

Case Study: Championing CDS



Using ACR's new CDS R-SCAN Registry interactive report, New York City's Jamaica Hospital significantly improves high-value CT imaging in the ED.

By Kerri Reeves

Key Takeaways:

- A team of physicians at a New York hospital used the ACR's CDS R-SCAN Registry to carry out a Radiology Support, Communication and Alignment Network (R-SCAN)TM quality improvement project.
- Radiologists and emergency department physicians collaborated on the project to improve high-value CT imaging in adult minor head trauma cases.
- After the project team used a personalized approach to education, ED physicians altered CT ordering behavior to achieve consistency, improve safety, and reduce waste.

Health systems nationwide are working to implement clinical decision support (CDS) in response to the 2020 deadline for the [Protecting Access to Medicare Act \(PAMA\)](#), which requires referring providers to begin implementing and training to use CDS when ordering advanced diagnostic imaging exams for Medicare patients. At Jamaica Hospital in Queens, N.Y., Sabiha Raof, MD, FACR, FCCP, ensured that her hospital stayed ahead of the curve, when she started advocating for hospital-wide CDS implementation four years ago.

Beginning in 2015, the 408-bed safety net hospital, which provides care regardless of patients' insurance status or ability to pay, incrementally started instituting CDS throughout most of the facility. By the spring of 2019, Jamaica Hospital had just one more group to reach: the emergency department (ED). The ED physicians, who previously became overwhelmed with the extra steps the electronic health record (EHR) added to their workflows, were reluctant to integrate another new system. To help the ED acclimate to consulting CDS for imaging orders, Raof proposed using the ACR's new [CDS R-SCAN Registry](#) to conduct an R-SCAN quality improvement project.

Initially funded through Center for Medicare and Medicaid Innovation's Transforming Clinical Practice Initiative and now a fully ACR-supported program, R-SCAN brings radiologists and referring physicians together to improve image ordering and ensure patients receive the most appropriate exams for their clinical indications. R-SCAN quality improvement projects focus on the most frequently ordered exams and include a pre-interventional analysis, educational intervention, and post-interventional analysis.

Participants have access to free educational resources that address evidence-based exam ordering, including PowerPoint presentations, white papers, and podcasts. Clinicians whose facilities have the [CareSelect® Imaging CDS](#) platform integrated into their EHRs can also use the new CDS R-SCAN Registry interactive report for deeper insights about imaging exam ordering patterns. As an early adopter of CDS, use of the registry report to conduct an R-SCAN quality improvement project was a natural progression



Sabiha Raof, MD, FACR, FCCP, proposed an R-SCAN project at Jamaica Hospital Medical Center for improved CT ordering in the ED. It was the first of its kind to use clinical decision support for both the pre- and post-interventional phases of the project.

for Jamaica — the first in the United States to take advantage of this new tool.

In reviewing the R-SCAN topics, Raof, radiology chair, chief medical officer, and patient safety officer at Jamaica, was drawn to one topic in particular: CT for adults with minor head trauma. Neuroradiologists and ED managing physicians had suspected that the hospital's ED doctors' ordering patterns varied for these cases. Raof saw an opportunity to partner with lead ED physicians to improve ordering around the topic. She was right. The project demonstrated a 33% improvement in high-value CT ordering for this patient population when comparing results for the three-month pre-and post-interventional periods. The team also achieved a 12% reduction in overall CT ordering volume in the ED.

"After the intervention, we were pleased to discover we were performing more high-value studies for minor head trauma and significantly improving patient safety," Raof says. "The patients who really needed the CT

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Shi Wen Lee, DO, vice chairman of emergency medicine at Jamaica Hospital, was a lead ED physician on the R-SCAN project to improve consistency of CT ordering for adult minor head trauma.

studies were getting them and those who didn't weren't. Plus, the utilization numbers going down within our capitated model is a big financial win for us."

Implementing CDS

Raooof began advocating for CDS implementation at Jamaica Hospital in 2015. She frequently gave presentations about CDS at department- and hospital-wide meetings using data to illustrate how having the right information at the point of order improves patient care and reduces costs. This was enough to persuade Jamaica's administrators to begin adoption of the technology. "Once we had the backing and buy-in of administration, it was easy to implement CDS," Raooof says.

Jamaica implemented CDS for inpatient care before expanding it across the hospital's ambulatory care network. Working with the CareSelect vendor, the hospital was able to seamlessly integrate the CDS tool into its EHR, allowing smooth implementation into the clinicians' workflow. Jamaica's radiologists offered a consult service to answer ordering physicians' questions about the CDS tool.

By the end of 2015, referring physicians throughout much of the hospital were using CDS, which provides guidance at the point of order about the utility of various imaging exams and their associated radiation exposure and estimated cost considerations. "This information helps referring physicians make the best possible decision about what to order," Raooof says.

Identifying an Opportunity

While Jamaica has widely used CDS since 2015, the ED physicians were not using the tool. ED physicians typically use clinical pathways taught in residency when deciding whether or not to order CTs in adult minor head trauma cases, resulting in exam ordering variability, explains Shi Wen Lee, DO, lead ED physician on the R-SCAN project. "It's hard to say we were 'overordering,' but I knew that we could be more consistent in our ordering practice," Lee says.

Anecdotally, both Jamaica's ED physicians and radiologists were aware of the inconsistency problem, but they had never officially quantified it or attempted to address it. That's where the R-SCAN project came in, says Raooof, who called Lee about partnering on the project. "We knew this was an opportunity to eliminate any unnecessary exams and provide only high-value imaging for the patient," she says.

ED physicians shared Raooof's objective of enhancing patient care and safety. They also recognized that R-SCAN would get them using CDS as PAMA requires. "When the radiologists approached us about the project, we were in agreement and thought we could use R-SCAN to give us some direction," Lee says. "Inconsistent ordering practices can slow us down in the ED, since unnecessary studies tend to prolong lengths of stay in the department."

Conducting Analysis

For the pre-interventional phase of the R-SCAN project, Raooof used the CDS R-SCAN Registry report to conduct a retrospective analysis of 673 CT exams ordered in the ED for adult minor head trauma from Dec. 1, 2018, to Feb. 28, 2019. A team of radiologists, neuroradiologists, ED physicians, and ACR's R-SCAN project director met to review the CDS data and analysis, which showed that Jamaica's ED physicians were inconsistently referring patients for CT scans, and that 67% of the exams were of low value.

The team identified the indications for which physicians inconsistently ordered imaging, as well as the clinicians who routinely ordered the highest number of exams. They discussed the need to improve consistency, and also noted how leveraging CDS data for this goal would complement other radiation safety measures in place at the hospital, including participation in the [ACR Dose Index Registry](#), use of Dose Watch software, and physicist review of doses and protocols, to improve care. "We used these meetings to say, 'This is where we are with our high-value imaging numbers, and this is where we'd like to be,'" explains Raooof, the first R-SCAN participant to use CDS throughout the project.

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To reach its high-value imaging goals, the group decided to implement the [Canadian CT Head Rule](#) to help ED physicians determine whether patients with minor head trauma require imaging. If a patient meets the imaging requirements under the Canadian CT Head Rule, the ED physician then uses the CDS tool that automatically pops up in the EHR to determine whether a CT is high value based on the patient's clinical indications. With the rule and CDS as the basis of their intervention, Raof and Lee, along with ED physician Morgan Chen, MD, devised a plan to educate Jamaica's ED physicians about the issues surrounding inconsistent ordering and how to correct those issues to achieve high-value CT ordering for adult minor head trauma cases.

Educating Physicians

Lee and Chen presented the CDS analysis that revealed ordering inconsistencies and shared the Canadian Head Rule and CDS solution in department-wide meetings in early 2019. Unfortunately, this intervention alone did not yield significant improvements in ordering consistency. "In a group setting, no one thinks you're speaking directly to them," Lee says.

Realizing that a more personalized educational approach could generate a more significant impact, the R-SCAN team analyzed the ordering habits of specific physicians using their national provider identifier (NPI) numbers within the CDS report. "We set up private meetings with individual ED physicians and shared the data specific to them, noting changes that each physician could make in future cases to improve high-value imaging. This had a huge impact on them," Lee reports, noting that in many cases, rushed physicians were simply choosing incorrect indications from the list.

Working collaboratively with individual ED physicians to improve high-value imaging, as opposed to instituting broad mandates, was critical, Lee says. "By showing

them the appropriateness scores of their imaging orders and the Canadian CT Head Rule guidelines, we weren't saying, 'You can't order this CT,' we were saying, 'It's okay not to order it,'" he explains.

The team also made a [library of R-SCAN materials](#) specific to CT for adult minor head trauma available to the ED physicians and posted the Canadian CT Head Rule guidelines at each workstation. By regularly reminding ED physicians of the approved indications for CT ordering in department meetings and by posting educational materials, the project team reinforced the mindset to reduce unnecessary tests throughout the department.

Reaping Results

Following the personalized educational component of the R-SCAN project, Raof analyzed minor head trauma CT ordering in the ED via CDS from April 1 through June 30 of 2019. Physicians ordered 568 CT exams, down from 673 during the three-month pre-interventional review. In addition to reducing overall ordering, the team improved the ordering of high-value exams from 202 (30%) at baseline to 386 (68%) post-education. The number of low-value exams plummeted from 488 (67%) at baseline to 157 (28%).

In all, Jamaica realized a 33% improvement in high-value CT ordering for adult patients in the ED with minor head injury and a 12% reduction in ordering volume.

"At Jamaica, radiologists and ED physicians were able to improve patient care and reduce waste by ensuring that imaging exams were appropriate and necessary," Raof says, noting that Jamaica's sister hospital in Flushing, N.Y., is also conducting an R-SCAN project in the ED with the same goal of improving high-value imaging.

Based on the success of the R-SCAN project, Jamaica's ED will build on the lessons it learned by continuing to

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follow the Canadian Head Rule for adult head trauma and consistently using CDS for image ordering, Lee says. "The entire healthcare system is changing into a value-based model, in which we need to provide the highest quality care to our patients and in a cost-effective manner," Raoof says. "Any unnecessary testing or lab work drives up the costs, so we need to take charge and prevent that from happening. Beyond that, radiologists need to get out of the reading rooms and interface with both patients and referring physicians. This R-SCAN project is one way to do that with measurable results."

Next steps

- Encourage widespread implementation of CDS among referring providers to improve decision making about appropriate imaging and deliver better patient care.
- Review the R-SCAN topics and select one that will help improve high-value image ordering within

your institution. And learn about participation in the [CDS R-SCAN Registry](#).

- Work with other departments to generate a plan for an educational intervention that focuses on increasing the use of high-value imaging.

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