

## Case Study: In Sync

### *Radiologists and ED physicians use R-SCAN™ to bolster their relationship and improve imaging appropriateness for pediatric patients.*

By Jenny Jones

#### Key Takeaways:

- Radiologists and ED physicians at Northwest Medical Center teamed up on an R-SCAN project to reduce inappropriate CT ordering for minor pediatric head injury.
- The radiologists and ED leaders initiated an educational intervention that led to a 16 percent reduction in inappropriate CT ordering for minor pediatric head injury in the ED.
- The project helped strengthen the relationship between the radiologists and ED physicians and set the stage for increased collaboration over time.

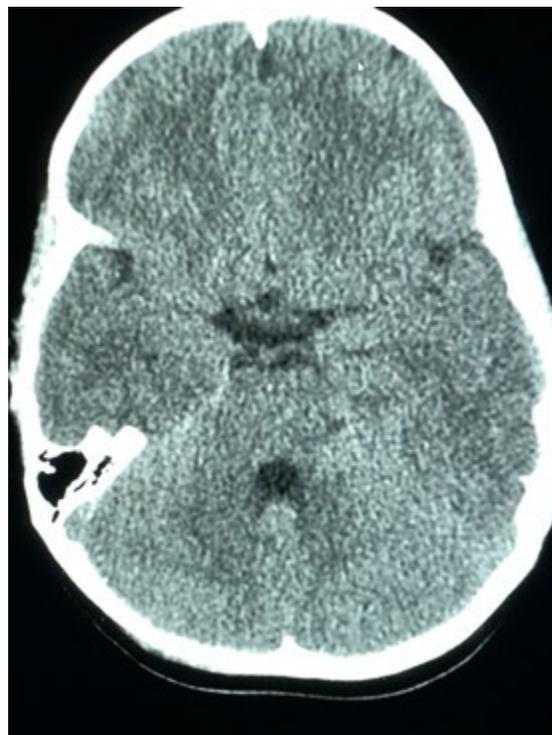
The radiologists with Envision Physician Services are always looking for ways to strengthen their relationships with referring providers at Northwest Medical Center in Ft. Lauderdale, Fla. So when they heard about the [ACR's Radiology Support, Communication, and Alignment Network \(R-SCAN™\)](#), which brings radiologists and ordering providers together to improve imaging appropriateness, they eagerly enrolled to collaborate with their clinical partners on a project that would meaningfully impact patient care.

The result was not only a 16 percent reduction in inappropriate image ordering for minor pediatric head injury in the ED, but also an enduring dedication to coordinated care delivery.

Adam M. Gittleman, MD, chief of radiology at Northwest Medical Center, and Bao T. Doan, MD, national medical director of radiology services with Envision Physician Services, led the project. After reviewing the dozen-plus [Choosing Wisely®](#) topics that support R-SCAN, the pair decided to pursue the [CT for Minor Pediatric Head Injury](#) topic, which recommends forgoing CT for the immediate evaluation of minor pediatric head trauma and instead using the [Pediatric Emergency Care Applied Research Network \(PECARN\)](#) criteria to determine imaging appropriateness.

"We selected this topic because we were receiving a lot of CT orders for minor pediatric head trauma," Gittleman says. "We wanted to collaborate with ED physicians to improve appropriate image ordering and reduce unnecessary radiation exposure for pediatric patients."

With this in mind, Gittleman and Doan approached Northwest's ED and pediatric medicine leaders about the number of CTs the ED physicians were ordering for minor pediatric head trauma and suggested that R-SCAN could help improve ordering practices. Bruce S. Whitman, DO, who was the site medical director in Northwest's ED at the time, and Ann Marie Font, MD, associate medical director of pediatrics at Northwest, both immediately agreed to participate in the project. "Our group supported the project because CT scans deliver a lot of ionizing radiation, and we're all committed to reducing radiation exposure in pediatric patients," Font says.



Radiologists and ED physicians at Northwest Medical Center collaborated on an R-SCAN project to reduce inappropriate head CTs for pediatric patients with minor head trauma.

In addition to reducing unnecessary imaging, Whitman recognized that R-SCAN would help the ED team meet the care improvement requirements outlined in the [Merit-based Incentive Payment System \(MIPS\)](#). "We knew MIPS was coming and that R-SCAN would help us document our progress to meet the performance criteria," Whitman says. "It was a good way for us to work with our radiology colleagues to educate our providers and, in turn, educate our patients and families about imaging appropriateness and radiation safety."

### Reducing Unnecessary Radiation

While all patients should be aware of the possible effects of radiation exposure, it is especially important for pediatric patients whose particular sensitivity to ionizing radiation may increase their cancer risk. A single CT scan delivers 1-2 millisieverts of radiation or the equivalent of about 100 chest X-rays — which

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Continued on next page

## Case Study: In Sync



Continued from previous page



Adam M. Gittleman, MD, chief of radiology at Northwest Medical Center, led an R-SCAN project to reduce inappropriate CT scans for minor pediatric head trauma.

may significantly impact children. “Part of the problem is that radiation is cumulative, meaning it stays with children throughout their lifetimes,” Doan explains. Still, Choosing Wisely reports that EDs nationwide order CTs for 50 percent of children with head injuries, and many of these scans may be unnecessary. “With R-SCAN, we thought we could make a big difference in reducing radiation exposure by preventing many unnecessary CT scans among our pediatric patients,” she adds.

In partnership with ED and pediatric leaders, Gittleman and Doan began following R-SCAN’s three-phase quality improvement approach: pre-interventional analysis, educational intervention, and post-interventional analysis. For the pre-interventional analysis, Gittleman and Whitman went back six months and randomly pulled 50 cases in which ED physicians ordered CTs for children with minor head trauma. “We spent a couple hours manually searching our radiologist information system and reviewing cases to see whether the ordering physicians followed the PECARN criteria,” Gittleman says. “If they followed PECARN, the CT was considered appropriate, and if they didn’t follow the criteria, the CT was considered inappropriate.”

The analysis revealed that about 45 percent of the cases were appropriate, while about 55 percent of the cases were inappropriate. “This was a retrospective review, so we didn’t have all of the information that the ordering physician would have had at the time,” Gittleman notes. “But we were concerned that more

than half of the CTs for pediatric patients didn’t meet the PECARN criteria and were therefore deemed inappropriate. We thought we could do better.”

### Educating Ordering Providers

Northwest’s ED physicians didn’t regularly follow the PECARN criteria before starting the project because the guidelines weren’t readily available in the hospital’s EHR, Whitman says. Unable to quickly consult the criteria in the fast-paced department, the ED physicians often ordered CT scans for patients with minor head injury — mainly because parents and families insisted. “Many times, physicians order studies because parents are worried about their children and want imaging to confirm they are okay,” Whitman explains. “In the past, our ED physicians didn’t have evidence at their fingertips to show parents that the studies were not clinically necessary.”

To change that, the radiologists partnered with ED and pediatric leaders for the project’s educational intervention phase. Gittleman and Doan shared [R-SCAN’s educational resources](#) with the leaders and attended departmental meetings to discuss the PECARN criteria. To ensure everyone was on the same page, Font talked to her team of pediatricians about the importance of reducing unnecessary radiation and informed them that the ED physicians would be using the PECARN criteria to determine imaging appropriateness.

On his end, Whitman used email to distribute the resources to his team members, including ED physicians, physician assistants, and nurse practitioners. He also met with his team to develop a plan for deploying the PECARN criteria in the ED. “We discussed how to let families know that we are using a clinical decision rule based on nationally recognized scientific data to determine whether CT scans were necessary,” Whitman says. “Everyone in the department was onboard and appreciated the opportunity to improve image ordering for our pediatric patients.”

From there, the radiologists and ED leaders worked with the hospital’s EHR vendor to integrate the PECARN criteria into the system. Now, when an ED physician orders a CT for pediatric head trauma, the system automatically provides a checklist to determine whether a CT is appropriate based on the PECARN criteria. “Time is the biggest factor in a busy emergency room,” Whitman says. “Having PECARN embedded within our EHR improves image ordering without impeding our workflow.”

If a CT scan is deemed inappropriate, the ED physician discusses it with the family. “The ED doc reviews the criteria with the family and explains that a CT scan is not necessary based on national data,” Whitman says. “These conversations take some time, but the families

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Continued on next page

## Case Study: In Sync



*Continued from previous page*

seem to appreciate the information. They ultimately decide whether to proceed with the scan.”

### Measuring the Impact

Six months after completing the educational intervention and implementing the PECARN criteria, the radiologists and ED physicians moved to the next phase of the R-SCAN project — post-interventional analysis. For this phase, the hospital’s IT department created a pediatric head trauma worklist within the hospital’s PACS and collected 50 cases for pediatric patients who suffered minor head trauma.

Using those cases, Gittleman and Whitman conducted another retrospective review to determine whether appropriate image ordering for pediatric head trauma had improved as a result of their combined efforts. This analysis showed that the data had in fact flipped — with about 54 percent of cases deemed appropriate and about 46 percent of cases deemed inappropriate based on the PECARN criteria.

Additionally, the team looked at the total number of head CTs that the ED physicians had ordered between December of 2016 and February of 2017 (pre-interventional) and the number of CTs they had ordered between December of 2017 and February of 2018 (post-interventional). This analysis showed that of the 68 total head CTs ordered for pediatric patients during the pre-interventional phase, about 44 percent were for minor head trauma, and of the 84 total head CTs ordered for pediatric patients during the post-interventional phase, about 37 percent were for minor head trauma.

“So we not only saw a 16 percent reduction in inappropriate image ordering as a result of our work, but we also saw a 20 percent reduction in the total number of head CTs ordered for minor head injury,” Gittleman says.

The project’s quantifiable results have helped Gittleman and Doan convince their radiology colleagues to make quality improvement a priority. The pair shared the project with their team, using this [PowerPoint presentation](#). “Sometimes we do things over and over without really pausing to contemplate whether we’re doing them in the best way possible,” Doan says. “A project like this allows us to look back at our processes and see that when we tweak them a little, we can make things better for us, our care partners, and, ultimately, our patients without even disrupting our workflow. It’s very rewarding when you see the positive impact of your efforts — especially when caring for our youngest and most vulnerable patients.”

### Strengthening Care Partnerships

In addition to achieving quantifiable results, the project has helped strengthen the relationship between



Bao T. Doan, MD, national medical director of radiology services with Envision Physician Services, says R-SCAN helped the team at Northwest reduce radiation exposure in some of its most vulnerable patients — children.

the radiologists, ED physicians, and pediatricians at Northwest. “Our groups have always had a collaborative relationship, but R-SCAN has encouraged us to interact even more,” Gittleman says. “We’re friendlier with one another, and we engage in conversations more often than we did before. That kind of collegiality leads to more coordinated patient care.”

Whitman agrees and says that the project has empowered the ED physicians to consult with the radiologists more frequently. “During this project, we communicated more directly with the radiologists, particularly with Dr. Gittleman, and now, our providers know that they can call the radiologists with questions about which tests are appropriate based on the clinical condition,” he says. “The radiologists are always willing to talk with us so we can treat our patients better. We look forward to continuing our collaboration to improve ordering of CTs and other imaging studies.”

Everything went so well, in fact, that the radiologists and ED physicians are preparing to partner on another R-SCAN project — this one aimed at reducing inappropriate CTAs for patients with suspected pulmonary embolism. “Reducing unnecessary CTAs is also part of the MIPS criteria and also involves radiation reduction,” Whitman says. “It will help us treat our patients more appropriately. It’s a good project all around.”

The radiology and ED teams hope to launch the PE project at Northwest Medical Center before eventually

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*Continued on next page*

## Case Study: In Sync

*Continued from previous page*

taking it across Envision Physician Services, which employs thousands of radiologists and other specialty providers nationwide. “We couldn’t expand our pediatric head trauma project across the network because only some of our facilities offer pediatric care, but all of our facilities see patients with suspected PE,” Doan explains. “The ultimate goal is to get every hospital that we service involved in this project. If we do this on a national basis, we think we’ll get even more significant results and improve patient care on an even larger scale.”

### Next Steps

- Enroll in R-SCAN and partner with referring providers to improve imaging appropriateness for enhanced patient care.
- Follow R-SCAN’s three-step quality improvement process and measure results, incorporating the PECARN criteria where appropriate.
- Educate patients and families about appropriate imaging and radiation safety and use evidence-based guidelines to educate them about the most clinically appropriate care pathway.

### 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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