University of Rochester uses mPower Clinical Analytics and PowerScribe Follow-up Manager to improve follow-up on incidental findings

Reducing the risk of delayed diagnosis with the Backstop program.

Challenge
– Need to help ensure that patients with incidental radiology findings receive their recommended follow-up care in a timely manner
– Desire to improve quality metrics for patients with incidental findings

Solution
– mPower Clinical Analytics
– PowerScribe Follow-up Manager

Results
– Natural language processing (NLP) automates recommendation identification and tracking, optimizing the radiology workflow and decreasing the risk of oversight and error
– Reduced risk of delayed diagnosis by 80%
– Improved communication and patient compliance with follow-up recommendations

Overcoming gaps in communication and a manual workflow to have a positive impact on patients' lives

Several years ago, a 60-year-old female patient arrived in the emergency department at the University of Rochester Medical Center complaining of chest pain. She had a chest x-ray during her visit. The radiologist indicated in the report an incidental nodule and recommended a follow-up chest CT. But there was a gap in communication, and the patient did not return for her recommended follow-up. Three years later, she returned to the ED, where imaging revealed a 4cm mass; she was diagnosed with stage 4 lung cancer which had already spread to her bones and liver. One year later, she passed away.

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Early diagnosis has a significant impact on survivability

The Institute of Medicine has released a series of reports that acknowledged the imperfect nature of our healthcare systems and recognized that efforts must be made to reduce the number of deaths related to preventable medical errors, including diagnostic errors and delays in diagnosis. Similarly, the American Medical Association conducted a 10-year review of patient safety research and discovered that up to 70% of radiology recommendations for incidental findings do not result in completion of the recommended imaging test. Too many patients are suffering from delayed diagnosis due to this lack of follow-up.

Whereas most incidental radiology findings are benign nodules, others do, in fact, represent early, treatable forms of cancer, and according to Dr. Ben Wandtke, Medical Staff President and Chief of Diagnostic Imaging, UR Medicine Thompson Health, and Associate Professor, Department of Imaging Sciences, University of Rochester Medical Center, it's an opportunity to improve patients' lives and cancer survival rates. "Due to gaps in communication, patients have fallen through the cracks. The difference between a stage 1 cancer diagnosis and a stage 4 diagnosis can be a 50% survival impact. Despite advances in cancer care, treating late stage cancer is more costly and less effective than an early diagnosis," he says.

Patients can fall through the cracks for a number of reasons, including inconsistent communication between hospital-based providers and primary care providers at

transitions of care, failure to notify patients of actionable test results, and inadequate systems for managing and tracking incidental findings.

"We needed to overcome these challenges, and so in 2015, we piloted our 'Backstop' recommendation tracking system with five radiologists at one of our facilities," explains Dr. Wandtke. "It was designed to be a safety net for our patients, and not to replace the office-based efforts of referring providers. We collaborated with our colleagues, recognizing that ED and hospitalist workflows are not designed to manage incidental findings."

Pilot program for tracking and intervening delivers promising results

The Backstop program was created to track potential malignancies and aneurysms when radiology reports include unconditional, actionable recommendations. That is, the follow-up recommendation must include a specific imaging modality and a due date and must not include any hedge statements. For example, a trackable recommendation within the University of Rochester's program would state, "CT chest without contrast recommended in six to 12 months."

In cases where radiologists were making these types of recommendations, the Backstop program depended on the provider manually adding these cases to a central database for tracking patients. These were to be added at the time of dictation, so that the nurse navigators would have access to the patient's information, including their PCP, reading radiologist, the incidental findings, recommended follow-up imaging and due date, and

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other information so the navigators would know to intervene. The database provided daily reports of overdue recommendations—meaning those cases where the due date had passed by 30 days or more.

Once an overdue recommendation was identified, the nurse navigators had a three-stage approach to intervening. First, they re-sent the radiology report to the referring provider. If another month passed and the follow-up recommendation had not been closed, the navigator would call the care manager at the provider's office. If another month passed, the radiologist would call the PCP directly to discuss follow-up.

During the pilot, Dr. Wandtke notes that they tracked 589 recommendations, 86% of which were satisfactorily closed through the Backstop program, reducing the risk of delayed diagnosis by 74%. Based on these results, the University of Rochester expanded Backstop to include six hospitals and 75 radiologists.

mPower Clinical Analytics and PowerScribe Follow-up Manager automate recommendation identification and tracking at large scale
The manual process required to flag recommendations for inclusion in the database, however, quickly became the barrier to widespread adoption of the program. Ultimately, the University of Rochester began working with Nuance for the NLP solution, mPower Clinical Analytics, and further leveraged PowerScribe Follow-up Manager.

mPower Clinical Analytics relies on radiologist-designed and validated algorithms to automatically extract information out of the full text of reports to get meaningful recommendations and improve patient outcomes.

"Radiologists already have a tremendous amount of work to complete every day, and requiring the extra manual steps to be performed on a consistent basis wasn't sustainable. NLP automatically reads through our radiology reports to extract those recommendations using clinical analytics, rather than depending on radiologists to remember to manually enter them into our database," explains Dr. Wandtke.

Now, every radiology report at these six University of Rochester sites is analyzed using NLP algorithms to detect recommendations. With PowerScribe Follow-up Manager, those recommendations are automatically extracted and proactively tracked by the system, alerting program navigators to prevent missed or delayed diagnosis. As an example, a 5mm pulmonary nodule is incidentally reported on a patient's chest CT and a follow-up CT has been recommended in 12 months for this low-risk patient. mPower can automatically extract this recommendation from the report, and if no follow-up study was performed in the 12-month time frame, it can automatically be placed in the Overdue Follow-up worklist.

Additionally, mPower Clinical Analytics provides the quality metrics to individual radiologists and section chiefs to not only compare providers to their peers, but also improve the quality of recommendations radiologists include in their reports.

The University of Rochester now tracks 500 recommendations per month (0.8% of diagnostic volume), and 91% of them are satisfactorily closed, reducing the risk of delayed diagnosis by 80%. "We were able to exceed the pilot project results on a large scale because we had

"We were able to exceed the pilot project results on a large scale because we had NLP to capture recommendations automatically and the capability to track and manage follow-up activities."

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NLP to capture recommendations automatically and the capability to track and manage follow-up activities," notes Dr. Wandtke, who goes on to say that the investment in both Nuance solutions provided a clear return for the organization:

• Increased examination completion rate by 29% (from 55% to 71%), improving both patient outcomes and reimbursements

• Tracking interventions result in a new exam completion in 35% of all cases, 75% of which were CT or MRI studies performed in the University of Rochester Health System

Every patient deserves their best chance for a cure
Beyond the numbers, however, Dr. Wandtke shared a success story from a patient who was tracked through the Backstop program: an 80-year-old female patient presented to the ED with shortness of breath, and the chest x-ray revealed a worrisome nodule, which was communicated and documented in the report.

mPower Clinical Analytics identified this patient and pulled the follow-up recommendation into PowerScribe Follow-up Manager for tracking via the Backstop program. After the second-level intervention in which the nurse navigator contacted the PCP's care manager, the patient received her follow-up CT three months after her ED visit. She subsequently received a PET scan, which confirmed a stage 1 lung cancer diagnosis. Dr. Wandtke says, "Essentially, this was the same situation as our first patient, but with the safety net in place, we had a very different outcome."

mPower Clinical Analytics with PowerScribe Follow-up Manager have helped move the University of Rochester toward consistent communication of results and significantly increased exam completion. "Our vision is that every patient deserves their best chance for a cure, and with this Backstop program and the Nuance tools, we're clearly making a difference," says Dr. Wandtke.

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