Self-Assessment

Test Results Reporting and Follow-Up

General Instructions for the SAFER Self-Assessment Guides

The SAFER Guides are designed to help healthcare organizations conduct self-assessments to optimize the safety and safe use of electronic health records (EHRs) in the following areas.

- High Priority Practices
- Organizational Responsibilities
- Contingency Planning
- System Configuration
- System Interfaces
- Patient Identification
- Computerized Provider Order Entry with Decision Support
- Test Results Reporting and Follow-up
- Clinician Communication

Each of the nine SAFER Guides begins with a Checklist of recommended practices. The downloadable SAFER Guides provide fillable circles that can be used to indicate the extent to which each recommended practice has been implemented. Following the Checklist, a Practice Worksheet gives a rationale for and examples of how to implement each recommended practice, as well as likely sources of input into assessment of each practice, and fillable fields to record team members and follow-up action. In addition to the downloadable version, the content of each SAFER Guide, with interactive references and supporting materials, can also be viewed on ONC's website at www.healthit.gov/SAFERGuide.

The SAFER Guides are based on the best evidence available at this time (2016), including a literature review, expert opinion, and field testing at a wide range of healthcare organizations, from small ambulatory practices to large health systems. The recommended practices in the SAFER Guides are intended to be useful for all EHR users. However, every organization faces unique circumstances and will implement a particular practice differently. As a result, some of the specific examples in the SAFER Guides for recommended practices may not be applicable to every organization.

The SAFER Guides are designed in part to help deal with safety concerns created by the continuously changing landscape that healthcare organizations face. Therefore, changes in technology, practice standards, regulations and policy should be taken into account when using the SAFER Guides. Periodic self-assessments using the SAFER Guides may also help organizations identify areas in which it is particularly important to address the implications of change for the safety and safe use of EHRs. Ultimately, the goal is to improve the overall safety of our health care system.

The SAFER Guides are not intended to be used for legal compliance purposes, and implementation of a recommended practice does not guarantee compliance with HIPAA, the HIPAA Security Rule, Medicare or Medicaid Conditions of Participation, or any other laws or regulations. The SAFER Guides are for informational purposes only and are not intended to be an exhaustive or definitive source. They do not constitute legal advice. Users of the SAFER Guides are encouraged to consult with their own legal counsel regarding compliance with Medicare or Medicaid program requirements, HIPAA, and any other laws.

For additional, general information on Medicare and Medicaid program requirements, please visit the Centers for Medicare & Medicaid Services website at www.cms.gov. For more information on HIPAA, please visit the HHS Office for Civil Rights website at www.hhs.gov/ocr.

Self-Assessment

Test Results Reporting and Follow-Up

Introduction

The *Test Results Reporting and Follow-Up SAFER Guide* identifies recommended safety practices intended to optimize the safety and safe use of processes and EHR technology for the electronic communication and management of diagnostic test results. Processes relating to test results are fragile, requiring careful planning, implementation, and maintenance to deliver correct information promptly to the intended recipients.[1] In the EHR-enabled healthcare environment, providers rely on technology to support and manage the reporting and follow-up of test results. This guide offers recommended practices related to the content and communication of test results to the clinician, as well as recommended practices related to the documentation and follow-up of test results.[2, 3]

If implemented and used correctly, EHRs have the potential to improve diagnostic test result reporting and follow-up. Initial evaluation of the impact of health IT for test results reporting and follow-up has produced mixed results.[4, 5, 6, 7] Furthermore, laboratory and radiology/imaging results reporting in EHRs remains vulnerable to safety events.[8] Failure to follow-up appropriately on diagnostic test results can lead to misdiagnosis, patient harm, and liability.

The Test Results Reporting and Follow-Up SAFER Guide recommends practices that optimize the safety and safe use of the EHR with respect to diagnostic test reporting. It will enable assessment of whether those aspects of the EHR associated with communication of diagnostic test results and related processes work as they should, are used correctly, and are designed and implemented to minimize the potential for errors.[5, 6, 9, 10, 11, 12]

Completing the self-assessment requires the engagement of people both within and outside the organization (eg., EHR technology developers, diagnostic services providers). Clinician leadership in the organization should be engaged in assessing whether and how any particular recommended practice affects the organization's ability to deliver safe, high quality care. Collaboration between clinicians and staff members while completing the self-assessment in this guide will enable an accurate snapshot of the organization's EHR status in terms of test results reporting-related safety. In addition, it should lead to a consensus about the organization's future path to optimize EHR-related safety and quality: setting priorities among the recommended practices not yet addressed, ensuring a plan is in place to maintain recommended practices already in place, dedicating the required resources to make necessary improvements, and working together to mitigate the test results-related safety risks introduced by the EHR.

Self-Assessment

Test Results Reporting and Follow-Up

Table of Contents

The SAFER Self-Assessment Guides were developed by health IT safety researchers and informatics experts:

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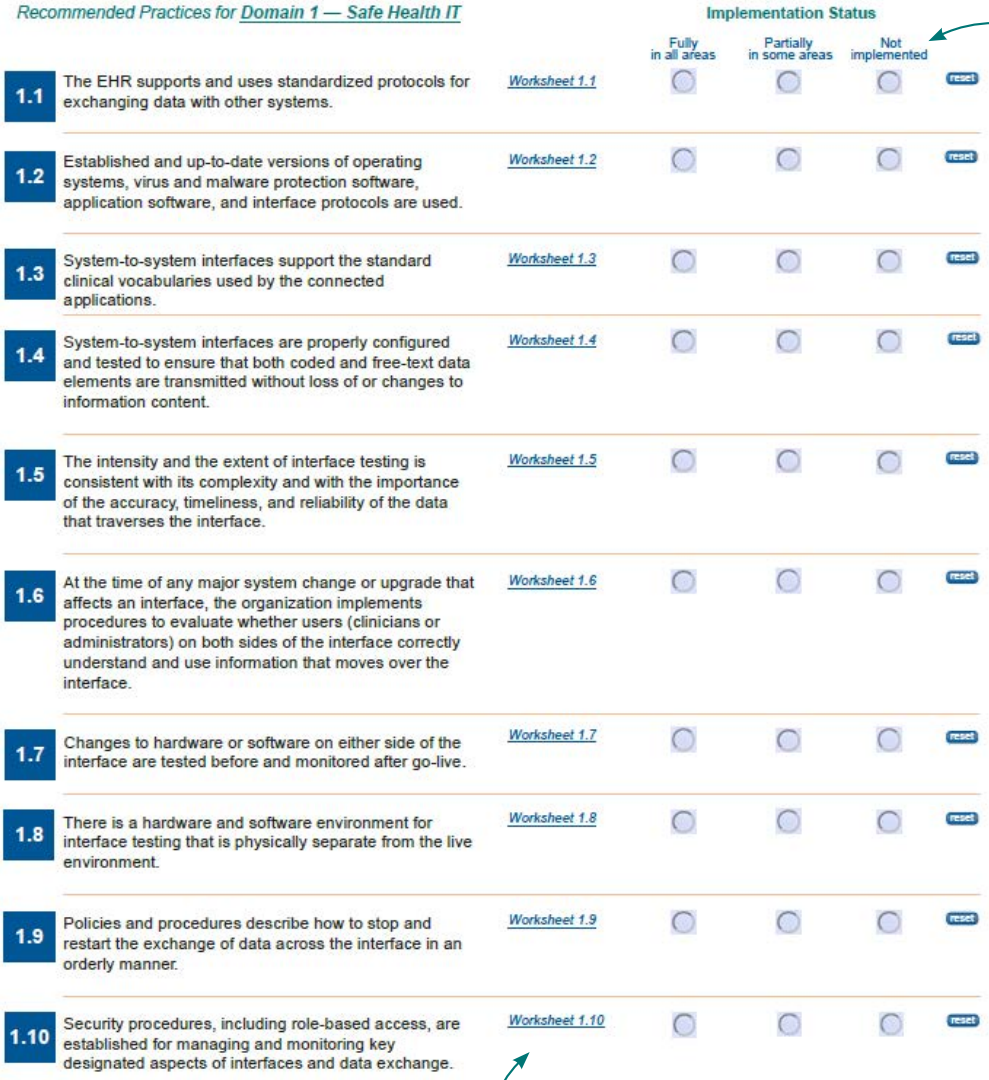
The *Checklist* is structured as a quick way to enter and print your self-assessment. Your selections on the *Checklist* will automatically update the related section of the corresponding *Recommended Practice Worksheet*.

The *Domain* associated with the *Recommended Practice(s)* appears at the top of the column.

The *Recommended Practice(s)* for the topic appear below the associated *Domain*.



Select the level of implementation achieved by your organization for each *Recommended Practice*.

Your *Implementation Status* will be reflected on the *Recommended Practice Worksheet* in this PDF.

To the right of each *Recommended Practice* is a link to the *Recommended Practice Worksheet* in this PDF.

The Worksheet provides guidance on implementing the Practice.

*Recommended Practices for **Domain 1 — Safe Health IT***

			Implementation Status			
			Fully in all areas	Partially in some areas	Not implemented	
1.1	Test names, values, and interpretations (i.e., outside of normal reference ranges) for laboratory results are stored in the EHR as structured data using standardized nomenclature.	Worksheet 1.1	○	○	○	reset
1.2	Predominantly test-based test reports (e.g. radiology or pathology reports) have a coded (e.g. abnormal/normal at a minimum) interpretation associated with them.	Worksheet 1.2	○	○	○	reset
1.3	Functionality for ordering tests and reporting results is tested pre- and post-go-live.	Worksheet 1.3	○	○	○	reset
1.4	After system changes in components or applications related to CPOE and diagnostic services, the data and data presentation are reviewed to ensure accuracy and completeness.	Worksheet 1.4	○	○	○	reset

*Recommended Practices for **Domain 2 — Using Health IT Safely***

			Implementation Status			
			Fully in all areas	Partially in some areas	Not implemented	
2.1	Orders for diagnostic tests are placed using CPOE and electronically transmitted to the diagnostic service provider (e.g., laboratory, radiology).	Worksheet 2.1	○	○	○	reset
2.2	The EHR is able to track the status of all orders and related procedures (e.g., specimen received and collected; test completed, reported, and acknowledged).	Worksheet 2.2	○	○	○	reset
2.3	The ordering clinician is identifiable on all ordered tests and test reports, and, if another clinician is responsible for follow-up, that clinician is also identified in the EHR.	Worksheet 2.3	○	○	○	reset
2.4	When test results are amended, the change is clearly visible in the EHR and printed reports.	Worksheet 2.4	○	○	○	reset
2.5	When test results are changed or amended, the ordering clinician and other clinicians responsible for follow-up are notified electronically. For clinically significant changes, the clinicians are also contacted directly.	Worksheet 2.5	○	○	○	reset

*Recommended Practices for **Domain 2 — Using Health IT Safely***

			Implementation Status			
			Fully in all areas	Partially in some areas	Not implemented	
2.6	"Send-out" (or reference lab) tests are electronically traced, and their results are incorporated into the EHR, with a coded test name, result value, and interpretation.	Worksheet 2.6	○	○	○	reset
2.7	Written policies specify unambiguous responsibility for test result follow-up with a shared understanding of that responsibility among all involved in providing follow-up care.	Worksheet 2.7	○	○	○	reset
2.8	Workflows that are particularly vulnerable to mishandling of test results, especially critical ones, are identified, and back-up procedures ensure test results are received by someone responsible for the affected patient's care.	Worksheet 2.8	○	○	○	reset
2.9	Results outside normal reference ranges, or otherwise determined to be abnormal, are flagged (e.g., presented in a visually distinct way).	Worksheet 2.9	○	○	○	reset
2.10	Display of results (e.g., numeric, text, graphical, image) should be easily accessible, clearly visible, not easily overlooked, and understandable.	Worksheet 2.10	○	○	○	reset
2.11	Automated non-interruptived results notifications (also called "in-basket alerts" or flags) are limited to those that are clinically relevant to minimize "alert fatigue."	Worksheet 2.11	○	○	○	reset
2.12	Results notifications remain in clinician inboxes until a clinician action occurs to address them.	Worksheet 2.12	○	○	○	reset
2.13	There is an EHR-based process for clinicians to either assign surrogates for reviewing notifications or enable surrogates to access the principle clinicians' inboxes.	Worksheet 2.13	○	○	○	reset
2.14	There are mechanisms to forward results and results notifications from one clinician to another.	Worksheet 2.14	○	○	○	reset

*Recommended Practices for **Domain 2 — Using Health IT Safely***

			Implementation Status			
			Fully in all areas	Partially in some areas	Not implemented	
2.15	Summarization tools to trend and graph laboratory data are available in the EHR.	*Worksheet 2.15*	○	○	○	reset
2.16	Test results can be sorted in the clinician's EHR inbox according to clinically relevant criteria (e.g., date/time, severity, read/unread, hospital location, patient).	*Worksheet 2.16*	○	○	○	reset
2.17	The EHR has the capability for clinicians to set reminders for themselves and other responsible clinical staff for future tasks to facilitate test result follow-up.	*Worksheet 2.17*	○	○	○	reset

*Recommended Practices for **Domain 3 — Monitoring Safety***

			Implementation Status			
			Fully in all areas	Partially in some areas	Not implemented	
3.1	As part of quality assurance activities, organizations monitor selected practices related to test result reporting and follow-up. Monitored practices include clinician use of the EHR for test results review and clinician follow-up on abnormal test results.	*Worksheet 3.1*	○	○	○	reset
3.2	As part of quality assurance, the organization monitors and addresses test results sent to the wrong clinician or never transmitted to any clinician (e.g., due to an interface problem or patient/provider misidentification).	*Worksheet 3.2*	○	○	○	reset
3.3	Organizational policies and procedures ensure timely patient notification of both normal and abnormal test results and the timeliness of notification is monitored.	*Worksheet 3.3*	○	○	○	reset

A multi-disciplinary team should complete this self-assessment and evaluate potential health IT-related patient safety risks addressed by this specific SAFER Guide within the context of your particular healthcare organization.

This Team Worksheet is intended to help organizations document the names and roles of the self-assessment team, as well as individual team members' activities. Typically, team members will be drawn from a number of different areas within your organization, and in some instances, from external sources. The suggested Sources of Input section in each Recommended Practice Worksheet identifies the types of expertise or services to consider engaging. It may be particularly useful to engage specific clinician and other leaders with accountability for safety practices identified in this guide.

The Worksheet includes fillable boxes that allow you to document relevant information. The Assessment Team Leader box allows documentation of the person or persons responsible for ensuring that the self-assessment is completed. The section labeled Assessment Team Members enables you to record the names of individuals, departments, or other organizations that contributed to the self-assessment. The date that the self-assessment is completed can be recorded in the Assessment Completion Date section and can also serve as a reminder for periodic reassessments. The section labeled Assessment Team Notes is intended to be used, as needed, to record important considerations or conclusions arrived at through the assessment process. This section can also be used to track important factors such as pending software updates, vacant key leadership positions, resource needs, and challenges and barriers to completing the self-assessment or implementing the Recommended Practices in this SAFER Guide.

Assessment Team Leader

Assessment Completion Date

Assessment Team Members

Assessment Team Notes

reset page

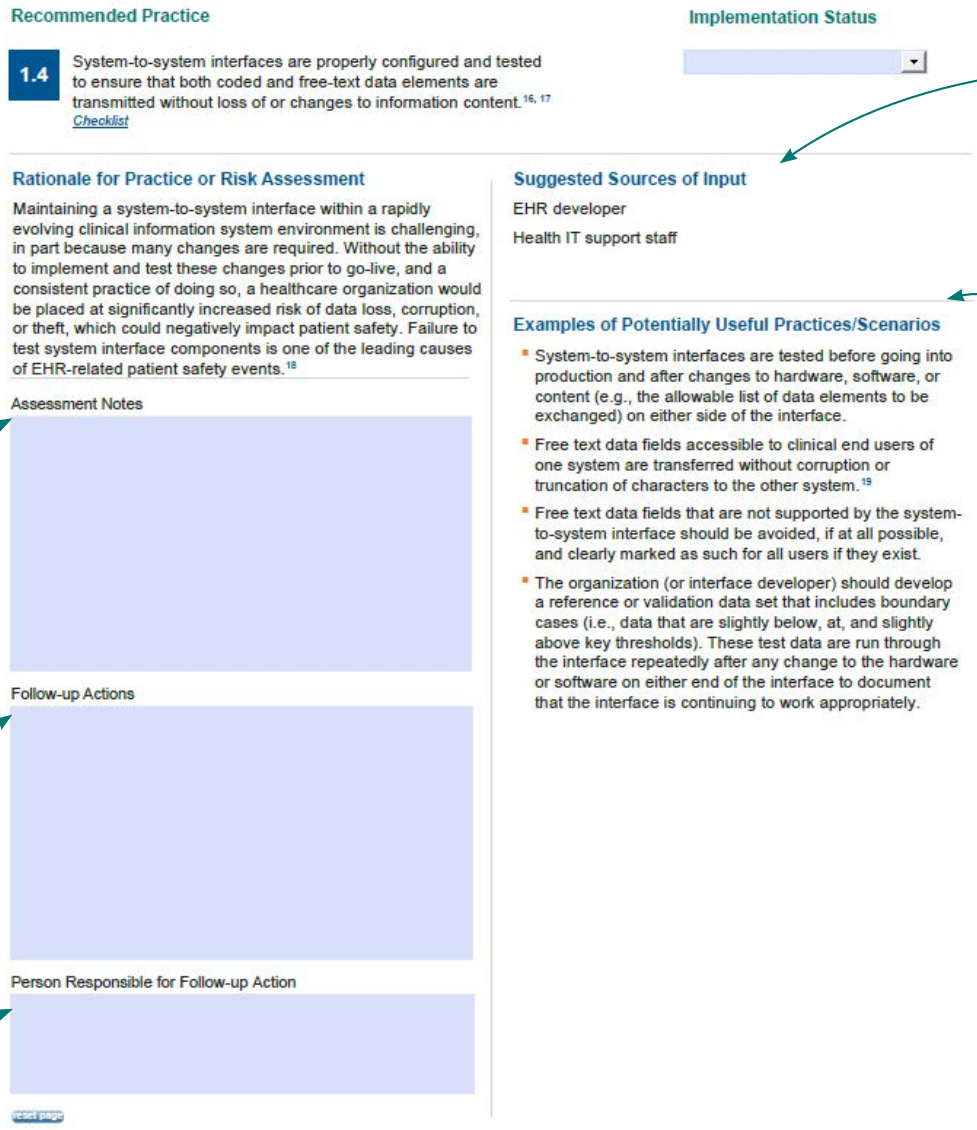
Each *Recommended Practice Worksheet* provides guidance on implementing a specific *Recommended Practice,* and allows you to enter and print information about your self-assessment.

The *Rationale* section provides guidance about "why" the safety activities are needed.

Enter any notes about your self-assessment.

Enter any follow-up activities required.

Enter the name of the person responsible for the follow-up activities.



The *Suggested Sources of Input* section indicates categories of personnel who can provide information to help evaluate your level of implementation.

The *Examples* section lists potentially useful practices or scenarios to inform your assessment and implementation of the specific *Recommended Practice*.

Recommended Practice

1.1 Test names, values, and interpretations (i.e., outside of normal reference ranges) for laboratory results are stored in the EHR as structured data using standardized nomenclature.[6, 12, 13, 14, 15, 16, 17]
Checklist

Implementation Status

Off

Rationale for Practice or Risk Assessment

Structured laboratory results facilitate EHR-based result reporting and tracking functions.[4] Structured data enable use of clinical decision support (CDS) that can avoid errors and optimize patient safety.

Suggested Sources of Input

Diagnostic services

EHR developer

Health IT support staff

Examples of Potentially Useful Practices/Scenarios

- Test result names (e.g., sodium, potassium) that are sent along with LOINC codes are stored as coded data.[18]
- Abnormal test result values and interpretations are defined and stored in a standardized, coded format (e.g., high/low sodium, critical potassium, positive/negative fecal occult blood test).[10, 19]
- There is a process to handle paper-based test results that includes, at a minimum, the entry of coded values into the EHR to indicate Test Result Name, Test Result Value, Units, Normal Range, Abnormal Flag, and Date/Time, along with a scanned copy of the report in the EHR.

Assessment Notes

Follow-up Actions

Person Responsible for Follow-up Action

reset page

Recommended Practice

1.2 Predominantly text-based test reports (e.g., radiology or pathology reports) have a coded (e.g., abnormal/normal at a minimum) interpretation associated with them.
Checklist

Implementation Status

Off

Rationale for Practice or Risk Assessment

Coded results in structured fields facilitate EHR-based result reporting and tracking functions.[4]

Assessment Notes

Follow-up Actions

Person Responsible for Follow-up Action

reset page

Suggested Sources of Input

Diagnostic services

EHR developer

Health IT support staff

Examples of Potentially Useful Practices/Scenarios

- Imaging results are coded by the interpreting radiologist as abnormal by using a structured code if there is a new or unexpected abnormality that requires follow-up.[20, 21, 22]
- Mammography results are stored according to BI-RADS®® criteria.[23, 24]

Recommended Practice

1.3 Functionality for ordering and reporting results is tested pre- and post-go-live.
Checklist

Implementation Status

Off

Rationale for Practice or Risk Assessment

Problems related to system configuration errors leading to results routing logic errors are inevitable. With testing, many such unforeseen problems can be identified and addressed before they result in patient harm. Errors related to closed loop test order entry and results delivery are difficult to detect and can lead to delays in care.

Assessment Notes

Follow-up Actions

Person Responsible for Follow-up Action

reset page

Suggested Sources of Input

Clinicians, support staff, and/or clinical administration

Diagnostic services

EHR developer

Health IT support staff

Examples of Potentially Useful Practices/Scenarios

- Efforts are made to proactively identify failure points related to EHR-enabled test results delivery.
- Specifically designed testing scripts are used to identify remediable points of vulnerability[25] to build systems that are more fault-tolerant.
- Specific testing of routing logic, provider recipients, and configuration is performed to ensure accurate results delivery.

Recommended Practice

1.4 After system changes in components or applications related to CPOE and diagnostic services, the data and data presentation are reviewed to ensure accuracy and completeness.
Checklist

Implementation Status

Off

Rationale for Practice or Risk Assessment

System changes can unexpectedly affect the integrity of the data as it moves through organizations in ways that may not be recognized without proactive review.

Suggested Sources of Input

Diagnostic services

EHR developer

Health IT support staff

Examples of Potentially Useful Practices/Scenarios

- The organization identifies specific types of EHR system changes that impact CPOE and diagnostic services (e.g., application upgrades, changes to interfaces) and carefully reviews data integrity at all points where data are used.
- Whenever code sets or configuration table data are changed, all downstream logic and systems relying on these code sets should be thoroughly tested.
- Error queues are used to monitor for proper system performance; results that cannot be automatically delivered are manually delivered.
- Order entry and result reporting interfaces are tested after every change to the laboratory or diagnostic imaging ordering catalog.

Assessment Notes

Follow-up Actions

Person Responsible for Follow-up Action

reset page

Recommended Practice

2.1 Orders for diagnostic tests are placed using CPOE and electronically transmitted to the diagnostic service provider (e.g., laboratory, radiology).[6, 26, 27, 28]
Checklist

Implementation Status

Off

Rationale for Practice or Risk Assessment

A hybrid paper and electronic environment for test ordering is hazardous. CPOE can facilitate closed loop communication and results accessibility via the EHR, but only if the results are available in the system. Test results can be lost or missed if on paper, when clinicians have come to rely on the EHR.

Assessment Notes

Follow-up Actions

Person Responsible for Follow-up Action

reset page

Suggested Sources of Input

Diagnostic services

EHR developer

Health IT support staff

Examples of Potentially Useful Practices/Scenarios

- For common tests, there is a two-way system-to-system interface (i.e., for ordering, resulting, acknowledging, and canceling orders) between the clinical staff, ordering staff, and organization and the testing facility.[29]
- Diagnostic tests that are not orderable through CPOE for any reason are promptly added to the system (Note: The healthcare organization or the EHR developer should be careful to map the new orderable test to the appropriate LOINC code).

Recommended Practice

2.2 The EHR is able to track the status of all orders and related procedures (e.g., specimen received and collected; test completed, reported, and acknowledged).[4]

Checklist

Implementation Status

Off

Rationale for Practice or Risk Assessment

Tracking orders facilitates closed loop communication. This enables detection of problems regarding order processing and delivery of test results.

Suggested Sources of Input

Diagnostic services

EHR developer

Health IT support staff

Examples of Potentially Useful Practices/Scenarios

- The EHR can record, display, and report whether orders were received, specimens collected, tests completed, results reported, and results acknowledged.[30, 31, 32, 33, 34, 35, 36, 37]
- Clinical practices where test result information is not fully integrated into the EHR use additional tracking strategies to enable follow-up.[38]

Assessment Notes

Follow-up Actions

Person Responsible for Follow-up Action

reset page

Recommended Practice

2.3 The ordering clinician is identifiable on all ordered tests and test reports, and, if another clinician is responsible for follow-up, that clinician is also identified in the EHR.[9]
Checklist

Implementation Status

Off

Rationale for Practice or Risk Assessment

Clear identification of the ordering clinician facilitates closed loop communication. Ambiguous responsibility increases the risk of follow-up failure.[4]

Assessment Notes

Follow-up Actions

Person Responsible for Follow-up Action

reset page

Suggested Sources of Input

Clinicians, support staff, and/or clinical administration

Health IT support staff

EHR developer

Examples of Potentially Useful Practices/Scenarios

- Result routing systems support delivery of results to the ordering provider.[5, 10, 12, 36]
- The EHR supports assignment or transfer of responsibility for test order follow-up.[36]
- Policies and procedures address situations vulnerable to follow-up failures, including shift hand-offs and when providers are out of the office or have departed the organization.
- There are escalation processes for high priority or urgent test results that are not responded to by providers within a pre-specified time period, including an alternate communication method.
- When another user other than the ordering clinician enters an order under the clinician's name (e.g., per protocol ordering) the entering user's name is visible on the order information.

Recommended Practice

2.4 When test results are amended, the change is clearly visible in the EHR and printed reports.[10]
Checklist

Implementation Status

Off

Rationale for Practice or Risk Assessment

Results that are subsequently changed carry a significant potential for delayed or wrong treatment based on outdated, incorrect results.

Suggested Sources of Input

Diagnostic services

EHR developer

Health IT support staff

Examples of Potentially Useful Practices/Scenarios

- Changed results are clearly flagged as such in the EHR (e.g., marked as “amended”).

Assessment Notes

Follow-up Actions

Person Responsible for Follow-up Action

reset page

Recommended Practice

2.5 When test results are changed or amended, the ordering clinician and other clinicians responsible for follow-up are notified electronically. For clinically significant changes, the clinicians are also contacted directly.[39]
Checklist

Implementation Status

Off

Rationale for Practice or Risk Assessment

Results that are subsequently changed carry a significant potential for delayed or wrong treatment based on outdated, incorrect results.

Suggested Sources of Input

Clinicians, support staff, and/or clinical administration

Diagnostic services

EHR developer

Health IT support staff

Examples of Potentially Useful Practices/Scenarios

- The individual changing the results is responsible for notifying appropriate clinicians of those changes. Electronic systems may not always ensure that a critical communication was received and reviewed promptly, and thus for clinically important changes to results, appropriate clinicians should be contacted directly.[10]
- Policies and procedures ensure that changes in test results and accompanying documentation are effectively communicated to the appropriate clinicians responsible for patient care, including after the patient has transitioned to another setting of care.

Assessment Notes

Follow-up Actions

Person Responsible for Follow-up Action

reset page

Recommended Practice

2.6 "Send-out" (or reference lab) tests are electronically tracked, and their results are incorporated into the EHR, with a coded test name, result value, and interpretation.
Checklist

Implementation Status

Off

Rationale for Practice or Risk Assessment

"Send-out" tests are vulnerable to loss to follow-up.[40]

Suggested Sources of Input

- Clinicians, support staff, and/or clinical administration
- Diagnostic services
- EHR developer
- Health IT support staff

Examples of Potentially Useful Practices/Scenarios

- The EHR facilitates the tracking of "send-out" tests at the point of ordering and provides a mechanism to allow clinicians or organizations to incorporate these results into the EHR and assign them to the correct patient.
- Procedures exist to ensure that all test results, including those received from outside the organization through fax or mail, are properly incorporated into the EHR.

Assessment Notes

Follow-up Actions

Person Responsible for Follow-up Action

reset page

Recommended Practice

2.7 Written policies specify unambiguous responsibility for test result follow-up with a shared understanding of that responsibility among all involved in providing follow-up care.[4, 6, 10, 13, 14, 33, 36, 41, 42, 43]
Checklist

Implementation Status

Off

Rationale for Practice or Risk Assessment

New workflows resulting from the introduction of EHRs can introduce new hazards related to miscommunication of responsibility for follow-up. Ambiguous responsibility increases the risk of follow-up failure.

Suggested Sources of Input

Clinicians, support staff, and/or clinical administration

Diagnostic services

Examples of Potentially Useful Practices/Scenarios

- In the outpatient setting, the ordering provider is responsible for follow-up unless he or she delegates this responsibility (e.g., to a covering provider). Delegation should be documented in the EHR and accepted by the delegate.[44]
- Ordering clinicians in any setting assume responsibility for follow-up care, unless that responsibility is unambiguously transferred to another clinician who accepts responsibility.[36]

Assessment Notes

Follow-up Actions

Person Responsible for Follow-up Action

reset page

Recommended Practice

2.8 Workflows that are particularly vulnerable to mishandling of test results, especially critical ones,[32] are identified,[45] and back-up procedures ensure test results are received by someone responsible for the affected patient's care.[6, 39]
Checklist

Implementation Status

Off

Rationale for Practice or Risk Assessment

Lost or mishandled test results, especially critical ones, are a significant risk to patients, especially in situations where workflows are particularly vulnerable to such failures (e.g., shift changes, transitions of care).[46]

Assessment Notes

Follow-up Actions

Person Responsible for Follow-up Action

reset page

Suggested Sources of Input

Clinicians, support staff, and/or clinical administration

Diagnostic services

EHR developer

Health IT support staff

Examples of Potentially Useful Practices/Scenarios

- Situations that are vulnerable to test results follow-up failures are identified.[47, 48, 49] These include handoffs between clinicians (e.g., between residents, part-time physicians, ER physicians, and hospitalists),[46] and care transitions[15, 50, 51] between clinical settings (e.g., between different units of a hospital; between the hospital and home or a post-acute facility). In these situations, processes should be in place to ensure that test results are communicated to a clinician responsible for follow-up care.[44]
- Life threatening results are notified through verbal means to ensure positive confirmation of receipt.[10]
- Notifications of abnormal test results that remain unacknowledged after a pre-specified time period are forwarded (or escalated) to an alternate responsible provider.[36, 52]
- Diagnostic services should ensure that test results are communicated to a back-up provider in a timely fashion in the event that the ordering provider is not available. The necessary timeliness is dependent on the significance of the test result.[53]
- The organization maintains an updated contact list of all practicing providers, and this list includes their coverage schedules.[9, 36]
- The organization maintains a patient-provider link (e.g., patient's PCP is identified) in the EHR as a back-up. In the event that the ordering provider does not acknowledge the result, a responsible clinician in the ordering practice must be notified.

Recommended Practice

2.9 Results outside normal reference ranges, or otherwise determined to be abnormal, are flagged (i.e., presented in a visually distinct way).[6, 10]
Checklist

Implementation Status

Off

Rationale for Practice or Risk Assessment

Although absence of flags does not necessarily mean that the result is normal, flagging can reduce the likelihood of missing abnormal or critical results.

Suggested Sources of Input

Diagnostic services

EHR developer

Health IT support staff

Examples of Potentially Useful Practices/Scenarios

- Abnormal results are flagged (e.g., bolded font, asterisk beside values, use of “H” or “L,” different colors) or marked for better visualization in the EHR.
- Color is not used as the only visual indicator of clinical significance.
- Critical values are flagged in a distinct way from simply abnormal values.

Assessment Notes

Follow-up Actions

Person Responsible for Follow-up Action

reset page

Recommended Practice

2.10 Display of results (e.g., numeric, text, graphical, image) should be easily accessible, clearly visible, not easily overlooked, and understandable.
Checklist

Implementation Status

Off

Rationale for Practice or Risk Assessment

Missed or misunderstood test results as the consequence of a poorly designed human-computer interface are as dangerous to patients as lost or wrong results. Results visualization and display should maximize safety to ensure critical information is not missed.

Assessment Notes

Follow-up Actions

Person Responsible for Follow-up Action

reset page

Suggested Sources of Input

Diagnostic services

EHR developer

Health IT support staff

Examples of Potentially Useful Practices/Scenarios

- Displays of test results undergo usability testing for the intended clinical users.
- Information is displayed in columns that are sufficiently wide to allow review of all pertinent information (i.e., providers do not need to drag columns on the user interface to detect abnormalities).[12]
- Multicomponent results are reported together (e.g., lupus anticoagulant has 2-3 subcomponents that may be individually positive or negative but should be reported together).
- Result details are reported on one screen, eliminating the need for horizontal scrolling. For example, providers should not have to use additional scrolling (e.g., on the “next page”) to access critical information.[6, 12]
- Most recent test results should by default be displayed first (e.g., either at the top of a row-based display or at the left side on a columnar display) to ensure that clinicians are always aware of current data.[54]

Recommended Practice

2.11 Automated non-interruptive results notifications (also called "in-basket alerts" or flags) are limited to those that are clinically relevant to minimize "alert fatigue."[4, 12, 14, 32, 41, 42, 55, 56]

Checklist

Implementation Status

Off

Rationale for Practice or Risk Assessment

Information overload from too many alerts is associated with more missed test results.[57] Results that are poorly displayed increase risk of misinterpretation or being overlooked completely.

Assessment Notes

Follow-up Actions

Person Responsible for Follow-up Action

reset page

Suggested Sources of Input

Diagnostic services

EHR developer

Health IT support staff

Examples of Potentially Useful Practices/Scenarios

- A multi-disciplinary committee that includes frontline clinicians decides which abnormal test results should be sent as high priority alerts.
- In integrated healthcare delivery networks that have a combined in-patient and ambulatory EHR, ambulatory clinicians have the option to turn off inbox result notifications for their patients while they are admitted in the inpatient environment.
- Notifications of a patient's results are batched (aggregated) by type and/or date to minimize the number of notifications and the cognitive load of notification processing.
- The organization monitors providers' inboxes (i.e., the total number of alert notifications sent to providers).
- The organization provides workflow support to help a provider when the number of unread notifications in his or her inbox grows large.

Recommended Practice

2.12 Results notifications remain in clinician inboxes until a clinician action occurs to address them.[4, 12, 58]
Checklist

Implementation Status

Off

Rationale for Practice or Risk Assessment

If notifications drop off, clinicians can miss results.

Suggested Sources of Input

Clinicians, support staff, and/or clinical administration

Health IT support staff

EHR developer

Examples of Potentially Useful Practices/Scenarios

- Notifications remain in the inbox until acted on (e.g., when a clinician signs or actively removes them).

Assessment Notes

Follow-up Actions

Person Responsible for Follow-up Action

reset page

Recommended Practice

2.13 There is an EHR-based process for clinicians to either assign surrogates[6, 9, 48, 59] for reviewing notifications or enable surrogates to access the principal clinicians' inboxes.
Checklist

Implementation Status

Off

Rationale for Practice or Risk Assessment

Not using surrogate features and functions appropriately increases risk of loss of test result follow-up.

Suggested Sources of Input

Clinicians, support staff, and/or clinical administration

Health IT support staff

EHR developer

Examples of Potentially Useful Practices/Scenarios

- If clinicians plan to be away, they assign a covering clinician to whom the system can automatically forward test results or alert clinicians sending messages that they are unavailable and another provider is covering.
- The organization has policies and procedures that establish expectations for timely review of test results and specifically address planned and unplanned absences.

Assessment Notes

Follow-up Actions

Person Responsible for Follow-up Action

reset page

Recommended Practice

2.14 There are mechanisms to forward results and results notifications from one clinician to another.[12, 41]
Checklist

Implementation Status

Off

Rationale for Practice or Risk Assessment

Notifications sometimes are sent to incorrect clinicians, and this functionality allows clinicians to forward them to the correct person.

Suggested Sources of Input

Clinicians, support staff, and/or clinical administration

Health IT support staff

EHR developer

Examples of Potentially Useful Practices/Scenarios

- In addition to automatic forwarding, such as when a clinician is on vacation, forwarding can be manually performed by a clinician for a specific notification (e.g., when the notification is transmitted to the incorrect clinician).
- Mechanisms are in place for tracking acknowledgment and acceptance of forwarded notifications.

Assessment Notes

Follow-up Actions

Person Responsible for Follow-up Action

reset page

Recommended Practice

2.15 Summarization tools to trend and graph laboratory data are available in the EHR.[60]
Checklist

Implementation Status

Off

Rationale for Practice or Risk Assessment

Displaying certain laboratory test results over time helps identify clinically relevant anomalies or trends. Summarization tools in the EHR improve visualization, interpretation, and accessibility of results.

Suggested Sources of Input

EHR developer

Health IT support staff

Examples of Potentially Useful Practices/Scenarios

- The EHR incorporates tools and reports that enable selected laboratory results to be graphed and displayed to view trends over time. The associated graphs follow standardized display criteria.[60]

Assessment Notes

Follow-up Actions

Person Responsible for Follow-up Action

reset page

Recommended Practice

2.16 Test results can be sorted in the clinician's EHR inbox according to clinically relevant criteria (e.g. date/time, severity, hospital location, patient).[6, 12, 39, 42]
Checklist

Implementation Status

Off

Rationale for Practice or Risk Assessment

Clinicians need ways to prioritize results review so that they can address the most pressing issues first and cope with information overload.[61] Sorting also improves visualization and accessibility of results.

Suggested Sources of Input

EHR developer

Health IT support staff

Examples of Potentially Useful Practices/Scenarios

- Results can be sorted according to important parameters (e.g., date, type, read/unread, urgency, patient, location).

Assessment Notes

Follow-up Actions

Person Responsible for Follow-up Action

reset page

Recommended Practice

2.17 The EHR has the capability for clinicians to set reminders for themselves and other responsible clinical staff for future tasks to facilitate test result follow-up.[42, 62]
Checklist

Implementation Status

Off

Rationale for Practice or Risk Assessment

The EHR can help clinicians follow-up with patients regarding test results.[63] Unless they set reminders for themselves, clinicians may forget about follow-up tasks that they need to do.[64]

Suggested Sources of Input

EHR developer

Health IT support staff

Examples of Potentially Useful Practices/Scenarios

- The EHR has a function for setting a reminder for a follow-up action due on a future date.[37]

Assessment Notes

Follow-up Actions

Person Responsible for Follow-up Action

reset page

Recommended Practice

3.1 As part of quality assurance activities, organizations monitor selected practices related to test result reporting and follow-up. Monitored practices include clinician use of the EHR for the test results review and clinician follow-up on abnormal test results.[4, 5, 6, 13, 36, 39, 48, 65, 66, 67, 68]
Checklist

Implementation Status

Off

Rationale for Practice or Risk Assessment

Effective quality assurance patient safety programs include monitoring of core clinical metrics.[69] Errors related to missed or delayed follow-up of test results are a significant cause of adverse events that harm patients.

Assessment Notes

Follow-up Actions

Person Responsible for Follow-up Action

reset page

Suggested Sources of Input

Clinicians, support staff, and/or clinical administration

Health IT support staff

EHR developer

Examples of Potentially Useful Practices/Scenarios

- The organization has in place processes to monitor and report alert responses (e.g., acknowledged or not,[34] time to acknowledgment)[9] and test result follow-up with patients.[5]
- Clinicians document communication of test results to patients in the EHR.[70]
- Organizational quality assurance activities select and measure test results-related benchmarks for ongoing monitoring, starting in areas of identified concern and high risk.[47] For example, an organization could develop a measurement system for test results reporting using measures along the following lines:
  - Percentage of all active clinicians who have reviewed at least one laboratory test result in the EHR within the last month. If the percentage is greater than 95 percent, this measure could indicate if the EHR is perceived as the "source of truth" for laboratory test results versus dependence on paper-based communication.
  - Test results with the lowest follow-up rate are investigated to understand the root causes of the problem. [6, 67]
  - Percentage of all test results reviewed by the ordering provider within four days, or sooner if results are considered more urgent, should be greater than 90 percent.
  - Results not reviewed for more than one week should be minimal.

Recommended Practice

3.2 As part of quality assurance, the organization monitors and addresses test results sent to the wrong clinician or never transmitted to any clinician (e.g., due to an interface problem or patient/provider misidentification).[25, 36]
Checklist

Implementation Status

Off

Rationale for Practice or Risk Assessment

When test results are "lost in the system," there is a danger that there will be no follow-up, posing a significant risk of patient harm.

Suggested Sources of Input

Clinicians, support staff, and/or clinical administration

Diagnostic services

EHR developer

Health IT support staff

Examples of Potentially Useful Practices/Scenarios

- Error logs are used to detect results such as those that were never delivered, results without any ordering provider, or results with unidentifiable providers.
- National Provider Identification (NPI) numbers are used for provider attribution of orders.
- Monitor provider master files (e.g., address book) to ensure that they are synchronized to avoid scenarios in which the ordering provider's contact information is outdated or unknown.

Assessment Notes

Follow-up Actions

Person Responsible for Follow-up Action

reset page

Recommended Practice

3.3 Organizational policies and procedures ensure timely patient notification of both normal and abnormal test results and the timeliness of notification is monitored.[71]
Checklist

Implementation Status

Off

Rationale for Practice or Risk Assessment

Failure in timely patient notification of test results is a major source of diagnostic error and liability. Standardized policies and procedures for timely patient notification reduces the risk of loss of follow-up.

Assessment Notes

Follow-up Actions

Person Responsible for Follow-up Action

reset page

Suggested Sources of Input

Clinicians, support staff, and/or clinical administration

Diagnostic services

Examples of Potentially Useful Practices/Scenarios

- National VA policy ñCommunicating Test Results to Providers and Patientsò Directive 1088 states that: ñIt is VHA policy that all test results must be communicated by the diagnostic provider to the ordering provider, or designee, within a time-frame that allows for prompt attention and appropriate action to be taken. All test results requiring action must be communicated by the ordering provider, or designee, to patients no later than 7 calendar days from the date on which the results are available. For test results that require no action, results must be communicated by the ordering provider, or designee, to patients no later than 14 calendar days from the date on which the results are available. Depending on the clinical context, certain test results may require review and communication in shorter time-frames.ò
- Notification of test results to patients is monitored for timeliness (i.e. did the provider notify the patient within the correct time frame).
- Certain time sensitive test results, as well as results for which clear, unambiguous communication is essential (e.g., HIV status, cancer diagnosis), are discussed in-person or via the telephone rather than using asynchronous electronic means (e.g., secure messaging, voice-mail, or patient portals).
- Organizations use patient portals to automatically release test results to patients who have activated their accounts. A link to lab test interpretations (such as http://labtestsonline.org/) is provided to portal users to explain their test results in more detail.
- For patients who have not activated their on-line accounts, traditional methods such as letter or phone calls are used to inform patients of their results on a timely basis.
- If unable to confirm patient communication and acknowledgment for abnormal results, alternative strategies are used to ensure follow-up (e.g., if secure message is not read, then telephone or send a letter).

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