Managing Incidental Findings

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An incidental finding, also referred to as an incidentaloma, is a mass or lesion detected on diagnostic imaging studies performed for an unrelated reason. For example, a pulmonary nodule discovered on a computed tomography (CT) angiogram of the chest for a suspected pulmonary embolism is considered an incidental finding.

Radiologists recognize that ensuring appropriate follow-up for incidental findings is highly important. Those that require additional action are referred to as an actionable incidental finding (AIF, Figure 1). Approximately 65% of all incidental findings are AIFs; among these, a diagnosis is confirmed in approximately 45% of patients. The incidence of cancer among all incidental findings completing follow-up is 2.3-4.5%.

In this review, we discuss the nature of AIFs and how radiologists supported by information technology (IT) tools can best manage them to achieve better patient outcomes.

Best Practices for Managing AIFs

Managing AIFs is complex; ensuring completion of any recommended follow-up is vitally important (Figure 2). The process starts when the radiologist detects and determines that a lesion on an image is an AIF and issues a recommendation for follow-up review, which is then accompanied by a closed-loop result communication to clinicians. Follow-up is tracked and documented upon completion.

Closing the Loop on Result Communication

An important concept in managing AIF is “closing the loop.” This consists of conveying the specified information to a recipient, the recipient acknowledging receipt of the information and requesting clarification if necessary and, finally, the original sender confirming that the information received is well understood. Closed loop communications, including the names of the sender and recipient, are documented in the radiology report or patient chart and include the names of both the reporter and recipient of the information, date, time, and means of communication.

Closed-loop communication with respect to AIFs may be accomplished verbally or through electronic communication technologies that can automatically confirm that the results were read by the recipient. Such technology can reduce the notification time of abnormal results, increase the rates of lab and pathology follow-up, and improve communication of these results.

Evidence-based Follow-up Recommendations

Evidence-based documents guide radiologists in identifying findings that do or do not require follow-up. They also help radiologists issue follow-up recommendations with regards to imaging modality and follow-up time intervals. Evidence-based guidance can prevent unnecessary follow-up tests, thereby decreasing patient anxiety and financial burden on patients and society.

Many medical societies and the American College of Radiology (ACR) have developed documents to guide management of various incidental findings. When the evidence base for some existing guidance documents is weak, or when there is no evidence to inform management, radiologists can collaborate locally to develop standardized recommendations based on local expert opinions. Otherwise, radiologists have to rely on their own experience and level of confidence.

Effectiveness of Follow-up Recommendations

The wording and placement of follow-up recommendations in the
Managing Incidental Findings

A radiology report can affect how likely they are to be completed and to engage patients in the process. Follow-up recommendation language should be clear and concise. Statements like, "If clinically indicated, follow-up CT could be performed in 4–6 weeks to document resolution," limit clinicians' ability to judge the necessity of follow-up and lead to low follow-up rates. On the other hand, recommendations that precisely identify the lesion in question, the recommended modality, and time interval can result in higher completion rates.

Detailed recommendations should be placed in the Impression section of the radiology report, where they can be easily seen and noted by clinicians. For example, a section in the radiology report reading, "Recommendation: Right upper lobe pulmonary nodule follow-up with a CT in 3-6 months to assess stability," is more useful than "follow-up to assess stability." Patient engagement plays an important role in ensuring that follow-up is completed. With passage of the 21st Century Cures Act, patient access to test results and clinical notes no longer poses a barrier, but their highly technical language is
Managing Incidental Findings

inaccessible to most patients. In the emergency room and some radiology settings, results may be discussed directly with patients. This helps ensure that patients fully understand the findings and their next steps. Similarly, placing Info-RADS messages in radiology reports is an effective way to convey the nature of imaging results and whether any further steps are necessary. These messages indicate to patients either that the results are normal and no additional steps need to be taken, or that there was a non-emergent finding for which the patient should contact their provider to discuss next steps. Sending radiology results to patients, as mandated in states such as Pennsylvania for AIFs, without providing an opportunity to ask for clarification, can risk increased patient distress that could in turn decrease patient willingness to pursue follow-up.

**Closing the Loop on Timely Follow-up Execution**

Tracking systems can be used to check whether follow-up has been completed or deemed clinically obsolete, as well as to intervene when it has not been completed as required (Figure 2). About 30% of follow-up recommendations lack confirmation of completion, posing a significant safety gap for patients and providers. The effectiveness of tracking systems in diminishing this safety gap is well documented. For example, a tracking system for incidental lung nodules reduce the missed follow-up rate from 74% to 10%. Mammography reminder systems increase the likelihood of obtaining a mammogram by 50%. At a single institution, AIF tracking systems increased follow-up completion rates from 43% to 71%.

**Tracking Process and IT Tools**

Many strategies are becoming available to simplify and make AIF management more effective and efficient.

**Accessing Evidence-based Guidance**

Some strategies focus on making evidence-based guidance accessible to radiologists when they are issuing their reports. Low-fidelity strategies using either no or simple IT tools, fall into three categories: physical or verbal reminders, electronic references, and enhanced reporting templates. Radiologists may access guidance documents as abbreviated hard copies their workstation. They may learn about guidance documents during monthly case conferences or through designated “guideline champions” who work with clinical teams to sustain guidance-based incidental findings management. Electronic guideline references may also be embedded within reporting systems, where radiologists can easily access and review them. In “enhanced radiology reporting,” the report includes more detail, such as the probability that a lung nodule is cancer, and a reference to the follow-up recommendation.

Although these simple strategies are an improvement over baseline, they typically yield inconsistent results owing to their reliance on individual radiologist practices. It is conceivable that practice standardization across the radiology enterprise using more sophisticated technology would be more successful.

**Tracking Systems**

Several US radiology practices use hybrid tracking systems that employ a mix of staffing and advanced IT tools (Figure 2). These systems may identify reports containing follow-up recommendations either by asking radiologists to flag reports with specific searchable phrases (eg, “#follow”) or by having tracking staff search independently for keywords and phrases. These tools may work manually or employ natural language processing (NLP) capabilities. The tracking team manually enters incomplete follow-up cases into an electronic database, and IT tools may be used to determine the date by which a given follow-up should be completed. For overdue cases, the responsibility for ordering follow-up care is typically reassigned to the clinical team.

Tracking system scalability remains a challenge, owing mainly to the need for support staff. No consensus currently exists among medical specialists and administrators regarding responsibility for oversight and financial accountability for tracking systems. As an unintended consequence, underfunded tracking programs may focus only on a handful of incidental finding categories, such as lung nodules.

**Natural Language Processing**

Natural language processing has emerged as a promising building block towards full automation of tracking systems. NLP-enabled applications can extract information from radiology reports and identify text that represents either AIFs or follow-up recommendations. Currently, NLP tools can identify radiology reports with follow-up recommendations entered into a tracking system, but chart review and additional follow-up actions still require dedicated staffing.

**Fully Automated Tracking**

Full tracking automation would be able to mine reports for AIFs based on descriptors used by the radiologist; insert appropriate follow-up recommendations into the report; transfer cases into a tracking data base, search electronic medical records for follow-up completion; send reminders for any pending follow-up; assist with scheduling, and issue a final alert.
Future Directions

Ensuring completion of follow-up recommendations for AIFs is important, given the large number of patients affected and the relatively high yield of clinically relevant diagnoses in this cohort. Missing such diagnoses, particularly with respect to cancer, is devastating for patients and represents a medicolegal risk to radiology practices.

Several studies have shown the feasibility of tracking systems for radiology follow-up recommendations, resulting in significant improvements in follow-up completion rates. However, the development of IT tools that support each step of the tracking workflow and that can easily be integrated with existing workflow technologies are urgently needed to make tracking programs more affordable and reliable. Tracking systems largely do not meet patients’ needs, thereby limiting patient engagement and compliance with radiology follow-up recommendations.

References


