaging and enhances quality of care.
- Distributing educational handouts to patients improves physician/patient engagement and increases patient satisfaction.

Pulmonary embolism (PE) is a life-threatening condition, affecting an estimated 300,000–600,000 people in the United States annually.¹ Occurring when a blood clot travels to the lungs, PE can be difficult to diagnose due to its non-specific symptoms: shortness of breath, chest pain, and palpitations.

For this reason, emergency departments (EDs) nationwide have ordered a steadily rising number of chest CTs for suspected PE over the years — with a fivefold increase from 2000 to 2009 alone.² But research shows that these exams are often unwarranted, resulting in unnecessary radiation exposure and escalating health care costs.

With this in mind, radiologists and ED physicians at Main Line Health's Riddle Hospital in suburban Philadelphia partnered to reduce inappropriate CT ordering for suspected PE in the hospital's ED.

R-SCAN Project

Ashima Lall, MD, MBA, FACHE, system chief of performance improvement for Radiology Associates of the Main Line, and Rebecca L. Pasdon, DO, emergency physician at Riddle, spearheaded the project using the ACR's [Radiology Support, Communication and Alignment Network \(R-SCAN™\)](#).

R-SCAN is a collaborative plan that brings radiologists and referring clinicians together to improve imaging appropriateness and optimization around more than a dozen [Choosing Wisely®](#) topics. Participants gain access to web-based educational resources, including [CareSelect Imaging](#), an expanded version of the foundational ACR Select clinical decision support (CDS) tool, which digitally delivers the [ACR Appropriateness Criteria® \(AC\)](#) at the point of order.

The Riddle team leveraged these tools to analyze the appropriateness of CT ordering for PE and to teach ED physicians about appropriate image ordering. They also used [Choosing Wisely](#) resources to teach patients about PE symptoms and the risks associated with CT radiation exposure.



Ashima Lall, MD, MBA, FACHE, system chief of performance improvement for Radiology Associates of the Main Line, engaged with emergency department colleagues at Riddle Hospital in a successful R-SCAN project.

Their efforts resulted in a 45 percent improvement in appropriate CT ordering for ED patients with suspected PE, and ED patients surveyed gave a largely positive evaluation of the educational materials. Here's how they did it.

Patient Involvement

From the start, Lall, who is also the director of PET/CT at Riddle and vice chair of the Quality Experience Committee under the ACR's Patient- and Family-Centered Care Commission, wanted to involve patients in the initiative — a first for an R-SCAN project.

Lall notes that PE is a terrifying prospect for patients, and recent press coverage about the dangers of radiation exposure exacerbates their worries. "We engaged the Patient Family Advisory Committee (PFAC) at the hospital, so the patient voice could be heard with this project," she says.

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Rebecca L. Pasdon, DO, helped distribute patient educational materials about CT for pulmonary embolism in the emergency department at Riddle Memorial Hospital.

Joanne Sunick, a member of the PFAC, who works with clinicians to improve patient care across Riddle, says that the group wholeheartedly supported the collaboration to improve CT ordering and was eager to provide insights into educating patients about PE.

The group agreed that distributing handouts about PE and CT would help empower ED patients to make shared decisions with their physicians. It emphasized that the materials should be presented at a level that every patient can easily understand.

“As a patient, it’s confusing when you’re trying to keep track of the acronyms, and you don’t know what they mean,” Sunick says. “Patients and families in the ED feel anxious enough; they don’t need anything more to worry about. Educational materials like this can help patients better understand their conditions and their diagnostic and treatment options.”

Based on the PFAC’s recommendations, Pasdon and the ED director worked with ED doctors to begin distributing a [Choosing Wisely handout](#) to patients with suspected PE. Written in patient-friendly language, the handout describes the likelihood of PE and its risk factors, as well as possible radiation dangers associated with CT.

“I’ve always explained to my patients what we were doing, why we were concerned, and what tests we

were ordering, but when they had the information sheet — something tangible to hold on to — that solidified everything,” Pasdon says.

Retrospective Analysis

In addition to educating patients about PE and CT, Lall and Pasdon followed R-SCAN’s quality improvement process to study CT orders and educate ED physicians about appropriate image ordering for suspected PE.

For the first step in the process, Lall and Pasdon conducted a retrospective analysis of 84 CT cases that ED physicians ordered for suspected PE during a three-month period.

Pasdon created a spreadsheet with validated clinical prediction rules to estimate PE probability for each patient. These rules aligned with AC and included Wells scores, pulmonary embolism rule-out criteria, and D-dimer test results.

Pasdon used this criterion to determine the low, moderate, and high levels of risk for PE. Only cases with a high level of PE risk were considered appropriate for CT.

Based on this scale, the retrospective analysis revealed that 63 percent of the CTs that ED physicians had ordered during the three-month period were inappropriate.

Educational Intervention

To improve imaging appropriateness, Lall and Pasdon conducted an educational intervention to teach ED physicians about image ordering for suspected PE.

During the educational intervention, Lall and Pasdon explained that for three months the ED physicians would use the CareSelect Imaging CDS tool to determine CT imaging appropriateness for patients with suspected PE. Leveraging the ACR AC, the tool takes into account medical history, basic exam results, and presenting symptoms to determine PE risk and the appropriateness of a chest CT — as also instructed by the American College of Emergency Physicians.³

All referring providers will be required to document that they have consulted CDS solutions, like CareSelect Imaging, once the Protecting Access to Medicare Act (PAMA) goes into effect in 2020. PAMA requires referring providers to consult AC before ordering advanced diagnostic imaging for Medicare patients in the outpatient setting.

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R-SCAN gives providers and radiologists a chance to familiarize themselves with CDS ahead of PAMA's implementation — something the team at Riddle appreciated.

Outstanding Outcomes

Following the educational intervention, Lall reviewed 90 cases of suspected PE in the ED and found that with CDS, the appropriateness of the ED physicians' CT orders for PE improved by 45 percent. "These results indicate that collaborative initiatives like R-SCAN can have significant impact on reducing unnecessary imaging for patients," Lall says.

Additionally, a quality nurse (or, in some cases, Lall herself) called 25 patients after they were discharged from Riddle to collect feedback about the educational handout. "It was important for me to hear the meaningful responses personally, not just look at the data," Lall says.

A majority of the patients said that they found the handout "very useful" and "of high quality." All respondents recommended that the CT information be shared with future ED patients.

"Patients really responded positively to the handouts," says Pasdon. "Patients want to be involved in their care. When patients understand what's happening to them, they are more actively engaged and empowered. Giving them even this small piece of the puzzle is really important."

Future Plans

Based on these results, Lall envisions using R-SCAN to improve appropriate image ordering in other areas, like primary care. ([View a poster outlining the project results.](#))

She describes R-SCAN as an "easily scalable and amazing platform" for better patient engagement

across health care. Both Lall and Pasdon say that sharing best practices like these is critical to providing more appropriate, affordable care.

"We need to keep innovating and building on what's been done," Lall says. "R-SCAN provides an opportunity to do that in an engaging and effective way."

Endnotes

1. National Heart, Lung and Blood Institute. What Is Pulmonary Embolism. <https://www.nhlbi.nih.gov/health-topics/pulmonary-embolism>. Accessed May 19, 2018.
2. Venkatesh, AK, et al. Trends and variation in the utilization and diagnostic yield of chest imaging for medicine. *AJR Am J Roentgenol*. 2018; 210(3): 572-577.
3. Choosing Wisely. American College of Emergency Physicians. October 27, 2014. <http://www.choosingwisely.org/clinician-lists/acep-ct-pulmonary-angiography-in-ed-patients>. Accessed May 18, 2018.

Next steps

- Determine which referring groups would benefit from a radiology-led educational intervention to improve appropriate image ordering.
- Enroll in R-SCAN and use the tools to educate referring physicians about appropriate image ordering.
- Identify areas of need for patient education and distribute handouts to engage and empower patients.

Share Your Story

Have a case study idea you'd like to share with the radiology community? To submit your idea, please [click here](#).



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