

## Case Study: Ordering Done Right

**A nurse practitioner uses R-SCAN® as an educational tool to improve nuclear stress test ordering by 27 percent at a VA hospital.**

By Chris Hobson

### Key Takeaways:

- A nurse practitioner and a Lean Six Sigma expert teamed up to reduce the number of low-value nuclear stress tests ordered in the Veterans Affairs healthcare system.
- Deploying R-SCAN® addressed a Veterans Health Administration policy to limit veterans' exposure to radiation.
- The R-SCAN collaboration with primary care physicians helped the team increase the ordering of high-value nuclear stress tests.

In 2017, Lee Ann Miller, DNP, a cardiology nurse practitioner in the stress lab of the Veterans Affairs Health System in Indiana, began noticing the nuclear stress test orders her department received annually seemed high compared to orders for exercise stress tests, which don't typically involve imaging. Miller conducted a literature search that confirmed her suspicions that nuclear imaging exams were being over-ordered.

As the cardiology nurse practitioner who oversees stress test orders, Miller frequently changed these orders to the more appropriate test based upon cardiac risk factors, clinical symptoms derived from a chart review, and evidence-based guidelines. The Veterans Health Administration policy handbook mandates that providers limit veterans' exposure to radiation.

"The inappropriate utilization of these tests raises concerns for patient safety because unnecessary amounts of radiation exposure can negatively impact veterans," Miller says.

Patients also began raising concerns about radiation exposure, questioning the amount of radiation they were receiving, Miller explains. All signs pointed to one conclusion: referring providers needed a better way of determining which study to order when assessing veterans' cardiac health. To address the issue, Miller initiated a quality improvement project through ACR's Radiology Support, Communication, and Alignment Network (R-SCAN®) to educate referring providers about appropriate image ordering. The result has been a 27 percent reduction in unnecessary nuclear stress test orders.

### Removing the Stress from Stress Testing

Although nuclear stress testing is valuable for assessing the cardiac health of veterans and other patients who have moderate-to-high risk factors for cardiovascular disease, judicious ordering of the test — following evidence-based guidelines — is important in avoiding the potential for patient discomfort or harm, along with the hazards implicit in radiation exposure, costs, and unnecessary testing without a commensurate benefit.



Lee Ann Miller, DNP, a cardiology nurse practitioner in the stress lab of the Veterans Affairs Health System in Indiana, led an R-SCAN project that increased high-value nuclear stress test orders.

R-SCAN is a step-by-step quality improvement program to enhance imaging care. The program provides free online access to [CareSelect Imaging™](#), a clinical decision support (CDS) technology that delivers the ACR Appropriateness Criteria® (AC) in electronic format. The program has a series of topics that participants can choose from, or they can take the approach that Miller chose and create their own project.

"Because R-SCAN incorporates evidence-based guidelines to assess the value of imaging tests performed, it was an attractive program to help our organization evaluate our adherence to best practices for nuclear stress tests," states Miller. And in the end, it proved a valuable teaching tool for referring providers, leading to the desired reduction in radiation exposure.

Although radiologists typically initiate R-SCAN projects, the program is set up to allow any clinician, including an NP like Miller, to register and lead the project. "However," Miller states, "I was able to consult with the facility radiologist regarding my project plan. He

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Andrea D. Bearden, nurse practitioner at the VA Northern Indiana Healthcare System, participated in the R-SCAN project to increase high-value nuclear stress test orders.

remarked that my project would greatly help reduce unnecessary imaging, and he encouraged me to engage in face-to-face education with ordering providers. So that's exactly what I did."

### Taking a Novel R-SCAN Approach

Miller's first step in the R-SCAN project involved identifying referring physicians with whom she could partner to improve their image ordering behaviors. This group consisted of all 39 primary care providers (PCPs) in her health system who regularly place nuclear stress test orders. Since the health system is comprised of 39 PCPs and only 3 cardiologists, says Miller, the burden of cardiovascular risk stratification falls on primary care. Once she identified the target physician pool, Miller pitched the R-SCAN program to the PCPs at three primary care sites located in northern Indiana.

Miller's novel approach included submitting her R-SCAN project to the hospital's Systems Redesign Committee, meeting Lean Six Sigma designation. Lean Six Sigma is a team-based concept aimed at identifying and reducing variation and waste to improve performance. Once the committee approved Miller's project, Tresia Odle, facility systems redesign coordinator who oversees all Lean Six Sigma improvement projects for VA Northern Indiana Healthcare System, joined the project as a coach. For the purposes of this R-SCAN project, Odle's coaching involved acting as a mentor for the project team leader and facilitators, ensuring that objectives were met.

Miller's drive to instill inter-professional cooperation hinged on whether the providers were ready to

improve their ordering practices. It turns out that they were more than ready. A number of cardiac stress test orders entered by PCPs included specific questions regarding the appropriateness of the orders, states Miller. "The PCPs asked the cardiology providers for guidance regarding the necessity for stress tests and myocardial perfusion imaging," she explains.

"The change project warranted collaboration with the health system's medical director, informatics director and informatics nurse, the system redesign coordinator, a cardiologist, a primary care physician, and a nurse practitioner," Miller says.

### Educating Referrers

R-SCAN creates educational opportunities in which project leaders present evidence-based guidelines to referring providers about best practices for appropriate image ordering. At the R-SCAN project's outset in May of 2018, each participating PCP attended an educational program presented at a mandatory monthly meeting. During these meetings, clinic times were blocked to ensure attendance. Each primary care access team comprised between 5 and 14 members. These small groups allowed for a more intimate educational experience during which PCPs could ask questions regarding appropriate stress test ordering.

Miller educated providers about the appropriate indications for ordering a nuclear stress test based on the ACR's AC. And she gave ordering providers access to a CDS tool integrated with her health system's electronic health record that provided guidance about when — and when not — to order a nuclear stress test.

During this educational period, Odle was instrumental in coordinating meeting times with the relevant departments — including the chief of staff's office, acute medicine, and primary care departments — to allow Miller to speak with the participating physicians, all of whom regularly order exercise stress and nuclear imaging stress tests. The content of Miller's educational sessions referred to indications for appropriate cardiac stress tests, contraindications, chest pain, and categories of chest pain. Miller incorporated key concepts from [Choosing Wisely](#)® to help providers understand appropriate test ordering.

In addition to face-to-face meetings with ordering providers, Miller also provided education at medical staff meetings and Patient-Aligned Care Team meetings, the latter of which included a PCP, RN, LPN, and an administrative assistant. Miller and Odle asked for the Patient-Aligned Care Team's feedback to ensure R-SCAN worked for everyone.

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Post-Education Case Data Summary		
Number of exams entered	37	
Average exam value rating	7.08	
<b>Exams ordered ratings</b>	<b>#</b>	<b>%</b>
Exams ordered rated high value:	27	73%
Exams ordered rated medium value:	10	27%
Exams ordered rated low value:	0	0%
<b>Reasons recorded for low value exams</b>	<b>#</b>	<b>%</b>
Contraindication	0	0%
Patient Preference	1	10%
Physician Preference	5	50%
Unknown	0	0%
Other	4	40%
<b>Total</b>	<b>10</b>	<b>100%</b>

Table 2. Post-intervention cardiac stress test order data for the year 2018.

One of the program participants was Andrea D. Bearden, nurse practitioner at the VA Northern Indiana Healthcare System, who is an ordering provider. When Miller presented during an advanced practice nurse meeting about radiation exposure to nuclear imaging patients, Bearden admits to being surprised.

"I did not realize how much radiation nuclear imaging patients are exposed to," Bearden says. "From that point forward, I wanted to ensure that I was not ordering unnecessary nuclear imaging. I wanted to order tests appropriate to the specific patient, based on evidence."

Once the educational sessions were completed and referring providers understood how to use the CDS tool, Miller waited 10 weeks before she began collecting post-intervention data. From there, she reviewed each nuclear stress test ordered and rated its value using the CDS tool, allowing her to give quick feedback to a given ordering provider. "They wanted to increase the value of the stress tests, so they would call me to help them with their decision-making for stress tests or cardiovascular risk stratification of veterans in their clinics," says Miller. "Also, since the CDS tool was new, I would walk them through any questions or difficulties they may have had."

## Quantifying Success

Taking stock of participating referring providers' historical ordering patterns, weeks three and four of the 10-week project included a retrospective case review of the previous year's nuclear stress test orders. (Shown in [Table 1](#) and [Figure 1](#))

"Our goal was to leverage R-SCAN to increase the number of high-value nuclear stress test orders by 25 percent — from 46 percent to 71 percent by the close of August of 2018," Odle says.

After the post-educational process ended, Miller began analyzing data again — and the results were encouraging. As a direct result of Miller's educational efforts, she found a 27 percent increase in high-value nuclear stress test orders ([Table 2](#)).

"R-SCAN provided feedback regarding the value of each stress test order," Miller says. "It gave me objective data and a percentage of change in ordering behaviors in a pre/post assessment." The significant improvement in high-value exams ordered highlights the utility of both provider education and the CDS tool.

## Gauging the Ripple Effect

"R-SCAN provided objective data to illuminate each provider's ordering behavior for stress testing with nuclear imaging," attests Miller. "Our facility showed a marked increase in plain exercise stress test orders, which suggests a lower incidence of unnecessary nuclear testing. This likely would not have been possible without the educational interventions and use of the CDS tool that were part of our R-SCAN project."

But the success of the project went beyond the numbers. Some of the ordering provider participants improved ordering behaviors they intend to maintain well into the future. Bearden, for instance, says that since participating in the project, she now orders stress tests based on patient history and the patient's aerobic

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fitness or MET score, a standardized measure of energy expenditure. "I plan to continue along my current course for ordering all stress tests," Bearden says.

Odle agrees that the project has achieved lasting results. "Dr. Miller and the team taught others to not be satisfied with the status quo and to work continually to make processes better," says Odle. "They inspired many care providers across our organization."

Miller believes that R-SCAN can prove useful in many circumstances, not just those involving stress test orders. "R-SCAN provides a foundation for other areas where ordering appropriateness is key, such as echocardiograms," notes Miller. In her role as an NP and with her newly earned Doctorate in Nursing, she found that R-SCAN helped her ensure that her patients receive the best care possible.

### Next Steps

- Assemble a team of care partners dedicated to improving image ordering appropriateness.

- Educate ordering providers about appropriate image ordering in a variety of settings, from face-to-face interventions to departmental meetings.
- Analyze image orders before and after the educational intervention to track ordering appropriateness.

### 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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