Academic Medical Center | Patient Safety Organization
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Patient Safety Alert: Results Management

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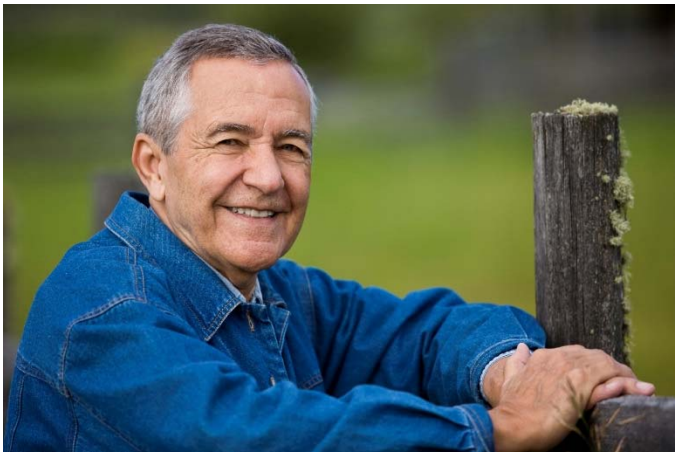
Continuing deliberations on test results management begun in 2013, the Academic Medical Center Patient Safety Organization (AMC PSO) gathered a panel of ambulatory risk management and patient safety experts to address this persistent issue. Related literature shows that 25% of all outpatient medical errors can be attributed to the test-results follow up process [1].

Recognizing that laboratory testing is ordered in more than 41% of ED visits, family physicians order tests in 29% of all patient visits, and general internists, in 38% of visits[2] makes this issue even more urgent. Further, nearly 25% of malpractice claims associated with diagnostic error can be attributed to results management system failures[3].

Case 1

An elderly, diabetic patient was admitted to a regional hospital, for treatment of a toe wound. The patient's history indicated a prior toe amputation. Initial surveillance culture for MRSA was negative. The treatment course began with IV antibiotics, which was altered to PO antibiotics after a few days of treatment. In less than a week, the patient was discharged to an extended care facility on PO antibiotics and instructions to follow-up with a Podiatry specialist.



Two weeks after the initial admission, the patient was seen by a podiatrist where wound cultures were performed. This culture, though not defined as a critical test result, was positive for MRSA and added to the EHR. A follow up appointment was scheduled for three weeks from this visit. This appointment was rescheduled for a later date. The podiatrist's workflow was to review cultures at the follow-up visit. Within one month the patient had completed the antibiotic course and was discharged from the extended care facility with a home care service.

Despite the positive MRSA culture, the condition of the patient's toe continued to improve during the extended care facility stay. Importantly, it was later discovered that the specialist was not aware of, nor had begun use of, the EHR's test results management module. The missed visit and lack of awareness of the EHR's results management module resulted in the positive MRSA culture not being considered in the treatment course upon discharge from the extended care facility.

Prior to the rescheduled follow up, the home care service noted that the toe wound was worsening, and the patient was seen in an urgent care clinic where the attending clinician discovered the positive MRSA culture, adjusted the PO antibiotic course, and scheduled an additional follow up appointment in 72 hours.

Despite this adjusted treatment, the toe wound continued to worsen and the patient was brought to the ED and admitted for a toe amputation.

Case 2

An adult patient is seen by their PCP for a routine appointment. A colonoscopy is recommended but deferred, pending cardiology evaluation, due to an ongoing anticoagulant regimen. Occult blood testing is recommended as an interim approach. The patient was given three stool cards and a return envelope. Provider information was not included on the cards and return envelope.

Nearly two months from the initial PCP visit, the patient's stool cards were returned revealing occult blood. At this time, the lab was processed, preserving the specimen. However, because provider information was not included on the stool cards or envelope, the results were not included in the results manager module of the EHR. Thus the result was not readily viewable to the PCP.

One year after this initial PCP visit, the patient returned for their next annual checkup. At this point the positive occult blood tests were noted and follow-up coordination for a colonoscopy was performed, which revealed one 4mm pre-cancerous polyp. A five-year follow-up was recommended.

Results Management Risks

"Workflow, user behavior, and organizational characteristics"[4] significantly impact electronic results management processes. Our case reviews, and a focused review of the literature, identified the following risks associated with Tests Results Management:

- Diagnostic test volume is steadily increasing, with some clinicians estimating reviews of over 1000 results/week, creating cognitive and general work overloads
- 25% of ambulatory care providers do not have a method to confirm that all ordered tests are completed[5]
- Lack of clear, structured governance imposes strain on already over-taxed results management processes,[6] are multidisciplinary (involving physicians, nurses, medical assistants, clerical staff, IT staff, and others)
- Hybrid (electronic/paper) systems have increased with great EHR utilization, and this has been shown to produce higher failure rates[6]
- EHR utilization is often not optimized[7], especially in remote, ambulatory practices
- Results and other EHR data are often organized in silos, creating fragmented clinical views
- Disproportionate amounts of unnecessary alerts lead to information overload[7] and alert fatigue[4], both of which can be attributed to poor EHR design[1]
- Results cannot be routed to appropriate clinicians when information is not complete on specimen cards or other hard copy forms of documentation

In addition to factors connected directly and indirectly to the EHR, these investigations also revealed significant risks in administrative domains:

- Robust systems are lacking for following up on missed patient visits and beginning the rescheduling process

- Standardized procedures for discussing abnormal test results, especially via phone, are needed when follow up appointments are missed
- Test requisition documents, when missing essential information, can lead to results not being appropriately routed
- Conflicting vendor/provider policies for results transmittal can lead to lapses in reporting and delays in follow up care.

IMPROVED RESULTS MANAGEMENT

Electronic results management systems have been shown to reduce delays and decrease incomplete follow-ups, but maximizing optimization requires integrating the technology with routine clinical workflow.

- Results data should be integrated with patient history and other clinical information and presented in a single-file format
- Results management governance and processes should account for the multidisciplinary nature of diagnostic testing, and help to create a standardized structure for all clinical staff roles
- Ongoing provider training on the full breadth of results functionality, proper utilization, and accompanying policies[2] may help to reduce redundant alerts and under-utilization
- Proper identification and management of newly deployed software and its support among all relevant providers is critical
- Categorized and structured approaches to results and alerts management[9], driven by clearly delineated policies, should be a guiding principle for results management design and functionality[3]
- Policies should set out a structured approach to delegate results management to other clinicians when the ordering clinician is not available
- Institutional policies should make clear that patients are empowered to correspond with all providers regarding unfulfilled tests

Conclusion

There is significantly more work to be done in this arena to capture the full potential of electronic results management and we need to realize the current limitations in these systems in order to avoid making errors in result management.

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