

Case Study: Tracking Actionable Incidental Findings



Radiologists use a closed-loop program to track actionable incidental findings, improving care.

By Kerri Reeves

Key Takeaways:

- Following a successful pilot program, a radiology department in Kansas instituted a system-wide initiative to track actionable incidental findings.
- Using keyword searches in records, nurse navigators close care gaps by identifying patient cases with possible missed imaging follow-ups.
- Over a three-year period, the program helped 70 patients avoid missed cancer diagnoses.

In 2016, when a patient underwent a CT screening exam at The University of Kansas Health System (KHS), the study revealed a 7mm lung nodule. The radiologist recommended a follow-up CT in six months to monitor the nodule. That scan revealed that the nodule remained stable, so the radiologist recommended another scan in 12 months. Unfortunately, the patient never returned for the recommended follow-up exam. Two years later, the patient presented in the emergency department (ED) with abdominal pain and underwent another CT. That study revealed Stage III lung cancer.

Scenarios like this are all too common at hospitals across the nation. Studies show that one of the biggest hurdles to improving healthcare outcomes in the U.S. is ensuring that patients receive recommended follow-up care for findings that require further evaluation. A 2019 Joint Commission [review](#) found that 6.8% to 62% of laboratory tests and 1% to 35.7% of radiology tests go without appropriate follow-up, often impacting patient outcomes, including missed cancer diagnoses.¹

To enhance follow-up care and improve outcomes at KHS, Neville Irani, MD, associate professor of radiology, developed the Closed Loop Imaging Program, which allows radiologists to track actionable incidental findings and coordinate timely follow-up care. Irani says that radiologists are well-positioned to lead this longitudinal care system because they often make follow-up recommendations with the aim of detecting cancer before it spreads.

“One of the most important things we do as radiologists is find cancer and find it early,” says Irani. “But it does no good if you detect a concerning finding and no one does anything about it. We needed a dedicated program to track our recommendations — specifically for incidental findings where we believe the patient should get follow-up imaging — to coordinate quality care for our patients.”

In three years of tracking recommendations, Irani and his team followed 18,267 actionable incidental findings. Of the nearly 2,500 patients who completed their follow-up imaging as a result of the program, 2.8% avoided a missed or delayed cancer diagnosis. “Radiologists don’t just make the diagnosis; they ideally help coordinate care and follow-up for better outcomes,”



Neville Irani, MD, associate professor of radiology at the University of Kansas Medical Center, implemented an actionable incidental findings tracking program that helps primary care partners and adds value to patient care.

Irani says. “This program demonstrates how radiology as a specialty can play a key role in improving the health of an entire population.”

Identifying the Problem

Irani got the idea to establish the tracking program after witnessing several missed or delayed diagnoses due to overlooked follow-up recommendations. In one case, radiologists detected an incidental renal mass in an ED patient, but the patient never returned for the recommended CT scan. In another case, radiologists detected an incidental thyroid nodule on an inpatient’s ultrasound images, but no one ever ordered the follow-up imaging. “In instances like these, the findings aren’t addressed in acute episodes of care,” Irani says. “If no one follows up on them, they could ultimately end with poor outcomes.”

Before the radiology department instituted the tracking program, PCPs were primarily responsible for ensuring that patients received appropriate follow-up care, explains Rita M. Hyde, MD, clinical service chief for the community department in KHS’ Kansas City Division. But with their busy schedules, Hyde and

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Rita M. Hyde, MD, clinical service chief for the community department in KHS' Kansas City Division, says that the tracking program helps ensure that patients receive the care they need.

other PCPs struggled to manage actionable incidental findings. “We developed systems and workarounds, like sending ourselves messages to trigger alerts to remind us about necessary follow-up for particular patients,” Hyde says. “But what we really needed was a process — along with a team to manage it — to make sure those findings were actually followed up on.”

Obstacles impeding appropriate follow-up care included that some patients don't have PCPs for longitudinal management and some follow-up recommendations never make it into the medical records. “Specialists who order exams aren't typically following actionable incidental findings,” Irani explains. “They often assume that since everything is electronic and automated that the patient's PCP or another provider has seen it and will act on it. With that flawed assumption, we've basically scaled bad communication processes.”

Closing the Loop

As Irani developed the actionable incidental findings tracking program, he leaned on his experience instituting an inferior vena cava (IVC) filter retrieval tracking program at KHS, which began in 2014. That program ensured that providers follow established guidelines for removing IVC filters immediately after a patient's pulmonary embolism risk subsides. The successful program minimized patient complications and generated increased volumes — which helped establish Irani's credibility in the tracking arena at KHS.

While the IVC program focused on one specific care management scenario, tracking actionable incidental findings is more complex due to the variability of such findings. With this in mind, Irani knew that he needed

to take an incremental approach to instituting the findings tracking program. He started by tracking lung nodules because they are common, have widely accepted follow-up guidelines, and can lead to adverse outcomes — even death — if not followed. In short, he knew that a closed-loop system would have a significant impact on outcomes.

To start, Irani reached out to Hyde to discuss the challenges that PCPs faced when managing follow-up of actionable incidental findings and meeting the [patient-centered medical home \(PCMH\) model](#) requirement that all abnormal imaging tests be tracked.² Together, Irani and Hyde outlined a radiology-led program to track and resolve pulmonary cases. They envisioned using the hashtag #follow in imaging reports so that nurse navigators could easily identify and track cases that required follow-up care.

From there, Irani and Hyde presented the plan to KHS quality and executive leaders for approval, explaining how the tracking program would improve patient care. The leaders agreed to a 12-month pilot of the Closed Loop Imaging Program that leveraged existing employees (a total of 1.4 full-time equivalents), who were “loaned” from other departments to staff the program. They also approved using an existing search engine solution to identify #follow in radiology reports that indicated the need for follow-up care.

Getting Radiologists On Board

In staff meetings and through email communications to the radiology team, Irani explained how the pilot program that would rely on KHS radiologists and radiology residents adding #follow to their reports to indicate the need for future follow-up imaging. Irani was extremely intentional about the basic program design, making it as simple as possible for radiologists and residents to note the need for follow-up care.

No formal training was required to get the radiologists involved in the program. “You just say ‘#follow’ and it shows up in the report, no choosing a macro or finding something in a template,” Irani explains. “Our main focus was radiologist adoption. It doesn't matter how fancy or good your intervention is; if no one adopts it, it's worthless.”

Well aware of the consequences of missed follow-ups, the radiologists were eager to participate, Irani explains. To further encourage adoption, the tracking team shared cases in which #follow led to positive outcomes in patient care as the program got underway. “We would tell the radiologists, ‘You dictated this, and it helped save a patient's life,’” says Rebecca Flynn Sourk, RN, BSN, clinical nurse coordinator of the Closed Loop Imaging Program. “Giving specific examples of how the hashtag works helped with adoption.”

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Rebecca Flynn Sourk, RN, BSN, clinical nurse coordinator of the Closed Loop Imaging Program at the University of Kansas Medical Center, communicates daily with ordering and primary care physicians about follow-up imaging recommendations.

Four months into the program, chest and emergency radiologists tagged hundreds of pulmonary nodule cases with follow-up recommendations. One year into the effort, every diagnostic radiologist had used the hashtag, Irani says. “Our plan was to use a simple program design by just using the phrase #follow to make adoption easy to integrate into a verbal, dictatable workflow. This proved to have higher adoption when compared to programs that used a templated approach with dropdowns.”

Implementing the Plan

While many radiologists were eager to include #follow when appropriate, not all radiologists remembered to add the tag to their reports. To account for this, Irani added a second layer to the program that utilized existing natural language processing (NLP) software to identify words or phrases in reports that may indicate a need for follow-up like “recommendation” or the words “follow-up” without a hashtag.

The radiology department also developed an algorithm using the date of the signed report to generate a due date for completion of the follow-up recommendation. For example, in three, six, or 12 months. Guided by #follow, NLP, and the due dates, nurse navigators manually reviewed patient charts to determine which cases had an incomplete follow-up and contacted ordering physicians about the follow-up recommendations to help facilitate exam scheduling as needed.

In the first nine months of the pilot, the program addressed thousands of patient cases recommended for follow-up, bringing back 177 patients who might

otherwise have been lost. Eight of those patients were diagnosed with lung cancer, and three of those were stage I lung carcinoma, which is treatable. Based on these findings, health system executives approved plans to continue and expand the program beyond the pilot, allocating three full-time nurse navigators to track all actionable incidental findings, not just lung nodules. Irani and his team recruited registered nurses from perioperative services to staff the quality improvement program.

Expanding the Program

With approval to expand the program beyond pulmonary nodules, Irani encouraged the radiologists to use #follow in all reports in which they recommended follow-up imaging. Since they had become used to including the hashtag in nodule cases, they seamlessly extended the practice to other types of cases.

“After the first year of the program, we had hospital approval to make this a permanent program as well as interest from radiologists to expand beyond lung nodules,” Irani says. “Since our approach to tagging cases was agnostic to the finding, expanding it to other findings was simple. In fact, about 6 months in, we had already started to see many radiologists tagging findings beyond lung nodules that were concerning to them or that they just wanted to make sure got biopsied.”

As the program expanded, the full-time nurse navigators began performing daily chart reviews to identify cases with incomplete follow-up. When the nurse navigators identify a case in which follow-up imaging has been missed, they reach out to the ordering physician or PCP to discuss the patient’s condition and schedule the follow-up exam as appropriate. “This way, we get a clearer picture of the patient’s status and the possible reason for the missed exam,” Sourk says.

Working with Referrers

To respect ordering physicians’ autonomy, the nurse navigators take action only once a follow-up exam has been missed. “We designed this as a safety net based on feedback from our primary care physicians and other ordering specialists who didn’t really want to be contacted until the recommendation was ‘overdue,’” Irani explains, adding that this enables ordering physicians to manage their patients while removing the burden of tracking actionable findings.

Further, the team doesn’t contact ordering physicians when it’s not necessary, which has been critical to achieving system-level coordination, Irani notes. “It’s not effective to follow-up on every recommendation,” he says. “A chest radiograph follow-up, for example, might be deemed inappropriate if the care team uncovers an alternative explanation for the finding. In this case, the navigators would not directly follow-up

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Nirmal Veeramachaneni, MD, thoracic surgeon at KHS, says the tracking program helps the whole health system provide better patient care.

with the ordering physician, which prevents unnecessary angst for the provider and patient.”

Assuming that follow-up care remains appropriate, the team will continue to follow the case until the patient receives the recommended follow-up study. “I say that our team basically does everything but drive the patient to the exam,” Sourk quips. “It really is about managing care coordination. This is a quality improvement program and a safety net for the health system, but most importantly, it’s a patient safety program. They deserve to get the care they need.”

Assessing the Impact

Since the program began in 2019, the team has tracked more than 18,000 follow-up recommendations and coordinated care for nearly 2,500 patients, ensuring that 2.8% of them avoided a missed diagnosis — potentially saving numerous lives. “The last thing we want is any patient to fall through the cracks. This program prevents that from happening,” says Nirmal Veeramachaneni, MD, thoracic surgeon at KHS. “Dr. Irani is helping an entire health system keep track of lesions that must be followed.”

Hyde agrees that the program has taken KHS’ patient care to the next level. “It’s taken a big burden off primary care to know that we have a team helping with this endeavor,” she says. “It really makes radiologists part of the patient care team in a way that’s different. They’re not just dictating a report and moving on; they’re really engaging and making sure that the handoff is complete so that patients receive the care they need.”

As the program has fulfilled an important need in imaging, Irani suggests that the methodology could be applied to all actionable laboratory and screening test results to improve much-needed collaboration across specialties in all healthcare systems. Irani founded a public charity, the Healthcare Quality Improvement Platform in Leawood, Kansas, in 2020, to help other practices and organizations on this journey. He is now bringing multiple institutions and departments together to learn from each other about follow-up care programs as well as other initiatives that can improve patient experience and outcomes.

“I encourage every health system to incorporate a tracking system for actionable incidental findings given the positive effect on patient outcomes,” Veeramachaneni says. “It really engages the radiologist with primary care physicians and specialists. Keeping that level of discourse and open communication is invaluable to the patient.”

Endnotes

1. Quick Safety 52: Advancing safety with closed-loop communication of test results, accessed April 4, 2022, via <https://www.jointcommission.org/resources/news-and-multimedia/newsletters/newsletters/quick-safety/quick-safety-issue-52-advancing-safety-with-closed-loop-communication-of-test-results/quick-safety-52-advancing-safety-with-closed-loop-communication-of-test-results/>.
2. Defining the PCMH, accessed April 4, 2022, via <https://www.ahrq.gov/ncepcr/tools/pcmh/defining/index.html>.

Now It’s Your Turn

Follow these steps to develop an actionable incidental findings tracking program, and tell us how you did at imaging3@acr.org or on Twitter with the hashtag [#Imaging3](https://twitter.com/Imaging3):

- Petition health system administration for staffing and technology resources to implement a tracking program.
- Communicate program methodologies to radiologists regarding follow-up recommendations and dictation requirements.
- Engage primary care and referring physicians to optimize communications about patient follow-up and the completion of exams.

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